In the Zone:
2005 Airshed Zones Conference

Final Report and Conference Proceedings

Prepared by the
Airshed Workshop Organizing Committee
For the
Clean Air Strategic Alliance
Board of Directors

March 2006

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2005 Airshed Zones Conference
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Clean Air Strategic Alliance

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By consensus, the CASA board of directors approved this report and the recommendations within at its December 1, 2005 meeting.

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In addition, this conference would not have been a success without the help and volunteer time of the CASA Airshed Conference Organizing Committee.

About CASA

The Clean Air Strategic Alliance (CASA) is a non-profit association composed of stakeholders from three sectors – government, industry and non-government organizations such as health and environmental groups. All CASA groups and teams, including the board of directors, make decisions and recommendations by consensus. These recommendations are likely to be more innovative and longer lasting than those reached through traditional negotiation processes. CASA's vision is that the air will be odourless, tasteless, look clear and have no measurable short- or long-term adverse effects on people, animals or the environment.

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Acronyms and Abbreviations

ADMS	Atmospheric Dispersion Modelling System
AENV	Alberta Environment
AHW	Alberta Health and Wellness
AMD	Air Monitoring Directive
AOPA	Agricultural Operations Practices Act
BAM	Beta Attenuation Monitor (a PM monitor)
BTEX	Benzene, toluene, ethylbenzene, xylene
CASA	Clean Air Strategic Alliance
CCME	Canadian Council of Ministers of the Environment
CEMA	Cumulative Environmental Management Association
CFO	Confined Feedlot Operation
CH_4	Methane
CHR	Calgary Health Region
CWS	Canada Wide Standard
EPA	Environmental Protection Agency
ER	Emergency Response
EUB	(Alberta) Energy and Utilities Board
FAP	Fort Air Partnership
GDAD	Guidance Document on Achievement Determination
H_2S	Hydrogen sulphide
ILO	Intensive Livestock Operation
LICA	Lakeland Industry and Community Association
NAPS	National Air Pollution Surveillance
NGO	Non-Government Organization
NMHC	Non-Methane Hydrocarbon
NOx	Nitrogen oxides (or Oxides of nitrogen)
NPO	Non-Profit Organization
PAMZ	Parkland Airshed Management Zone
PAS	Palliser Airshed Society
PASZA	Peace Air Shed Zone Association
PM	Particulate matter
QA/QC	Quality assurance/Quality control
RHA	Regional Health Authority
SDCC	Sustainable Development Coordinating Committee
SIA	Strathcona Industrial Association
SO_2	Sulphur dioxide
SOP	Standard Operating Procedure
TEOM	Tapered Element Oscillating Microbalance (a continuous PM monitor)
TRS	Total Reduced Sulphur
VOCs	Volatile Organic Compounds
WBEA	Wood Buffalo Environmental Association
WCAS	West Central Airshed Society

1 Airshed Zones and CASA[1]

Many of Alberta's air quality issues are local, both in their cause and the solutions that are required to address them. In such cases, province-wide approaches are often inappropriate and inefficient. An increasingly attractive alternative is the establishment of airshed zones. Airshed zones are guided by local or regional multi-stakeholder non-profit societies who make decisions by consensus. These societies work within a designated area to monitor, analyze, and report on air quality, and they recommend and implement actions to improve air quality within that zone.

Using airshed zones to address regional air quality issues is an innovative approach that arose from the Clean Air Strategy for Alberta.[2] At public meetings and in written submissions, Clean Air Strategy participants identified local air quality issues and problems as a priority, which led to goal G of the Strategy: to "develop and implement a zone approach to managing air quality within specific airsheds."[3] In some areas, stakeholders had already been working together to identify local air quality issues and solutions, and were in a good position to formalize their approach by setting up an airshed zone. The first zone was established in March 1995 in the west central region of the province. Since then, six more airshed zones have been formed, and several more are in the planning stages.

Regional airshed zones have a number of benefits. Among other things, zones:

- improve existing monitoring in the region,
- make local and regional monitoring systems more efficient,
- collect data to address regional air quality concerns, and
- obtain information about regional air quality.

Zones also offer flexibility in the way air quality issues are addressed, and this approach tends to make the monitoring and management of air quality both more efficient and more cost-effective. Airshed zones have become an important partner in addressing air quality issues in many regions of the province. Not all zones followed exactly the same process in their formation and management approach, and as more zones were established and existing ones evolved, it became important to clarify the roles and relationships among the partners (CASA, Alberta Environment and the zones themselves) and to update the original CASA airshed zones guidelines.

A CASA project team was charged with these two tasks, and reported to the board in the fall of 2004. One of the team's recommendations was that a zones workshop be held in 2005 to allow existing and emerging zones to share experiences and ideas and address common concerns.

[1] Much of the text in this section is adapted from the Final Report of the Airshed Zones Project Team to the CASA board in September 2004.
[2] The Clean Air Strategy for Alberta was an 18-month process undertaken at the request of the Ministers of Energy and Environment in 1990-1991 and was guided by a multi-stakeholder Advisory Committee. One of the recommendations was the establishment of the Clean Air Strategic Alliance.
[3] *Clean Air Strategy for Alberta, Report to the Ministers*. 1991. p.50.

2 The 2005 Airshed Zones Conference

The Airshed Workshop Organizing Committee was formed in early 2005 (see Appendix A), with the primary task of organizing the airshed zones conference. The conference proceedings are part of this report. Co-chairs Lisa Strosher and Bob Scotten welcomed approximately 200 delegates to this first zones conference, including individuals from Ontario, BC and Saskatchewan (see Appendix B). They also thanked the sponsors for their enthusiastic support and the presenters who so willingly and capably provided their expertise and shared their experiences.

3 Recommendations to the CASA Board

Introduction

Currently, Alberta has seven airshed zones that have been endorsed by CASA with work ongoing in the development of several others. Despite the differences in mandate, location and boards of directors, all of these zones share many common issues and concerns. Chief among them is the establishment of clear lines of communications between airsheds, and the development of a venue where the common barriers to airshed development, growth and operation can be discussed.

Within this context, many participants of the In The Zone conference supported the development of an ongoing process to facilitate communication and understanding between airshed zones. Specifically, it was recognized that more information and open discussions pertaining to issues common to all airshed zones were required. Air quality, health, transportation and sustainable funding were some of the broad issues identified by the conference participants.

To that end, the CASA Airshed Workshop Organizing Committee feels that there is a need for an Alberta Airshed Council to be formed. It is envisioned that this council will provide a forum for airshed zones and other key stakeholders to discuss their common issues and concerns with a view towards more efficient communication and problem identification. The Alberta Airshed Council should operate as an independent organization that is responsible for all aspects of its operation. The CASA Secretariat will facilitate the formation of the council by convening its first meeting.

4 The Airshed Zones Conference – Presentations[4]

4.1 Beyond the Silos: Alberta Environment and a Shared Future, by Peter Watson

Peter Watson, Deputy Minister of Alberta Environment (AENV), stressed the commitment of his department to partnerships with organizations such as CASA and the province's airshed zones. He discussed the three themes that have become touchstones for AENV: leading the way, working together and making a difference, and noted how CASA has succeeded in each of these areas with respect to air quality in Alberta. Government is looking for ways to work more effectively across ministries to ensure that policies and approaches are aligned to achieve common environmental outcomes. A specific example is the commitment made by AENV, Alberta Energy and Alberta Sustainable Resource Development to work to better integrate their departmental policies and programs to protect the environment and improve natural resource management. To meet goals for Albertans, government must move past the conventional ministry-by-ministry approaches. Peter commended CASA and the airshed zones for their multi-stakeholder approach and what it has accomplished to date.

Q: I appreciate the efforts these three departments are making towards integration, but why wasn't the Agriculture department included? I see them as a key ministry in dealing with environmental matters.

Peter Watson: It was not because we didn't recognize Agriculture's role and the need to partner with them. Rather it was more related to the historical relationship of these three ministries through the government's Sustainable Development Coordinating Council (SDCC). The SDCC includes all ministries that have some role or influence on environmental outcomes. It is co-chaired by these three ministries and they felt they needed to start there. But we think this idea will spread across government and we are working with Alberta Agriculture, Food and Rural Development on a host of issues.

4.2 CASA and Airshed Zones, by Donna Tingley

Donna Tingley, executive director of CASA, presented an overview of the CASA process and successes, and looked specifically at airshed zones and their role. The three stakeholder groups that formed CASA – industry, government and non-government organizations – have developed, refined and successfully used a collaborative approach with consensus at its centre. Through consensus-based decision making, the sectors share responsibility and support the strategic decisions made by the CASA board. A key CASA principle is that all those who have a stake in the outcome need to be part of the process of developing solutions. At present, CASA has 12 active teams. Donna referred to some of the major CASA successes, including the development of an emissions management framework for the electricity sector and the framework that has led to substantial reductions in emissions from solution gas flaring and venting. Airshed zones were one of the original recommendations of the Clean Air Strategy for Alberta process in the early 1990s, and were established to develop local solutions to local and regional air quality issues. She also directed delegates to the recently updated document on airshed zones guidelines, which describes in more detail the structure and function of zones.[5]

[4] Individual presentations may be found in their entirety on the CASA website at: www.casahome.org.
[5] This document is available on request to the CASA office or online at www.airsheds.ca.

4.3 Alberta Environment and Air Quality Management, by Albert Poulette

Albert Poulette is Regional Compliance Manager for the Northern Region of Alberta Environment. Albert noted that airshed formation and development are strategic priorities for Alberta Environment, and that the department sees airsheds as a better way to do business. The airshed concept works for Albertans, offering greater involvement for those who affect air quality, and opportunities to engage and empower those who are locally affected. AENV is committed to airshed sustainability, making contributions of expertise, management support, resources and funding. He summarized some of the recent partnership highlights with zones, including education initiatives, assistance in forming new zones, and support for monitoring. Looking ahead, the department is expected to approve an airshed grant program for ongoing support as well as allocate some resources for monitoring equipment. AENV is interested in exploring new ideas that zones might have for other partnerships.

Q: As a public member of a zones board, we often hear comments from our stakeholders that the zones and synergy groups are simply downloading from AENV and Alberta Energy. I appreciate the efforts of the government, but how would you respond to this concern?

Albert Poulette: This is often the first question that comes up with new zones. We believe that zones are a more inclusive way to do business. AENV provides funds, people, and other support, but we still have to have a regulatory backstop and we do. AENV has been looking for other ways to do things and zones are a way to get people involved and working to achieve common objectives.

4.4 Perspectives on Airshed Zones

4.4.1 Non-Government Organization Perspectives, by Martha Kostuch

Martha Kostuch is a veterinarian in the Rocky Mountain House area. She is involved with many environmental organizations and has actively participated on a number of CASA teams as well as the Parkland Airshed Management Zone (PAMZ). Martha provided an overview of the roles played by NGOs, most of which rely on volunteers to participate in various processes and boards. Although NGOs don't specifically represent the public, they try to ensure that members of the public have opportunities to be involved in decision-making processes, and ensure that the processes and outcomes are transparent. NGOs strongly supported the formation of an airshed in the Red Deer area, which eventually became the PAMZ, as a way of making sure that monitoring was providing useful information and resources were allocated effectively. CASA and the zones are a sound way for stakeholders to collaborate and develop better working relationships. Zones have led to better air quality monitoring in Alberta: there is now monitoring for more substances in more places, better sharing of the information, improved use of the monitoring data in making decisions and policy, and better communications and education in the zones themselves.

4.4.2 Municipal Perspectives, by Phyllis Kobasiuk

Phyllis Kobasiuk is the mayor of Parkland County west of Edmonton; she has served as an elected municipal official since 1989 and as a member of the CASA board. Parkland County is involved with the West Central Airshed Society and is a strong supporter of the airshed approach. Zones give people an opportunity to participate in addressing local air quality issues, and when there is clear support from local residents and businesses, it generates support and buy-in from elected officials. Zones facilitate and encourage local and regional action in support of larger global issues. Phyllis noted the recent health impact study done in the Wabamun area to measure certain aspects of residents' health and determine what they were being exposed to through the air. The study also collected data about the exposure of children to heavy metals and other compounds. The results are expected in early 2006.

4.4.3 An Industry Perspective, by Don Thompson

Don Thompson is Corporate Secretary with Syncrude Canada and is also Syncrude's General Manager of Environment, Health and Safety. His presentation focused on Syncrude's experience with the Wood Buffalo Environmental Association in northeastern Alberta and looked in detail at why industry strongly supports the airshed approach. Airshed monitoring provides an opportunity for all local parties to participate, and is transparent and objective. Don noted that the airshed zone model has been adapted and used to address other issues in the Wood Buffalo area, including human health monitoring, terrestrial effects monitoring, and monitoring of aquatic systems. Zones are an opportunity to effectively integrate research and monitoring activities in a way that is reliable and trusted. The outcome has been enhanced community and stakeholder confidence and compliance in an effective and efficient manner that has enduring value to all stakeholders.

4.4.4 Discussion

Q: I commend Syncrude and other partners on demonstrating the advantages of the CASA principles of collaboration and data sharing through the airshed process. Do you think we will have to wait until watershed groups are formed before we have the same sharing of water data?

Don Thompson: A lot of the data is already there from physical monitoring of water. Ongoing water management issues in the region, such as in-stream flow needs, are being looked at through the Cumulative Environmental Management Association (CEMA). I think water management is coming together and these issues are in the public forum already.

Comment from same questioner: I have recently finished a report on hydrometrics and other monitoring, and identified a number of stations in the Fort McMurray area that are proprietary. I'd like to talk with you over a break about this.

Q: This is a question for all the panelists: What promising direction does each of you see for the CASA process? Can we look forward?

Phyllis Kobasiuk: I sit on the CASA communications committee. Communications is always a challenge. If people don't understand the issues, it's harder to get them to take action. CASA has done a lot of good work and we want to build on that.

Martha Kostuch: I see two main areas that need emphasis: a) improving air quality in Edmonton and Calgary, and b) the need for more zones to get involved in developing management plans. There is a strong need for airsheds in Edmonton and Calgary and getting them going will require continued support from AENV, CASA, and all stakeholders in these areas. The second area is airshed involvement in managing air issues. To date, most zones have focused on gathering information and data, but I think they have a role in management.

Donna Tingley: I also see two areas. The first is risk communications. It's challenging for people to put in perspective the risks they face in their lives, and this area needs more work. The second is exposure education, specifically, "what things are affecting me and what can I do about it." Studies show personal exposure and lifestyle are areas where people can take charge.

Q to Don Thompson: I'd like to challenge your comments about a company's core business. I'm concerned about the emphasis that an airshed's role and focus should be on compliance. This is the end use, not the main driver. Just because air quality is changing, and maybe concentrations are going up but are still well below the standard or objective, the conclusion would be that air quality is still good, but that's not true. I don't think an airshed should be driven by compliance monitoring.

Don Thompson: Syncrude has an air licence and, in my view, compliance is a core business. I also talked about the need to monitor trends. Trends are important, so we need the right stations in the right places to pick them up. I don't disagree with you, but as an industry representative, we must comply with the requirements in our licence.

Martha Kostuch: One of the roles of airsheds is to provide compliance information and they take that role very seriously. But the real goal is better air quality. Just because emitters are complying with their licences doesn't mean you have good air quality. We need to go beyond compliance to measure and share information about air quality so individuals can make decisions about their own health and the health of the environment. Pollution prevention and continuous improvement are high priorities for PAMZ.

Phyllis Kobasiuk: The public is pushing the envelope. Standards are important and the environment is higher on their list of issues. People choose where they want to live, and air quality and environmental quality are factors in these decisions.

Q to Martha Kostuch: What two things could government do in the areas of education and funding to improve air quality in Alberta?

Martha Kostuch: I don't think this is the role of the government. The Government of Alberta is a partner in air quality management and that includes education. AENV's role relates to enforcement and regulation. With respect to education, zones have a lot of scope. And there have been improvements in funding to the department. But I am concerned about AENV's ability to have continued funding and resources available to implement the partnerships they've made with CASA. What structures are in place to ensure these commitments are there for the long term? For example, there were a number of commitments from the Electricity Project Team's work, and various commitments related to PM and ozone, acid deposition, and other areas. Every time we implement a framework, we have to put pressure on AENV to ensure the people and resources are available to implement them.

4.5 Overview of Airshed Zones

This session of the conference featured overview presentations from the executive directors or managers from each of the six existing airshed zones and from the Lakeland Industry and Community Association.[6]

4.5.1 West Central Airshed Society, by Bob Scotten

The West Central Airshed Society (WCAS) is celebrating its tenth anniversary as Alberta's first official zone. WCAS arose out of interest in the community in having continuous air quality information data to know more about short-term events and to help determine long-term trends. A group of stakeholders worked to establish the zone and agreed to use CASA's consensus model. WCAS now has 81 members and a board with members from ten sectors. The executive director oversees the society's two major monitoring programs (ambient air monitoring and agricultural bio-monitoring) and personnel including an environmental engineer and technical contractors. WCAS is based in a predominantly rural area and has focused its monitoring program in non-urban areas to avoid issues like major vehicle emissions. The airshed recently expanded its boundaries and added several stations from industrial partners, plus stations in Drayton Valley and Hinton. Emerging issues include more monitoring as sour gas reserves are developed in the Pembina Basin, and a possible expansion of the zone to the north. For more information, visit the WCAS website at www.wcas.ca.

4.5.2 Wood Buffalo Environmental Association, by Bob Scotten

The key driver for air quality monitoring in the Wood Buffalo area is oil sands development, which generates about 487,000 tonnes of emissions per year. Human health has been a big issue in the region and was a major concern for the Fort McKay community when the Wood Buffalo Environmental Association (WBEA) was first established. First Nations have been actively engaged with the WBEA all along. Other issues included odours, soil and water acidification, ground level ozone, direct effects on vegetation, heavy metal deposition and accumulation, smoke, and dust. The WBEA has strong stakeholder support and has developed and implemented a range of monitoring programs, as well as a strong communications program. For more information, visit the WBEA website at http://www.wbea.org/.

4.5.3 Parkland Airshed Management Zone, by Kevin Warren

The Parkland Airshed Management Zone (PAMZ) was formally established in 1997. PAMZ membership now includes more than 50 companies, government agencies, environmental groups, farmers, ranchers and members of the public. As well as monitoring air quality through the use of both passive and continuous monitors and the use of two portable stations, PAMZ collects the data for the specific purposes of identifying and prioritizing air quality issues and developing action plans to address them. Human health has been the top issue in the zone for some time, and intensive livestock operations (ILOs) are now an important issue as well. Most PAMZ monitoring has been done in areas where people live. Kevin presented

[6] Shortly after the conference, the Lakeland Industry and Community Association was approved by the CASA board of directors as Alberta's seventh airshed zone.

some data from PAMZ, noting a significant drop in SO_2 in the zone since monitoring began in 2000. PAMZ has a formal process for gathering public input to identify air quality issues in the zone. Current initiatives include more monitoring of ILOs, monitoring ozone and particulate matter downwind of Red Deer, monitoring air quality in medium-sized towns in the zone, baseline monitoring in areas with planned extensive coalbed methane operations, a vehicle emissions testing program, and a human health monitoring program that is being developed. For more information, visit the PAMZ website at http://www.pamz.org/.

4.5.4 Fort Air Partnership, by Myra Moore

The Fort Air Partnership (FAP) is located in the Fort Saskatchewan area northeast of Edmonton. FAP was formed in 1997 and has 15 board members. A key project was the study on volatile organic compounds (VOCs) done with Environment Canada, comparing results obtained in FAP with the five other cities where the study was also done. July results showed that FAP had lower concentrations for 143 of the 150 different VOCs than other cities in the study. The project has been extended to the end of March 2006. FAP has also placed a high priority on education and outreach projects, and received two grants to develop education tools, one of which is a package for use by junior high school teachers in the area. FAP's communications committee provides weekly air quality index reports to a local newspaper. A personal exposure study has also been done and FAP is planning for a comprehensive follow-up health study that meets the needs of all stakeholders. Future plans include looking at continuous BTEX analysis in the Scotford area; likely more ambient monitoring requirements due to expansions; regional acid deposition monitoring; an expanded passive monitoring study; and additional PM and ozone requirements as a result of the CASA PM and ozone management framework. For more information, visit the FAP website at http://www.fortair.org/.

4.5.5 Peace Air Shed Zone Association, by Kevin Warren

The Peace area in northwestern Alberta was identified as a region with substantial air emissions with numerous sources, and a long history of air quality concerns and conflict. The first stakeholder meeting was held in December 1999; the Peace Air Shed Zone Association (PASZA) was registered as a non-profit society in March 2001, and CASA endorsed the zone in March 2003. The main air quality issues for PASZA are human health, crop and vegetation effects, and ILOs. PASZA has four fixed continuous monitoring stations and 43 passives, with plans for two future continuous monitoring stations, including a portable, which will go to sites for one year at a time. Kevin presented some data from the passive monitoring on ozone, SO_2, and NOx. PASZA is currently focused on implementing the next phases of the regional monitoring program. A sub-committee has been formed to look at expansion of the southern boundaries. PASZA is participating on CASA's Confined Feeding Operations project team before deciding on further steps related to ILOs. For more information, visit PASZA's website at http://www.pasza.ca/home/.

4.5.6 Palliser Airshed Society, by Carleen Schaefer

The Palliser Airshed Society (PAS) was formed in September 2003 in response to air quality issues identified in the Medicine Hat region. A main driver was NOx levels and concerns about models indicating high ambient levels and potential impact on growth in the area, as Medicine Hat is at the center of both east-west and north-south highway corridors. Stakeholders felt there was a need to gather credible scientific information, and an airshed zone was formed. The PAS program was developed to consider public input, industrial influences, and air modeling results. The small size of this zone is a challenge, particularly in terms of funding. The City of Medicine Hat is both a municipal and an industry member of the zone. Carleen reviewed the monitoring results to date, and noted that PAS is working with others to organize science-related events for schools and community groups, and is also looking at possible expansion of the zone in southeastern Alberta. For more information, visit the PAS website at http://www.palliserairshed.ca/.

4.5.7 Lakeland Industrial and Community Association, by Glynis Carling

The Lakeland Industrial and Community Association (LICA) is based in east central Alberta, where there is a mix of local and regional industrial activity. LICA is an established synergy group with active participation by community, industry, government and NGO partners. The "place-based" approach is of interest to LICA and there is interest in having a phased and integrated approach to environmental monitoring, which could include air monitoring, water studies and lake monitoring, soil monitoring for potential acidification impacts, and biodiversity monitoring options. LICA is looking at becoming an umbrella organization that will likely encompass both an airshed zone and a watershed planning and advisory council, which provides an opportunity to share infrastructure and avoid duplication of resources. Regional air monitoring has been in place for two years; there are 20 passive stations in addition to the monitoring done by industry according to their operating approvals. LICA is formalizing its zone status and will apply for five approval amendments to rationalize industry monitoring requirements and to expand the regional monitoring network. Historical air quality monitoring data is also available, and there are currently no major air quality issues in the area. For more information, visit the LICA website at http://www.lica.ca/.

4.5.8 Discussion

Q to Kevin Warren: How long does PAMZ run the mobile units?

Kevin Warren: The Peregrine station stays in a location for at least one month and returns six months later for another month. Meteorological conditions have a big influence on air quality so we need to look at air quality under various conditions. The other portable station (Raven) is moved on a quarterly basis, staying in one place for about 90 days. This station was donated by industry and is old, so we don't want to move it as often. In 2006, we will be replacing this station with one that is identical to the other, so the time frame and use could change.

Q to Kevin Warren: Are there any areas where SO_2 levels have increased, even though average trends are down?

Kevin Warren: Overall in the zone, levels have gone down, although the northeast corner is still high and this is an area where we are now looking at more monitoring.

Q to Bob Scotten: The WBEA does not have sectoral representation, but do all 29 members have a seat on the board? How do they reach consensus?
Bob Scotten: It is hard to get consensus at times, as there is often a lot of discussion on challenging issues and some sectors don't always agree within themselves.

Q to Bob Scotten: As a comment, there had been at least one blowout in the Drayton Valley area prior to Lodgepole and people there had some major issues, which contributed to the formation of the WCAS. It is my understanding that the WCAS had a background station that was providing continuous air quality monitoring. What is the status of that station?
Bob Scotten: That would be the Hightower station, which has been down for a while. We had been paying about $130/month for power, but after deregulation, the power provider was allowed to charge consumers what their costs were and we were advised that electricity costs would go to about $35,000 per year. This was prohibitive so we decommissioned the site last year and are reviewing options for alternative power or for a new site.

Previous questioner, cont.: If you don't have background information, how can you tell what's happening to your trends?
Bob Scotten: We looked at other options for power, such as solar, wind, and our own diesel, but the cost was high and reliability was an issue. Running power from the grid would be very expensive. We've looked for a site further south in the grid so we could power the station and have phone lines. This means moving the station, which would affect continuity of the data. We have identified a couple of potential sites where Telus has towers and existing power, but it's a long process to get co-location approved; one of these sites is Athabasca Lookout. It's now mostly a matter of logistics, since AENV wants the site up and so do we.

Kevin Warren: PAMZ contributed to funding the Hightower site and used data from it. When we set up the Raven station, we started looking for a background site for PAMZ, and have been using Limestone Mountain. When winds come from the west it's a good site (97% of time), but there is a problem with all season access. PAMZ is not planning to look for another background site, but will revisit this issue in 2006.

Q to Kevin Warren: You presented an annual isopleth for ozone, but I suggest you should also look at this seasonally.
Kevin Warren: PAMZ does look at seasonal variations in ozone.

Q to Kevin Warren: The CASA communications committee has talked about putting data in local papers to provide information about local air quality to residents. Are we able to measure transboundary influences from other areas?
Kevin Warren: We think we are picking up some transboundary emissions in PAMZ but we are not set up to do this specific collection and analysis. However, others have looked at their data and come to the same conclusion. One event noted in the PM and ozone results could have been due to long distance transport.

Q to Carleen Schaefer: The main focus of PAS is on NOx emissions, which are created largely by transportation in the zone. Is PAS funded by any transportation agencies?

Carleen Schaefer: No. The railways were invited to participate and declined.

Comment: It does seem that no one representing railways, or transportation in general, is attending this conference.

Q: How do zones address conflicts that come up during discussions?

Kevin Warren: When PAMZ was forming, we had some assistance from CASA, so PAMZ bylaws allow members to address conflicts that come up. To date, PAMZ has had consensus on most issues. There have been some issues with membership, but bylaws enabled those to be addressed.

Q to Kevin Warren: Is the City of Grande Prairie participating in PASZA?

Kevin Warren: No. They were originally, and they have been invited to participate, not as a funding member, but to enable them to get information and have a say without having to be a funder. Efforts are underway to get them more involved.

Comment: It is very important to have municipal involvement in zones.

Q: What sort of time commitments are participants expected to make to a zone?

Kevin Warren: It varies. Boards typically meet five to six times a year, one meeting of which is the annual general meeting (AGM). Meetings usually last about three hours and roughly the same amount of time is needed between meetings to review materials and prepare. For committee members, it depends on the issues and whether they form sub-committees to look at additional items. The commitment could get to be significant if someone is on several committees. In 2004, PAMZ had a total of 2200-2400 in-kind hours for all activities.

Myra Moore: FAP meets about every month, and we are seeing a total of some 1500 in-kind hours per year for the whole board.

Carleen Schaefer: PAS meets five to six times per year, and one meeting is combined with the AGM; our numbers are similar to PAMZ.

Glynis Carling: LICA volunteer hours are high now because we are trying to get set up. The board meets ten times a year, as do committees. We have not tracked in-kind hours.

Bob Scotten: The WBEA governance committee meets monthly. Members also spend a lot of time providing input to various committees. WBEA general meetings are quarterly, and committee meetings vary. The WCAS board meets quarterly for one day each time. We also have an agriculture committee and a technical committee, and the total time is probably 800-1000 hours through the year.

Q: I am interested in the umbrella concept that LICA is looking at. Are there any regional groups providing this kind of support in other zones?

Myra Moore: The Northeast Capital Association also monitors regional groundwater in the FAP zone.

Kevin Warren: For the foreseeable future, PAMZ will be focused on air quality issues, but this is an interesting approach and bears watching.

Q: Alberta's two big cities are in a very different situation than most of the existing zones, given the urban setting and different emissions sources. Zones in the cities could get complex quickly. Do any of the presenters have any comments on how to proceed in Edmonton and Calgary?

Myra Moore: FAP is within the Edmonton Census Metropolitan Area so we are part of the PM and ozone work. FAP air quality is heavily influenced by Edmonton and there would be a lot of benefits to having a Capital Region zone, particularly in terms of data availability. Once there is more public data, we will see how zones are influenced and what the overall plan could be.

Kevin Warren: It is likely that the two cities are in areas that will need to develop a management plan for PM and ozone. Zones are a natural way to address this. The PM and ozone analysis will be done by January 2006 and areas that need to do a plan will have two years to develop one. This could drive zone formation in the two cities.

Q: What mechanisms are in place to find out what emissions are moving between zones? How can this be addressed from a design perspective as well as a data perspective?

Bob Scotten: Not a lot has been done to this point. One purpose of this conference was to bring people together to start to look for opportunities for airshed cooperation on common issues.

Kevin Warren: On most things, zones do work cooperatively. Maybe we need a formal zone association to do some of this coordination.

4.5.9 Summary

Session chair Lisa Strosher summarized presentations and discussion, noting that:

- Communications are an important area of activity for zones to get the word out to residents and others in the area.
- Funding is an important and ongoing challenge. Traditional funding for zones has relied on contributions from industry emitters, which could be a critical issue for large cities whose emissions are not predominantly from large industries.
- There is a general recognition of the need to look at forming new zones in areas where there aren't any.
- Zone formation is being considered in the Calgary-Bow Valley region, Edmonton, and the north-central area between WCAS and PASZA.
- A primary incentive for zone formation in Edmonton and Calgary is the recent assessment for PM and ozone, which suggests that both cities will need to prepare a management plan for ozone. A zone would provide a way to develop a local plan with multi-stakeholder input.

Lisa provided a few more details on airshed initiatives for Calgary and Edmonton. Much of the work to date in Calgary has been led by the Calgary Health Region (CHR), which is working with all levels of government, industry, NGOs and CASA on the development of a regional zone. Initial work began in the Bow Valley corridor in 2002, and in 2003, the CHR

began contacting stakeholders to determine their interest in participating in a zone. Multi-stakeholder meetings began in 2004 and by spring 2005, subgroups were formed to look at boundaries, membership and other issues. A formal board will be in place by the end of 2005. A subgroup has identified a number of air quality issues in the CHR, including transportation emissions, the need for improved ambient air quality monitoring, air quality and its effects on human health, industrial impacts on air quality, transboundary pollution impacts, wood smoke and home heating effects, the need to improve public knowledge about air quality, and issues arising from the PM and ozone management framework.

In Edmonton, discussions began in 2002, and several meetings have been held over the last three years, with the City of Edmonton involved. Issues were identified with respect to boundaries and whether the zone would do only air quality monitoring or become involved with air quality management. However, there was no clear driving force for zone formation, and AENV has let a joint contract to the Toxics Watch Society and the Sierra Club to consult with stakeholders in the Edmonton area, identify issues or concerns, determine their willingness to be involved with a zone, and report back to AENV by March 2006.

4.6 Process Considerations for Zones

4.6.1 Seven Steps to Zone Formation, by Bob Stone

Bob Stone, Director of Environmental Monitoring and Evaluation with Alberta Environment, described the various steps that stakeholders should consider when they wish to form an airshed zone. He referred particularly to CASA's Airshed Zones Guidelines pamphlet, which was updated in 2004 and is available on request to CASA or online at www.airsheds.ca. AENV believes zones are an effective leading edge approach for managing and understanding local and regional air quality issues. The impetus for forming a zone can be an issue, event, ongoing concern, or raised level of awareness, alone or in combination, which prompts local public concern about air quality. Bob described the rationale and value of zones, when they are an appropriate mechanism for responding to local and regional air quality concerns, attributes of zones, and the seven key steps in zone formation:

1. Recognize the "driver"
2. Should we have an airshed zone?
3. Seek participation and membership
4. Establish boundaries
5. Establish operational zone management systems
6. Find funding
7. Seek CASA endorsement

Discussion

Q: Calgary and Edmonton are unique compared with existing zones. For the cities, what are the drivers for getting people to the table? I don't see anything to convince councils to be involved. And in Edmonton's case, what about the outlying municipalities and industries? What can we use to make this happen?

Bob Stone: Yes, the cities are different and it has been a challenge. There has been some interest, but stakeholders are still struggling to find a focus. For Calgary, the health authority has taken a lead role, but Edmonton is different. There are licensed emission sources in Edmonton and surrounding area. We are also waiting to hear the results of the work being

done by the Toxics Watch Society and the Sierra Club. But a key driver is likely to be the requirement for the Census Metropolitan Areas to develop a management plan under the PM and Ozone framework, and we'll have that information shortly.

Comment: I compliment CASA on its ten years of work. But I see that most of the zones involve large areas of rural Alberta. My concern is that the population density of Alberta is in towns and cities, most of which are not in zones, while major emitters are outside the cities. If zones expand to a few more large geographical areas without movement in the major urban areas, the cities will be surrounded by functional zones. We might have trouble getting anything established in cities that takes into account what is happening outside their boundaries. This is a big issue in eastern Alberta where there are no zones. We need to think carefully about how boundaries are set and where zones are formed. This is also a concern for municipal politicians who are interested in equity and don't want to see part of their municipality covered and part left out. Efficiency is a concern too, since everyone is stretched for money.

Bob Stone: I agree. The challenge is to bring everyone on board. We would like to see monitoring expanded through the province.

Q: What is the authority of an airshed zone, once it's established? If they develop recommendations, for example, who will act on them? In cities, we see a lot of people driving around in cars; who takes responsibility for these emissions? Also, why isn't the Minister of Municipal Affairs involved?

Bob Stone: As we heard earlier, zones have become good at monitoring and establishing relationships, now they need to move more toward management. Most issues are local or regional and zones can resolve them within their boundaries. For broader issues at the provincial level, zones provide an opportunity to work collectively with the province. In terms of authority, individual parties are still responsible for their actions. With cars, these issues need to be brought to the attention of CASA and others. As far as Municipal Affairs is concerned, Alberta Environment has not approached them, and perhaps they should be invited to get involved. Zones could engage other departments if they feel it's needed and AENV would support them.

Q: First, is there an overseeing body for zones? And what would AENV like to see in terms of where zones should be, how many of them, what priorities should they have, etc.?

Bob Stone: No there isn't really any oversight agency or body. AENV does want to see monitoring expanded. Two-thirds of the sites contributing to the data warehouse are zones sites. Zones are locally driven, so AENV's preference is to see zones arise from public desire rather than be imposed. AENV wants to nurture interest where it arises. A CASA team is presently reviewing the monitoring network and strategy, but I'm not sure if this is part of its mandate.

Q: With Canada-Wide Standards coming into effect for PM and ozone, what will be done about areas that don't have zones?

Bob Stone: There is no zone in the High Level-Rainbow Lake area, so we don't know how close they are to the target. But we do know Edmonton and Calgary are close.

Comment: In trying to get a zone around Calgary, the thinking in the past has been balkanized, and it's good to see leadership from the health authorities. I think the health authorities generally need to shift their thinking a bit. Regional health authority (RHA) thinking has been focused on emergency data and other statistics as indicators of human health, but they need to start thinking more along the lines of finding correlations and looking at environmental health connectors.

Bob Stone: The RHA in the Peace River area has been involved and taken some leadership steps too.

Q: What is AENV's role in approving monitoring programs, funding, etc?

Bob Stone: AENV staff is involved in the zones, sitting on boards and the various committees. AENV doesn't approve zone plans *per se*, but if they submit a plan that requires approvals to be amended, there is a process to follow. AENV looks for a plan that ensures the same level of oversight that was provided in the approval. When a zone develops its monitoring plan, AENV staff on the board and technical committees provides their input so the plan will reflect department input, as they are part of the consensus approach. Among other things, AENV staff specifically consider if a company has a good environmental track record, how they deal with public complaints, have they had enforcement actions taken against them, and is there any kind of issue now. AENV is reluctant to amend approvals for operators that might be struggling and prefers to wait until things stabilize.

Carleen Schaefer: In some cases, zones have been able to rationalize monitoring and change a number of licences with one application.

Q: My experience with the Strathcona Industrial Association (SIA) is that conditions for companies joining the zone are part of the process for amending approvals. SIA has a monitoring program but not all emitters in the area are members and companies are not forced to join. If SIA joins a formal airshed, what would AENV do to involve those companies that are not now participating, but gain benefit from the current system?

Bob Stone: AENV advises companies as approvals are issued or renewed, that they can do their own monitoring or join a zone, and does encourage them to participate in a zone.

Bob Scotten: PAS worked closely with AENV to describe to companies in the region the benefits of participating in PAS. With AENV's close involvement in the presentations, it was clear to companies that this would be a good thing to do. Eight out of nine companies agreed to participate. Zone participation is not forced but is encouraged and it's effective.

Q: Canada's largest air force base is in the LICA region. How effective have other zones been in engaging federal government agencies? LICA has not been very effective in engaging them to date.

Bob Stone: Environment Canada has shown a lot of interest and is a member in some zones. In this case, it would be the Department of National Defence, so a different approach may be needed to engage them.

Carleen Schaefer: If PAS expands, they will aim to include the Suffield base, so it might be helpful to have Environment Canada involvement as a first step.

Comment: Zones may also have to deal with Transport Canada regarding airports.

Q: Whom should zones involve on transportation issues, given that many NOx emissions are from vehicles?

Bob Stone: This is a difficult question since there is no one single entity and a range of groups may need to be involved.

Comment: In our work towards an Edmonton zone, we have tried to get the Alberta Motor Association involved to represent the transportation sector. If other zones approached them they might be more interested in active engagement.

Comment: We may need some creative thinking about who to involve with transportation issues since the usual focus of transportation departments is building roads.

Bob Stone: Transportation doesn't just build roads so we need to ensure they are held accountable for other parts of their mandate.

Comment: Airsheds don't have the legal authority to require anyone to do anything. So how can we influence driving? We need to look at some of the benefits. Airsheds were started because industry saw them as way to save money or to do more monitoring for the same amount of money. There aren't the same drivers or benefits in Calgary and Edmonton, so we need to look at some of the other benefits and possible actions. More people at the table can exert some peer pressure. Education is another option to make the public and schools more aware. We also need to get a handle on broader participation and figure out how to bring non-point source emitters, such as the transportation sector, to the table.

Comment: Some large companies are federally regulated with major centers and they need to be convinced too.

Comment: In the Bow Valley, 50% of NOx emissions come from transportation. I think the energy companies should be at the table since people buy their gas from these same companies.

Bob Scotten: The WCAS used to have CN Rail as a funding member. CN contributes 16% of the NOx emissions in WCAS. When they moved their western Canada offices to Montreal, they ended their membership, but their involvement is a precedent. In PAS, they are major source of NOx emissions in Medicine Hat, but have refused to get involved on the grounds that they are federally regulated.

Bob Stone: Energy audits and emissions inventories can show the emissions from a particular source and this is a powerful tool. Being federally regulated doesn't stop a company from contributing and being responsible.

Comment: If the only reason for not participating is because an agency is federally regulated, this isn't really adequate. CASA includes Environment Canada, so engagement of such agencies should be addressed in a more integrated way.

Comment: They need to be shown the benefits of being involved. Federal departments and agencies have been involved in various CASA teams so perhaps they could be approached on that basis.

4.6.2 How to Reach Consensus in your Airshed Zone, by Christine Macken

Christine Macken, senior adviser with the Alberta Energy and Utilities Board and formerly CASA's senior project manager, noted that CASA was founded on consensus principles. She reviewed the ten consensus principles found in the CASA document, "Beyond Consultation."[7] The definition CASA uses for consensus is "a process by which all those who have a stake in the outcome aim to reach agreement on actions or outcomes." Christine presented a number of suggestions on how to manage and participate in a successful consensus process. Consensus is reached when each party is satisfied with a decision (that is, the decision meets the needs of each stakeholder and each party is "able to live with" the outcome). At the outset, groups need to make sure they have a fallback mechanism in case they can't reach consensus. She concluded by reviewing some truths and misconceptions about consensus and presented information about things that the CASA secretariat can help zones with. More information is available online at:

- www.cbuilding.org/, the Consensus Building Institute, which is a joint project by Harvard and MIT
- www.resolv.org/, the Center for Environmental and Public Policy dispute resolution

Discussion

Q: You said that no agreement is acceptable. What if there is immediate concern about loss of life or other serious effects? Are there places where this is not acceptable? If people have different views about how to proceed, what do you do?

Christine Macken: An emergency overrides a consensus process and there are emergency response procedures in place. CASA zones tend to focus on management issues related to ambient air quality such as, the parameters that should be monitored, where monitoring should occur, etc. Day-to-day operational issues are not usually discussed.

Bob Stone: When you become part of a zone, you bring your responsibilities to the table. If part of your responsibility is to have or to activate an emergency response plan, you are still responsible for that plan.

Q: One of the 10 principles emphasized voluntary participation. What if it's not voluntary? I'm involved in another jurisdiction where participation is required. Does this take away from the strength of the process?

Christine Macken: I wouldn't say this is the most important of the 10 principles. But if you are compelled to be there, it does take away from the philosophy of being interest based and collaborative. If you have to be there, you're not necessarily going to be committed and feel this is a good process. It would detract, but wouldn't necessarily ruin it. My experience is that sometimes people are there because their organization told them to be there; the organization has bought in but the person may not. Over time, most individuals do buy in.

[7] This document is online at http://www.casahome.org/uploads/CASABeyondConsultation2005FINAL.pdf.

Comment: My company in Qatar has been told to develop a management plan, so this isn't really collaboration, but it may be a unique situation.

Comment: Even though you are required to do something by a regulator, you still have the option about how you do it. Usually after you start to participate, you can find a win-win.

Bob Stone: Some AENV staff was initially skeptical about the use of consensus. AENV had decision-making authority, and wasn't sure what the impact might be of other processes that share responsibilities. The department is still accountable for our decisions, but we listen better and aim to be actively engaged. Even if the case still ends up in court, we can show how the decision was made.

Q: Can you share any strategies or tricks for reaching consensus? If the group is stuck, how can you move them ahead?

Christine Macken: I would say go back and look at the principles and see if there is anything that's causing the group to be stuck; e.g., the purpose is not clear or they need more information. Also if you think the group is stuck, share your observation and see how others are feeling. That may trigger a discussion about what others think and why they think they are stuck. You could ask the CASA secretariat to observe a meeting and offer their insights into the actual situation.

Q: Do you ever worry about groupthink or getting there too fast?

Christine Macken: This happens sometimes. Make sure that everyone who needs to be part of the discussion is there. "Group think" happens sometimes if there isn't enough diversity or new ideas at the table. You get people in the room who have worked together before or who know each other very well, and this leads to group think. An effective strategy for avoiding 'group think' is to establish an environment where members are not afraid to disagree.

Q: What do you think about using facilitators to initiate discussion?

Christine Macken: A key strength of facilitators is to manage meetings. Facilitators can free up people around the table to participate in the discussion, and not have to worry about managing the meeting. The CASA secretariat has good staff that knows how to work with multi-stakeholder groups. Facilitators come in all forms so before you go this way, think about what you need. For a CASA process, you definitely want one who is familiar with multi-stakeholder processes. My opinion is that you don't need to use them all the time, but an outside resource can be useful and, if you are really stuck, a facilitator might help.

Donna Tingley: CASA has a team that is close to not reaching consensus. Non-consensus is an option, but it does feel like failure. It's hard for participants who have put a lot into a process to come away with less than they hoped for.

Christine Macken: This is disappointing. If a group is close to concluding that it won't reach consensus, I would encourage them to look at the process and the implications of bringing forward a non-consensus report. My experience is that when non-consensus happens it is usually over a clear component or aspect of an issue, it is rare to find a group in non-consensus on every element of some project. However, the non-consensus item can detract from seeing those areas where the group has made progress.

In the event of non-consensus, it is important to make sure that each person is clear about why they don't agree. And if they don't reach consensus, try to look at the positives – we brought together a lot of valuable information, we established a foundation for potential future work and we may be able to come back and work together again down the road.

4.6.3 Governance for your Zone, by Donna Tingley

Donna Tingley, executive director of CASA, provided a detailed overview of things that existing and potential airsheds should consider when developing their governance structure as a not-for-profit organization. CASA and all airsheds are incorporated under the *Alberta Societies Act*.[8] Although she provided a wide range of information based on her experience and research, she encouraged delegates to seek legal advice if they have specific issues or problems. Donna reviewed the usual duties and obligations of board members, noting that the job of the board of directors of a non-profit society is to manage the organization and that the society can only do the activities listed in its objects. She also described some of the financial issues that non-profits should pay attention to, and concluded with some general rules of thumb that can help such organizations succeed.

Discussion

Q: To what extent can a zone carry out activities and provide services within its scope of work?

Donna Tingley: Many non-profit organizations (NPOs) sell services and enter into contracts with clients. I can't see any reason why zones would be prohibited from doing this, but you would need to consider the specific situation. Alberta has considered reforming the Societies Act, so there could be new legislation that might affect transparency regarding financial management.

Q: We've had difficulty getting someone to take on the role of treasurer; are there extra obligations for this position?

Donna Tingley: Your bylaws will define the roles and responsibilities. CASA procedures and guidelines specifically say that the executive director is the secretary-treasurer, but you definitely want someone who understands and can do the job.

Q: How well do you think directors understand their duties?

Donna Tingley: Probably not thoroughly. I meet with each new CASA director after he or she is appointed and before their first board meeting. They get a binder with a lot of details and it explains the insurance, indemnity clause, etc. but doesn't go into details about the duties. The literature on board development also talks about the need for regular training. It's also very important for members to read materials they are given.

Comment: If your bylaws specify that you have a board treasurer, this can be nominal. The board can delegate responsibility for the duties, but the board is accountable for what happens. The person can't be both a board director and a paid employee.

[8] More information and guidance on incorporating a society is online at http://www3.gov.ab.ca/gs/information/clctc/incorporating_societies.cfm

Donna Tingley: Directors are accountable and responsible. Staff is hired and carries out the policies.

Q: How do you instill commitment in the members of your governance group and keep them engaged in the governance side?

Donna Tingley: I try to provide my board with the information they need to have, such as financial statements, and help them with accountability and other aspects, but there aren't often a lot of questions.

Comment: Various institutions and organizations offer board development programs.

Comment: It might be useful to share this presentation with the CASA board as part of the strategic planning process.

Donna Tingley: I find it useful to put out at each meeting small pieces to help the board learn and stay engaged and up to date to prevent problems.

4.6.4 Funding an Airshed, by Kevin Warren and Bob Scotten

Kevin Warren and Bob Scotten between them have, at one time, managed five of the airshed zones in Alberta. They noted that the operating and capital budgets for Alberta's airshed zones range from about $120,000 to $3.2-million. The total projected budget for the six current zones for 2006 is about $5.8-million. Funding should be fair and equitable, with all stakeholders contributing either dollars or in-kind support. Each zone's funding formula is defined by the zone to recognize its needs. Key steps include preparation of an emissions inventory and a business plan, and designing and implementing a monitoring program. Partnerships are a way for zones to leverage their funds and undertake work that might otherwise not be possible. It's useful for zones to do marketing and communications on a regular basis to convey the benefits to all stakeholders and encourage more widespread involvement. Zones have fixed costs and as emissions drop, they become vulnerable if funders decide they no longer want to participate, so zones are exploring other possibilities for future funding.

Discussion

Q: Are there opportunities for Kyoto funding, since if greenhouse gases are reduced, other emissions would drop as well?

Bob Scotten: Zones don't monitor greenhouse gases, but the other problem is that grants are given on a one-time only basis, so would not be a source of long-term funding.

Q: Do any airsheds have charitable status or is CASA looking at this possibility?

Bob Scotten: No. Charitable status comes with a number of other conditions. CASA is not looking at charitable status due to these other conditions.

Comment: Peter Watson talked about aligning policy across other ministries. Cities get money from the province based on the amount of fuel purchased in the city, so it's in the city's interest to encourage more fuel consumption to get more money. The province should think about how all these things might be working at cross-purposes and what they really want to achieve.

Bob Scotten: These messages need to go back to Alberta Environment for further consideration. We do need a fallback; AENV and other ministries need to think about how important this is and how they can help make zones sustainable.

Q: How much of NOx is unfunded?

Bob Scotten: When CN Rail belonged to the West Central Airshed Society, its share was about $55,000 per year. If all municipalities contributed, the funds based on emissions from vehicles and furnaces in the WCAS would be about $10,000.

Kevin Warren: For PAMZ, NO_2 emissions from transportation are assigned to municipalities. I don't know what Calgary has done regarding an emissions inventory.

Bob Scotten: A line of credit is another tool, but establishing a line of credit is harder at the beginning because zones first need to get the initial capital. WCAS has been able to do this based on the strength of contracts with companies they serve. It's definitely easier for an established airshed to get a line of credit.

Q: Has CASA ever set up a project team to look at funding?

Bob Scotten: The team that updated the airshed zone guidelines talked about this and decided it should be on the program for this conference. Maybe that idea could be a recommendation from the conference.

Comment: This idea is timely as we are now looking at new zones in cities and what we've done in the past won't work for urban zones. How could we ensure that each citizen takes some responsibility for his or her emissions? We need some creative thinking around the funding issue and need to show the costs and benefits of urban zones.

4.7 Technical Considerations for Zones

4.7.1 Monitoring Reporting Directive, by Bettina Mueller

In Alberta, airshed zones, industry, Alberta Environment and Environment Canada operate a comprehensive network of air quality monitoring stations across Alberta that measure outdoor (ambient) air quality. The data from these stations are reported to Alberta Environment and the CASA Data Warehouse. The use of standardized monitoring methods and quality assurance and quality control procedures results in consistent, verifiable, high quality and comparable air quality data that meet the requirements for informed decision-making. The Air Monitoring Directive outlines the methods acceptable in Alberta for air monitoring and reporting of environmental monitoring data and, for the first time since its initial draft in 1986, includes requirements for a comprehensive quality system.

Discussion

Q: When will the Air Monitoring Directive (AMD) be released?

A: Section one will be out by the end of 2005.

Q: How long will we have to implement it?

A: One year to develop a QA/QC program with one more year to implement.

Q: What are the consequences of failing an audit?

A: They are not defined in the AMD, but could be administrative penalties.
Harry Benders, AENV indicated it's the usual practice that an auditor works with the operator to resolve the situation and if it cannot be resolved, the auditor requests that the data be invalidated; the onus is on the operator to establish the validity of the data.

Q: Will there be any monitoring requirements for temporary short-term flaring (well-testing)?

A: This type of monitoring falls under the EUB's jurisdiction and is not covered by the AMD.
Albert Duben, of the EUB indicated that they are putting together some standards for operating procedures for this type of monitoring as a follow-up to recommendations that came out of a review of all the downwind monitoring associated with the Acclaim blow-out.

Q: There is a need to set standards for modelling. New models have improved modelling, will this be part of the AMD?

A: Bob Myrick indicated that AENV makes recommendations for model types for larger-scale monitoring but not for modelling well tests as this falls under the EUB and is not covered by the AMD.
Al Duben indicated that the EUB would be addressing short-term flaring modelling requirements also.

Q: Is the draft AMD posted on the Internet?

A: Yes, the AMD can be found at: www3.gov.ab.ca/env/air/OGS/airmonitdir.html.

Q: Can you summarize the improvements of the new AMD over the 1986 version?

A: The new AMD reflects updates to technology. With more and more monitoring being done by third parties it was felt there was a need to audit QA/QC procedures, a need for maintaining documentation, and a need for Quality Assurance Plans.

Q: Is the new AMD more or less prescriptive?

A: Yes and no. It gives examples and lists minimum performance specifications rather than specifying the make and model of the analyzer. PM monitors are the exception.

Q: When will Part Two be completed?

A: Soon hopefully, chapters will be released, as they are available. Staff resource issues have been a limitation but the situation is better now.

Q: Will the review and comment process be the same as for Part One?

A: Yes, you can sign up on an e-mail list server to be notified of updates, etc.

Q: What is the status of the replacement of statics with passives?

A: Statics are being phased out. We are working on a validation protocol in Part Two for diffusive type sensors that is based on a European protocol updated for Alberta climatic conditions.

Q: What if sections of Part Two change feelings about sections of Part One that were already approved? What is the process to change Part One?

A: There will be a three-year review of the AMD with an opportunity for feedback. The review feedback will be addressed, and this process will occur sooner if changes are substantive.

Q: While waiting for Part Two to be ready, operators will have to refer to two documents: the new Part One and the old AMD. What if there is a conflict between them?

A: A section at the front indicates that the newer version takes precedence over the old where there is a conflict. Eventually the old AMD will be totally replaced by the new Part One and Part Two.

Q: In what section is the Passive Validation Protocol found?

A: In Section 2.

4.7.2 Monitoring Types 101, by Bob Myrick

In Alberta, ambient air quality is monitored using a variety of monitoring methods and technologies. Methods range from complex and expensive techniques that collect high-resolution air quality data on a continuous basis, to cost-effective methods that collect lower resolution data but can be used for saturation sampling over a large area. This presentation covered common air quality monitoring techniques used in Alberta in addition to new and innovative monitoring technologies that may be used to monitor air quality in the future.

Discussion

Q: Will the AMD provide guidance on makes and models of instrumentation?

A: Yes, through minimum specifications

Q: Is there a consistent protocol for instrumentation siting?

A: In Alberta, yes! Nationally, there is for PM and for NAPS sites.

Comment: Siting needs to be considered when reviewing data.

Q: You can be collecting great data, but how it is analyzed is just as important. You need to run statistical analysis to verify the data is good, and go beyond a compliance mentality. Would you consider the new AMD to be the equivalent as a protocol manual, especially for airsheds?

A: Yes. Some analyzers have good manuals that would also be part of the protocol document, however where there is not enough information we will cover proper operations in the AMD.

Q: Will Part Two contain a definition of a continuous analyzer?

A: Yes, with exceptions noted.

Q: What is the status of the methane/non-methane hydrocarbon (CH_4/NMHC) upgrade program?

A: AENV has nine new analyzers under test and being readied to go.

Q: Will more effort be put into characterization of NMHC in future and for other compounds such as TRS?

A: Yes, technology for speciation has improved and costs have come down. Kevin Warren talked about PAMZ's use of Summa canisters for speciating NMHC only when the issue requires it, not as a regular program. Kevin indicated that many of the airsheds have switched or will be switching from H_2S to TRS and reporting using the H_2S Objective.

4.7.3 Data Handling and Management, by Bob Myrick

The availability of accurate, defensible ambient air quality and air emissions data and information is an essential building block of Alberta's air management systems. In Alberta, real-time air quality data and archived air quality data from airshed and government stations are publicly available at a "one-stop shopping location." The availability of province-wide air quality data and information at a central location provides convenient and efficient access to province-wide data for the public, researchers, consultants and government staff. This presentation provided an overview of the existing and planned air quality data management tools, including the successes and challenges of developing, maintaining and improving these archiving and reporting tools.

4.7.4 Particulate Matter Monitoring, by Tom Dann

In Canada, with the expansion of the continuous PM network, a great deal has been learned about the spatial and temporal variability of $PM_{2.5}$. The greatest advantage of continuous measurements is the reduction in manpower required. Most continuous $PM_{2.5}$ instruments operating in Canada are Rupprecht and Patashnick TEOM instruments operating at 40°C or at 30°C with a dryer. These instruments have been shown to volatilize most of the ammonium nitrate and some portion of the organic carbon fraction of $PM_{2.5}$. The problem is

most acute during wintertime when nitrate levels are high and under-estimation of mass can be as high as 50%. In Canada, there is a need to establish a reference method for $PM_{2.5}$ and develop performance measures for continuous instruments against the reference method. Ongoing comparisons of filter-based instruments against continuous instruments are underway at a number of sites in Canada.

Discussion

Q: Ammonium nitrate has a melting point of 170°C; why are there concerns about heating an analyzer to 50°C? How can you get any losses at that temperature? Perhaps the cold season bias problem is related to a problem with filter-based measurements?

A: In the design of the evaluation program, the possibility of condensation and evaporation with filter-based samplers has been considered. There are many published studies that support the theory that ammonium nitrate loss is genuine, and also that filter-based measurements do not concentrate it.

Q: Which analyzer would you buy? TEOM or BAM?

A: I am comfortable with either one.

Q: Would you buy now or wait?

A: I would wait 6-12 months. By then, the US EPA will have the results of a large field study being conducted at the manufacturer's expense.

Q: What is the Beta Radiation Source in the BAMS?

A: C14, no licence is required.

Q: Are other technologies such as Grimm (light scattering) being evaluated?

A: Yes, the Grimm 180 and Thermo Electron BAM will also be evaluated.

Q: How do you deal with coarse PM ($PM_{2.5-10}$)?

A: The coarse fraction is being monitoring with Dichots.

Q: Will there be a PM_{10} standard?

A: This will be revisited in 2010.

Q: Are the co-location evaluation studies located in both urban and rural sites?

A: Yes, there are lots of both. A study indicates that straight TEOM is okay rurally at many sites year-round where there is little wood burning or ammonium nitrate.

Q: What could explain the BAM monitor's positive bias?

A: Humidity

Q: Will you be providing consultants with information on how to audit TEOMs and BAMs?

A: We will provide standard operating procedures (SOPs) but auditing flows would be the extent. For BAMs, it's also important to audit the accuracy of the relative humidity sensor.

4.7.5 Odour Measurement, by Ike Edeogu

All odour results from a blend of gaseous substances (odorants) and their interactions. The strength of an odour is expressed in terms of its odour threshold concentration. Several steps are required for undertaking an odour survey, including identifying odour sources, assessing odour intensity and offensiveness, determining frequency of occurrence and duration of each odour event, locating odour sampling or assessment points and installing associated instrumentation. This presentation introduced odour basics as well as odour measurement technologies including the Olfactometer, Nasal Ranger (R), and Electronic Nose.

Discussion

Q: What's the maximum hold-time for samples for the olfactometer?

A: 24 hours.

Q: How does the odour modelling approach compare to distance offset models?

A: I'm not sure. In Europe they use an Atmospheric Dispersion Modelling System (ADMS).

Q: What work have you been doing on odour mitigation technologies?
A: Colleagues are looking at various technologies including oil spilling, essential oil masking, diet manipulation, and others.

Q: Are you considering developing resident education programs? A lot of times it's psychological, if they can smell it, then it must be bad for their health.

A: We are not working much with residents at this time, but are starting to consider education in future. An education workshop was held recently in Pincher Creek.

4.7.6 Emergency and Response Planning and Health, by Steven Probert, Eric Bone and Bob Black

An important part of protecting the environment and human health is responding to emergency incidents such as fires, spills or leaks that involve hazardous materials or dangerous goods. Communities in the vicinity of such incidents are often concerned about exposure to airborne contaminants. Determining public exposure to contaminants, identifying ambient air concentrations of hazardous air pollutants, characterizing pollutant dispersion and protecting populated areas are all important objectives in an emergency response air monitoring plan. This presentation profiled how local authorities respond to emergencies, assess the threat posed by the materials involved, notify affected communities and disseminate data and information after the event.

Discussion

Q: What plans are in place for the Mobile Air Monitoring Laboratory (MAML) and the new emergency response (ER) vehicle?

A: Plans are being developed jointly by the City of Edmonton, AENV and Capital Health.

Q: Who develops the plan for regions that may have overlapping jurisdictions?

A: Plans are developed jointly, including action plans and authority during actions and response.

Q: Are there plans in place for development of databases dealing with health sensitivities, plume dispersion modeling info, etc?

A: As part of ER planning, Capital Health is consulted regarding specific populations at risk. Modelling information would also be used.

Q: Regarding ambient air monitoring stations, during an incident, concentrations in the air may exceed the measuring capability of the instruments in the stations. How is this dealt with?

A: ER can try and bring in alternative instrumentation to measure higher concentrations. Also, other substances may be able to be used as a surrogate for the specific substance.

4.8 Management Considerations for Zones

4.8.1 Overview of Federal and Provincial Programs, by Randy Angle

Randy Angle provided an overview of the range of air management initiatives across Alberta, Canada and internationally. These included the CCME Canada Wide Standards, Pollution Prevention/Continuous Improvement, Management of Air Emissions in the Electricity Sector, Alberta's Acid Deposition Management Framework, the National Air Pollution Surveillance Network, and Canada-US Border Air Quality Strategies.

Discussion

Q: Is there currently a group addressing long-range transport issues between the Western United States and Alberta?

A: No, there are no programs that include Alberta specifically. The Canada-US Border Air Quality Strategy has programs in BC, Washington and the Great Lakes area.

Q: What will be the process for the review of Canada Wide Standards (CWS) and the identification of new substances to be considered for CWS?

A: The review will be conducted by scoping groups. The exact process and type of stakeholder involvement have not yet been finalized.

4.8.2 Particulate Matter and Ozone Framework, by Long Fu

The framework developed by CASA's PM and Ozone project team will help Alberta meet its commitment under the Canada Wide Standard for fine particulate matter and ozone. A number of stakeholders are fundamental to the successful implementation of the management framework, including Alberta Environment, Environment Canada, airshed zones, industries, interested stakeholders and the public. This presentation explained the framework and its implementation, and addressed the idea of shared responsibility and the opportunity for airsheds to participate in management plans. It also outlined the general roles and responsibilities of each party.

Discussion

Q: Is AENV going to look at the nature of $PM_{2.5}$ from different sources, considering that the source of PM determines the composition of PM?

A: This is a good suggestion, and will be a focus of AENV in the future. AENV will be collaborating with other agencies to look further at source apportionment.

Q: What is the duration of time required for elevated PM or ozone levels to trigger action under the management framework?

A: Long provided an explanation of the calculations for PM and ozone:

- Achievement of PM levels (24-hour averaging time) based on 98th percentile ambient measurement annually, averaged over three consecutive years
- Achievement of ozone levels (8-hour averaging time) based on the 4th highest measurement annually, averaged over three consecutive years

Q: Can you clarify the process for backing out naturally occurring and background episodes of high ozone in Edmonton? According to the CWS guidance document, since ozone levels are above the CWS, only episodes above the CWS can be backed out.

A: AENV is following the CWS Guidance Document on Achievement Determination (GDAD) for calculations to back out naturally occurring/ background levels that exceed the CWS.

Q: I would like clarification of $PM_{2.5}$ levels in Grande Prairie; if you average the levels from the four station, and divide by four, the number is greater than 20, and this is not consistent with assessment summary results.

A: AENV will have to look at this again to confirm, and would be happy to discuss results following presentation.

Q: How often is the CWS achievement calculated?

A: CWS is averaged over three years, but the assessment of the CWS achievement (and management framework) is conducted every year (for the three-year period).

Q: How will the framework affect applications to regulatory agencies such as the EUB?

A: The management framework numbers will not be used in the approval process; the Alberta Air Quality Objectives will be used. Agencies will be asked to request that applicants participate in a collaborative process to make reductions to overall ambient levels (i.e., participate in an airshed zone). The regulatory agency will act as a backstop for the framework.

4.8.3 Human Health and Environmental Monitoring, by Alex MacKenzie and Timothy Lambert

A common issue for all airshed zones is public concern about air quality and its possible impacts on human health. These two presentations featured a discussion on the relationships between air quality and human health. It drew on insight and experience from the public health and policy communities and examined the links between air pollution and impacts on health. The use of human health risk assessments and community exposure monitoring programs was also discussed. Tim Lambert talked about health effects related to various air pollutants. There were no questions following this presentation. Alex MacKenzie then gave a presentation on human exposure monitoring. A question and answer session followed this presentation.

Q: It was suggested during the presentation that ambient levels do not matter to overall individual exposure, but the graphs seem to show something different. If ambient levels decrease, then indoor levels should decrease. Please clarify.

A: The example of $PM_{2.5}$ was discussed. If ambient $PM_{2.5}$ levels decrease from 6 $\mu g/m^3$ to 4 $\mu g/m^3$, the indoor level drops from 25-19. The effect is not significant. The presenter suggested that it should not be stated that there is no threshold for health effects from $PM_{2.5}$ exposures.

Q: What is Alberta Health and Wellness (AHW) doing to affect outcomes on health? Are they doing anything to educate people on what an individual can do to influence outcome from exposures to pollutants?

A: AHW has been promoting the concept of exposure monitoring. The department has been working with airsheds, health authorities, and others on these programs. They have provided resources to all partnerships in the programs. Four exposure-monitoring programs have been completed. Three have returned identical information that contradicts the current direction stakeholders are taking to decrease pollutants in the ambient environment. According to the results, reducing ambient levels of pollutants will have no effect on human exposure levels. To follow up with the results, comparison studies need to be done to follow the trend. The next step will be to study a large urban environment.

Q: How much do the studies cost? Will it be possible to do this type of study in Edmonton or Calgary?

A: Initially, these studies cost $5500/person. Now the cost is approximately $250,000 for 100 people in the study ($2500/person). The study in Fort McMurray cost $2.5-million. The approach will work in an urban study, but the populations may need to be split up across the city.

Comment: It is impractical for most zones to do these studies because of the high cost ($250,000 would be most of an annual budget for a zone).

Q: How are communities chosen?

A: The Fort McMurray study was driven by issues (concerns about oil sands and impacts on health). Grande Prairie is a relatively large community, and the activity in the area brought a lot of media attention, but no industry support. The general driver is concerns about air quality.

Q. Why not look at areas downwind from emission sources?

A: The studies do; some of the communities are downwind from emission sources (meteorological data is used to determine this). There is usually a mix of urban and rural communities in the studies.

Q: Are the graphs in the presentation a compilation of results from several studies?

A: No, they were taken from individual studies.

Q: How many people are needed to do a study?

A: It depends on the area involved; the numbers are determined by a biostatistician.

Q: Have the results of the AHW studies been published or peer-reviewed? If not, can you please comment on why not?

A: No, AHW has not had time to put the papers together.

Q: What percentage of their budget should airsheds spend on this type of monitoring compared to ambient air quality monitoring?

A: It's hard to say. This opens up the issue of where resources and attention in airsheds should be focused.

Q to Tim Lambert: What is your comment on the data presented, specifically on the graphs presented for indoor and outdoor concentrations of $PM_{2.5}$?

A: I can't comment on the graphs specifically, as this is someone else's data. However, it would be interesting to compare methodologies of the AHW studies with other exposure monitoring studies. A study by the US Environmental Protection Agency found that the longer the time period for the exposure monitoring, the closer the relationship/correlation becomes between indoor and outdoor concentrations of pollutants.

Q: What effort is AHW putting into exposure studies and health studies in the Wabamun area?

A: The Wabamun exposure monitoring study will be complete in June 2006.

Q: What about doing health and epidemiological studies in that area?

A: AHW will not be doing those types of studies anywhere.

Q: Is anyone listening to AHW?

A: People are starting to recognize the value of measuring actual human exposure. The AHW studies have had good reception from CASA, the EUB, Alberta Energy, Alberta Environment, and some health authorities.

4.8.4 Education and Outreach, by Myra Moore

One of the goals for many airsheds is to educate and inform the public about the importance of air quality and what people can do to make wise decisions and minimize their impacts on the environment. This presentation examined what one airshed – the Fort Air Partnership – is doing to promote public education in their zone and how they are identifying air quality issues through public outreach programs.

Discussion

Q: Did FAP need any special approvals to get the education kit (curriculum guide/poster/video) approved for use by the junior high schools in the airshed zone area?

A: The Education Steering Committee includes members of the school boards in our airshed zone region. We also worked with a teachers' advisory panel and consulted with Alberta Education on the project. Because the kit addresses the curriculum requirements directly, and assists the teachers by providing tools to address curriculum content, it is a welcome supplement for the teachers, and did not require any special approval by Alberta Education.

Q: How will the information in the kit be shared with other airsheds and the rest of the province?

A: Once the on-line portion of the tool kit is developed, anyone with Internet access can get it. We may also approach Alberta Education and Alberta Environment for funding to have the kit distributed to all junior high schools throughout the province.

Q: When will the on-line resources be available?

A: By the end of January 2006.

Q: How will you evaluate the kit and ensure teachers use it?

A: We are including an evaluation form with all kits distributed, and will review and act on recommendations. We will also be following up with our steering committee members regarding teacher use, as they will be actively promoting it and following up on its use.

Q: What is the cost of developing this type of educational program and what type of funds did you get in grant money?

A: FAP received a grant for $50,000 and the program cost $50,000. Alberta Environment has a grant application to make materials available on a website for $48,000 for online resources. Alberta Education has been involved in developing it, and there will be a pilot kit available soon. The goal next year will be to get assistance from Alberta Environment and Alberta Education to move the program province wide.

Q: How many hours of classroom teaching does the resource program provide?

A: It varies depending on the level of detail the teachers go into with the students. There is a 40-page teacher guide (grades 7-9), with one to two weeks' worth of lessons. The lessons incorporate other curriculum areas besides grade 7 and 9 Science, including Math, Language Arts, Social Studies, Health and Life Skills.

Q: How closely do you work with NRCAER (North East Region Community Awareness Emergency Response) and do they use FAP air quality data?

A: Very closely. If there is an impact on air quality from an incident, then yes, they most definitely use our air quality data.

Q: What are the formal steps required to get material into a school curriculum?

A: If the resource material fits with the Alberta curriculum, the teachers can use it in the classroom. There is no formal process, but material probably would have to be approved by an individual school principal if a teacher wants to use it in the classroom.

Q: Has the resource material been distributed in line with the school year?

A: No. It will be ready for the second semester (February 2006). It will go out to schools with an evaluation form.

Q: Will you be sharing the content of the education materials with other airsheds?

A: Yes, it will be shared on the Internet, and FAP will also be selling the educational video on a cost recovery basis.

Q: How was the video made?

A: A request for proposals was put out for all parts of the contract (poster, DVD, graphic content, etc.).

The FAP educational video was shown at the end of the session. People were invited to email the FAP or Myra Moore directly to request a copy of the video. The audience provided feedback on the video. Overall, there were very good comments on the content. It was suggested that the kids in the video should wear helmets.

4.8.5 Role of Airshed Zones in Air Quality Management, by Martha Kostuch, Leo Touchette, Sheila Leggett

Airsheds have the ability to develop response plans to deal with any specific air quality concerns in their region, to move from air quality monitoring to management. This session focused on the experience of regulators and airsheds working within a zone to respond to air quality issues. The roles of the regulatory authorities were explored in conjunction with the mandate of an airshed zones, and the idea of "local solutions to local issues" was also addressed.

Discussion

Q to Sheila Leggett: How do you respond to complaints regarding ILOs?
A: We try to work with operators to make changes to their operation. Often, some education on best management practices is a good first step. It is important to recognize that everyone has values around these issues based on their experience.

Q to Sheila Leggett: Does the NRCB receive complaints from other types of agriculture? For instance, cow – calf operations?
A: The bulk of complaints relate to CFOs (Confined Feeding Operations) and AOPA (Agricultural Operations Practices Act). But, we do get some complaints from other types of operations.

Q to Sheila Leggett: Are there any plans to incorporate ambient air quality objectives into the NRCB approval process?
A: The NRCB is tasked with enforcing the Agricultural Operations Practices Act. Ambient Air Quality Objectives fall under Alberta Environment.

Martha Kostuch: The CASA Confined Feeding Operations Team is in the process of defining its terms of reference. We are hopeful that odour will be addressed at this table.

Appendix A: Members of the Organizing Committee and Committee Terms of Reference

Michael Bisaga	Alberta Environment
Matthew Dance	CASA
Myles Kitagawa	Toxics Watch Society, Central Alberta Airshed Zone
Myra Moore	Fort Air Partnership
Albert Poulette	Alberta Environment
Carleen Schaefer	Palliser Airshed Society
Bob Scotten	West Central Airshed Society
Lisa Strosher	Calgary Health Region, Calgary-Bow Valley Airshed Zone
Yvonne Walsh	Wood Buffalo Environmental Association
Kevin Warren	Parkland Airshed Management Zone, Peace Airshed Zone Association
Kenneth Pierce	WBEA

Terms of Reference

22 March 2005

Purpose:

The Airshed Workshop Organizing Committee was formed as a result of a recommendation from the Airshed Zone Project Team with the purpose of planning, fundraising and hosting an Airshed Zone Workshop in 2005.

Goal:

The Airshed Zone Workshop will act as a catalyst for the advancement of the Airshed Zone initiative and concept by facilating communication between existing and forming zones, government and interested members of the Alberta public. Furthermore, education, information sharing and networking will be encouraged as a means of supporting development of new zones and maintaining the sustainable operation of current airshed zones.

Objectives:

- To celebrate ten years of airshed zone success in Alberta.
- To advance the airshed zone initiative/concept through communication and education.
- To share information and technology with stakeholders, forming zones and existing zones.
- To advance the sustainable, ongoing, operation of airshed zones by promoting the formation of and participation in airsheds by all relevant stakeholders.

Key Task Areas:

1. Define the specific goals and objectives of the workshop.
2. Define the workshop audience.
3. Develop a workshop program and the related support materials.
4. Draft a work plan and a budget.

5. Work with the CASA Communications Advisor to develop a Communications Plan.
6. Implement the work plan.
7. Fundraise.
8. Hold a workshop during the week of October 24th.
9. Draft a final report and proceedings.

Timelines:

June 2005

Terms of Reference approved by the CASA Board

August 2005

Communications Plan finalized

October 2005

Hold the workshop during the week of October 24th

March 2006

Final reports and recommendations to the CASA Board

Membership:

Representatives from:

- Established Airshed Zones
- Forming Airshed Zones
- Alberta Environment
- Environmental Sciences Association (proposed)

Reporting to the CASA Board of Directors:

June 2005

Terms of Reference approved by the CASA Board

March 2006

Final reports and recommendations to the CASA Board

Appendix B: Conference Participants

Name	Organization
Shane Adam	AGAT Laboratories
Marilyn Albert	Alberta Environment
Darren Aldous	Alberta Urban Municipalities Association
Randy Angle	AENV
Cathy Ashcroft	City of Calgary
Bernie Aumiller	Atco Power
Kelly Baragar	Focus Corporation
Randall Barrett	Alberta Environment
Doug Beddome	Natural Resources Conservation Board
Harry Benders	AENV
Jim Benum	EUB
Brodie Biggar	AGAT Laboratories
Michael Bisaga	AENV
Bob Black	Capital Health
Eric Bone	Capital Health
Elaine Bowers	Lakeland Industry & Community Association
David Brand	Luscar Ltd.
Will Breckenridge	IROC Systems Corp
Mark Brostrom	City of Edmonton
Ken Brown	Alberta Research Council
Michelle Brunet	AENV
Neil Buonocore	Clean Air Environmental
Robert Burkholder	
Dinah Canart	Strathcona County
Glynis Carling	Imperial Oil Resources
Rafael Castro	
Claude Chamberland	Shell Canada Ltd.
Kris Chawla	Alberta Agriculture, Food & Rural Development
Sheila Chernys	Petro-Canada
Kerra Chomlak	Clean Air Strategic Alliance
Andrew Clayton	Alberta Environment
Dene Cooper	Municipal District of Bighorn
Jeff Cooper	Jacques Whitford Ltd.
Marilyn Craig	AEUB
Robert Cree	Ft. McMurray First Nations #468
Gary Cross	Focus Corporation
Matthew Dance	Clean Air Strategic Alliance
Tom Dann	Environment Canada
Bev David	Petro-Canada
Keith Denman	Alberta Environment
Robert Deresh	Lakeland Industry & Community Association
Dan Dore	Petro-Canada
Al Duben	AEUB
Ike Edeogu	Alberta Agriculture, Food & Rural Development
Iris English	Lakeland Industry & Community Association
Marianne English	Clean Air Strategic Alliance
Carol Engstrom	Husky Energy
Gerald Feschuk	AENV/PASZA
Cal Finley	RAS Gas
Tracy Forbister	Seacor Environmental Inc.

Name	Organization
Long Fu	AENV
Ken Furrie	Enbridge/Midcoast Canada Operating Corp.
Don Gibson	Owens Corning Canada
Brian Goliss	Shell Canada Ltd.
F. Goodazi	Earth Sciences Sector, Federal Government
Traci Gourlau	
David Graham	AENV
David Gue	Palliser Airshed Zone (Board)
Frank Haggard	Lakeland Industry & Community Association
Martin Hansen	Jacques Whitford Limited
Richard Harpe	County of Grande Prairie #1
Lenore Harris	PAMZ
Ruth Harrison	Leduc County
Burgess Hawkins	Halton Region Health Department
Sharon Hawrelak	Clean Air Strategic Alliance
Sherry Hennessey	EnCana
Tracey Henselwood	Core Laboratories
Andrew Higgins	Canadian Natural Resources Ltd.
Lynda Holizki	IROC Systems Corp
Brandy Hryeyk	Sherrit International Corp.
Bill Hume	Environment Canada
Ahmed Idriss	Alberta Environment
Tao Jin	Seacor Environmental Inc.
Barbara Johnson	West Central Airshed Society
Ron Jones	Elk Valley Coal Corporation
Audrey Kelto	Leduc County
Gillian Kerr	Environmental Practice
Warren Kindzierski	Seacor Environmental Inc.
Robert Kitching	Brazeau County
Phyllis Kobasiuk	AAMD&C
Brent Korobanik	The Focus Corporation
Martha Kostuch	Prairie Acid Rain Coalition
Martina Krieger	AENV
Brian Kwong	Seacor Environmental Inc.
Marcel Labonte	Info-Comp Services
Tim Lambert	Canadian Public Health Association
Shane Lamden	Nova Chemicals Corporation
Lynda Langford	Saskatchewan Environment
Monique Lapalme	Environment Canada
Allan Legge	Biosphere Solutions
Sheila Leggett	Alberta Sustainable Resources
Yolanta Leszczynski	Shell Canada Ltd.
Chow-Seng Liu	Public
Bernice Lloyd	Clean Air Strategic Alliance
Garry Lorenz	Husky Oil Operations Ltd.
Darren Lysack	Petro-Canada
Sean MacGregor	Petro-Canada
Christine Macken	EUB
Alex MacKenzie	Alberta Health and Wellness
Chris Madland	Golder Associates Ltd.
Shannon Makinson	EnCana Corporation
Shahin Manji	AENV (Monitoring/Evaluation)
Claire McAuley	AXYS Environmental Consulting
David McCoy	Husky Energy
Kevin McCullum	Focus Corporation

Name	Organization
Jim McKinley	
Greg McLean	Alberta Energy & Utilities Board
Sandra McMillan	AENV
Richard Melick	AENV
Al Montpellier	AENV/FAP
Henry Montpetit	Alberta Energy & Utilities Board
Myra Moore	Fort Air Partnership
Kerry Mowbray	EnCana Corporation
Bettina Mueller	AENV
Allan Mumby	City of Edmonton
Bob Myrick	AENV
Sean Naaykens	
Kristy Nicol	Shell Scotford Upgrader
Matt Nordstrom	AGAT Laboratories
Garry Ogletree	Enviro-Test Laboratories
David Onuczko	Northeast Capital Industrial Association
Maurice Ouellet	Shell Canada Ltd.
Richard Ouellette	AGAT Laboratories
Richard Palczynski	AMEC Earth & Environmental
Marlene Parker	Clean Air Strategic Alliance
Babu Paul	Petro-Canada
Sarah Paulson	Alberta Energy & Utilities Board
Mike Pawlicki	Lafarge North America
Dan Pearson	Maxxam Analytics Inc.
John Percic	Petro Canada
Roxanne Pettipas	Conoco Phillips Canada
Rick Phaneuf	Alberta Environment
Albert Poulette	AENV
Sanjay Prasad	RWDI
Grant Prill	Alberta Research Council
Steven Probert	Capital Health
Darrell Prokopishin	Palliser Health Information
Keith Purves	Fort Air Partnership
Michael Queenan	RAPID
Ed Rahn	AEUB
Peter Reid	Jacques Whitford Limited
Hamed Sanei	H-S Consulting
Scott Sangster	Nova Chemicals Corporation
Jacqueline Sarrasin	Bonavista Petroleum
Mary Jane Savage	Public
Robert Savage	AEUB
Carleen Schaefer	Focus Corporation/Palliser Airshed
Jason Schulz	EPCOR
Brent Scorfield	Alberta Research Council
Bob Scotten	Seacor Environmental Inc.
Larry Serbin	Enviro-Test Laboratories
Brian Serink	Alberta Research Council
James Shorey	CDNova Instruments Ltd.
Rod Sikora	KEYERA Energy
Kristofer Siriunas	EUB
Frank Skinner	Alberta Research Council
Rich Smith	Alberta Beef Producers
Craig Snider	Maxxam Analytics
Garth Stanley	RSLS Engineering Inc.
Raymond Stemp	AENV

Name	Organization
Darcy Stephenson	Central Alberta Midstream
Bob Stone	AENV
Lisa Strosher	Calgary Health Region
Mel Strosher	Alberta Research Council
Aaron Studer	Husky Oil Operations Ltd.
Natalie Suzuki	BC Ministry of Environment
Lindsay Telfer	Sierra Club of Canada
Don Thompson	Syncrude Canada Limited
Brenda Thorne	EnCana Corporation
Donna Tingley	Clean Air Strategic Alliance
Margaret Tisdale	Environment Canada
Leo Touchette	Alberta Department of Energy
Mike Trefry	Imperial Oil
Ken Tsang	Dow Chemical Canada Inc.
Nadine Valentijin	AENV
Rick Vermeersch	Maxxam Analytics Inc.
Thomas Vyskocil	Diagnostics Engineering Inc.
Terry Waddock	M.D. of Foothills No. 31
Darcy Walberg	Agrium
Kim Walker	IROC Systems Corp
Kale Wallgren	Diagnostics Engineering Inc.
Kevin Warren	PAMZ & RASZ
Brad Watson	Lafarge
Peter Watson	AENV
Reg Watson	PAMZ
Irene Wenger Ouellette	Wenger and Oullette Solutions
Robin West	NAL Resources
Angela Wharmby	Alberta Research Council
Laura Whittle	Suncor Energy Inc.
Kim Williams	Alberta Pork
Dianne Wirtz	Seacor Environmental Inc.
Doug Wong	Millennium EMS Solutions Ltd.
Raymond Wong	AENV
Brenda Woo	Health Canada
Gwen Wood	AEUB
Weiguo Wu	AENV
Bond Xinbang Feng	Alberta Research Council