

**CASA Indoor Air Quality Project Team**

**Issues Identification Retreat**

**July 5 – 6, 2007**

**Village Creek Country Inn**

**Pigeon Lake, Alberta**

## 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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## Participating Members

<b>Name</b>	<b>Organization</b>
Dean Befus	The Lung Association of Alberta and Northwest Territories
Roy Clough	Alberta Employment, Immigration & Industry
Dennis French	DF Technical
Julie French	DF Technical
Warren Kindzierski	WBK & Associates
David Lee	Northern Lights Health Region
Kevin McLeod	Clean Air Strategic Alliance (CASA)
Anand Mishra	Canada Mortgage & Housing Corporation
Asish Mohapatra	Calgary Health Region
Ian Peace	Residents for Accountability in Power Industry Development (RAPID)
Carmen Rieder	Consultant
Ludmilla Rodriguez	Capital Health Authority
Roger Steele	Building Owners & Management Association
Dennis Stefani	Calgary Health Region
Brenda Woo	Health Canada

## Schedule of Events

### *Thursday July 5, 2007:*

6:00 PM	DINNER
7:30 PM	Overview
7:40 PM	Presentation: “Current Technologies in Indoor Air Quality Measurement”, Dennis French, DF Consulting (Sponsor)
9:00 PM	WINE & CHEESE

### *Friday July 6, 2007:*

8:30 AM	Introductions & Overview
9:15 AM	Stakeholder Presentations: <ul style="list-style-type: none"><li>• Regional Health Authorities<ul style="list-style-type: none"><li>○ Capital Health</li><li>○ Calgary Health Region</li><li>○ Northern Lights Health Region</li></ul></li><li>• Alberta Employment, Immigration &amp; Industry</li><li>• Health Canada</li><li>• Alberta Lung Association</li><li>• DF Technical &amp; Consulting Services Ltd.</li><li>• Canada Mortgage and Housing Corporation</li><li>• Residents for Accountability in Power Industry Development (RAPID)</li></ul>
12:00 PM	LUNCH
1:00 PM	Review of Common and Unique Issues and Corresponding Responsibilities
2:00 PM	Identification of Opportunities and Limitations
2:30PM	Recommendation of Next Steps
3:00PM	Adjournment

## **Retreat Objectives**

The Issues Retreat was an initial opportunity for team members to gather and exchange ideas. As such, the retreat objectives are:

1. To familiarize key stakeholders with respective responsibilities in the area of indoor air quality and thereby develop strategic directions to address indoor air quality in a coordinated, comprehensive manner.
2. To create a common understanding of the respective roles, responsibilities and topical issues facing each of the representative stakeholder agencies on indoor air quality in Alberta.
3. To identify current and emerging issues pertaining to indoor air quality issues in Alberta.
4. To validate a role for the CASA Indoor Air Quality (IAQ) Project Team in addressing indoor air quality issues.

## **Current Technologies in Indoor Air Quality Measurement**

The following is based on a presentation provided to the group by DF Technical and Consulting Services Ltd.

The goal of the presentation was to provide an understanding of instruments routinely used to quantify indoor air quality, including type of data that can be obtained from them.

### **Laser diode particle counter**

- Uses:
  - Identify particulate sources
  - Determine the filtration efficiency of air handling systems
  - Identify filtration breaks in a ventilation system
  - Estimate flushing rates for ventilation systems
- Can be used with real time monitoring equipment
- Different instruments have the capacity to measure a particular particulate size or survey a range of sizes

### **IAQ Monitors**

- A data logging unit that will measure temperature, relative humidity, carbon dioxide, carbon monoxide, nitrogen dioxide and sulphur dioxide, as required
- A significant problem is that air can be over or under sampled
- Areas with different temperature zones or multiple air handling systems will require multiple monitors
- The instrument is to be used in profile with where employees are working. Office cubicles present a particular challenge for effective use of IAQ monitors.
- Carbon dioxide can be used as a tracer gas since it is relatively easy to monitor and predicts the behaviour of other gases.
- Analysis of the logged data from the monitor requires interpretation from experienced, trained personnel

### **Borescope**

- A device with a remote eye that can be used to look inside walls or ventilation systems for the presence of mould or obstructions

### **Moisture meter**

- Mould requires moisture for growth
- A moisture meter will have probes that either contact or penetrate the material

## **Condensation meter (Psychrometer)**

- Water condensing around windows can facilitate mould growth
- The amount of moisture will dictate the type of moulds that can grow (*Aspergillus*, *Stachybotrys*)

## **Spore trap**

- An air sampling device that collects dust particles and spores and embeds them on a microscope slide for analysis
- Allows microscopic visualization of spores in order to generate a complete reading of spores that are alive, dead, dormant or fragmented
- Cannot positively identify toxic spore varieties; however, high spore counts indicate that clean up is required
- Reveals if a contractor is using biocides since the spore trap will show total spore numbers even if other methods do not identify mould growth
- Selecting an appropriate background spore level for comparison is a significant challenge for quantification using the spore trap.
  - Example: On a rainy day, outdoor spore counts will be very low. On such a day, using the outdoor spore count as background will skew the results.

## **Variable air sampler (Reuter Centrifugal Sampler, RCS)**

- Instrument that samples the air in a time-based or volume-based fashion and applies the air sample to various media strips, which will foster growth of mould and yeast
- Results are obtained in one week
- Identifies the species of mould or yeast

## **Volatile Organic Compound (VOC) meter**

- Uses photo-ionization to detect VOCs
- A limitation of the VOC meter is that it provides the total VOC concentration. It cannot differentiate between different VOCs. If total VOC is high, another method should be used to investigate further.

## **Conventional gas detector**

- Measures percent LEL (Lower Explosive Limit); however, indoor air is typically well below the sensitivity of this instrument

## **Modernized gas detector tubes**

- Uses gases tubes and an optical sensor to identify specific gases
- Most commonly used to measure ozone

## **Air flow meter**

- An air velocity meter used to quantify air flow from ducts and thereby calculate the number of air changes in a room

## **Infrared imaging camera**

- Uses small temperature differentials to identify air leaks or moisture

## **Air current smoke tubes**

- Uses smoke to visualize air movement in an area

## **Tools to test for specific contaminants**

- Asbestos air sampling cassettes
- Lead test kits
- Formaldehyde direct reading meters

## **Discussion**

- Can anyone use these devices or is specific training required?
  - *Anyone can collect samples; however, data interpretation requires scientific training.*
- Do the instruments need to be calibrated?
  - *All of the instruments need to be calibrated – most quarterly, some semi-annually or annually.*
- Have you tested for radon in Alberta?
  - *Analysis is done by a company in Saskatoon. A recent study by the Alberta Government showed that radon levels are extremely low in Alberta.*
- Have you monitored cigarette smoke?
  - *Yes, but the nose is typically more sensitive than detection instruments. Sampling is typically done over a long period of time; the air volume will dilute the smoke sample making it undetectable.*
- Do you do house dust mite analysis?
  - *This is not yet done in Canadian labs. Samples can be sent to the U.S. for analysis.*
- Have you done testing on houses previously used as methamphetamine labs to determine if they are safe for inhabitation?
  - *Not at this point*

## Stakeholder Presentations

Each stakeholder was asked to provide a presentation to inform the group of their roles, responsibilities as well as current and emerging issues.

### *Regional Health Authorities*

#### Roles and Responsibilities

- Indoor air quality is considered a public health priority since about 85% of our time is spent indoors and multiple indoor sources can lead to poor IAQ
- Public health inspectors follow the Alberta Public Health Act which includes the Housing Regulation and the General Nuisance and Sanitation Regulation
  - Inspectors typically evaluate public buildings (hospitals, day cares, schools) and landlord-tenant issues
  - Privately owned buildings do not fall under this act unless a nuisance is being created
  - The definition of nuisance is: “No person shall create, commit or maintain a condition that is or might become injurious or dangerous to the public health or that might hinder in any manner the prevention or suppression of disease.”

#### Current and Emerging Issues

- Mould
  - Source of mould must be identified
- Grow operations and methamphetamine labs
  - Determine when a premises is safe to be occupied again once the drug operation has been removed
  - A Grow Operation Mould Protocol is being developed by the Calgary Health Authority
- Asbestos
  - Increasing problem with inner-city housing projects that require the demolition of older buildings that contain asbestos
  - The Asbestos Containing Materials (ACM) Code recently transferred responsibility for ACM from the Alberta Building Code to the Occupational Health and Safety (OHS) Code. This means that the public health component was transferred to the respective Health Regions and concern was expressed about adequate monitoring.
- Ultrafines/Nano-toxicology
- Vapour intrusion (petroleum and chlorinated hydrocarbons)
  - Contaminated sites have the potential to infiltrate indoors
- Human Exposure Monitoring Program (HEMP)
  - Initiated by Alberta Health in 2000 in response to the oil sands projects
  - Managed by the Wood Buffalo Environmental Association in Fort McMurray

- Program studies the correlation between human exposure to air contaminants and human health
- Residential and industrial/traffic interfaces
- “Green” and energy efficient buildings
  - Are tighter homes an IAQ concern?
- Electromagnetic fields

### **Interventions and Related Activities**

- A risk analysis framework is being developed with the following key features:
  - Receptor identification
  - Toxicology assessment
  - Complex exposure assessment
    - Includes indoor and outdoor environments and contaminants; physical, chemical, biological and psychosocial stressors
  - Risk characterization

### **IAQ Issues and Opportunities**

- Anticipate that a multi-stakeholder approach is best to resolve IAQ issues; however, overlaps in jurisdiction must be avoided.
- Health Region had a few more slides; however, due to time constraints they were not discussed. These slides are part of the PowerPoint handouts given to team members.

### **Questions**

- What is typically done about odour related complaints?
  - Use tools to identify the source of the odour and subsequently complete a risk analysis to determine if the source is a significant health risk
  - Different regions have different regulations with respect to odour

## ***Alberta Employment, Immigration and Industry***

### **Roles and Responsibilities**

- An organizational chart for the Labour Standards and Workplace Safety division of Alberta Employment, Immigration and Industry was presented
- IAQ issues may fall under a number of departments but primarily involves the Workplace Policy and Standards and Compliance divisions
  - Generally, the department is responsible for employment standards, labour relations, workplace safety, assessment of standards and legislation programs
  - Specifically, responsibilities involve development, interpretation and enforcement of legislation, development of best practices, Workplace Partnerships and responding to complaints involving IAQ

### **Interventions and Related Activities**

- Legislation that may apply to IAQ is found in part four of the Occupational Health and Safety Code 2006
- A number of documents are available at [www.whs.gov.ab.ca](http://www.whs.gov.ab.ca) pertaining to IAQ issues:
  - Workplace Health and Safety Bulletin, Indoor Air Quality
  - Indoor Air Quality Tool kit
  - Highlights of the Changes to the OHS Code 2006

### **Questions**

- A strip mall tenant has complained about odours causing health effects being generated by an adjacent business. What action will be taken?
  - An inspector will assess the situation and, if necessary, write an order for investigation by a hygiene consultant.
  - Action could only be taken based on occupational exposure limits (OEL)
  - No financial compensation is available if investigation demonstrates that the initial complaint was unwarranted.
  - Odours are a very difficult area for enforcement.

## ***Health Canada***

### **Roles and Responsibilities**

- The Air Health Effects Division (AHED) is responsible for assessing the risks associated with exposure to both indoor and outdoor air pollution
- Specific activities of AHED include:
  - Exposure assessments
  - Health research studies
  - Reviews of the scientific literature
  - Development of standards and guidelines to reduce health risks
  - Public education
- Other Health Canada groups with IAQ-related mandates:
  - Tobacco Control Program
  - Workplace Health and Public Safety Program
    - Responsible for federal work places
  - Product Safety Program
    - Responsible for consumer safety
    - Issue product warnings and advisories (e.g. ozone generators, lead-containing candles)
  - Radiation Protection Bureau
  - Management of Toxic Substances Division
  - First Nations Environmental Health Services

### **Current and Emerging IAQ Issues**

- Radon
  - New guidelines have recently been released. As a result of these new guidelines, a radon strategy is being developed, which includes education, testing of all government buildings and mapping of radon levels across Canada.
- Mould
- Carbon monoxide

### **Interventions and Related Activities**

- An IAQ working group is conducting a survey across Canada.
  - Survey completed in: PEI, Toronto, Quebec City and Regina
  - Survey to be done next year in: British Columbia, Nova Scotia and New Brunswick
  - Alberta is the only province not participating in the survey

### **IAQ Issues and Opportunities**

- Support the idea of an IAQ symposium
- Alberta participation in the National Indoor Air Quality Survey

- Discussion:
  - Participation requires provincial involvement. Health authorities cannot collaborate directly with the federal government.
  - Alberta has recently undertaken health-based index and air quality index pilot studies.
- More information available at: [www.hc-sc.gc.ca/ewh-semt/air/in/index\\_e.html](http://www.hc-sc.gc.ca/ewh-semt/air/in/index_e.html)

## Questions

- What kind of information is collected in the national IAQ surveys?
  - Samples and questionnaire-based data are collected
  - Conducted in private homes not public buildings

## ***Alberta Lung Association***

### **Roles and Responsibilities**

- Advocate governments and educate people with lung disease and the public on IAQ issues
- Canadian Lung Association
  - National level
- Alberta Lung Association
  - Work with municipalities and provincial government on tobacco and other IAQ issues

### **Current and Emerging IAQ Issues**

- Tobacco
  - Tobacco is the number one factor in lung disease
  - Tobacco issues in condos and apartments need to be considered
- Clean air in schools and daycares
  - Environments must be free from allergens and asthma triggers
- Radon
  - Causes lung cancer

### **Interventions and Related Activities**

- In association with several stakeholders including: COPD and Asthma Network of Alberta (CANA), Alberta Asthma Centre, ASTHMA-C, the Health Regions, the academic divisions of paediatric and adult pulmonary medicine (U of A and U of C), etc the Lung Association is developing a proposal for an Alberta lung health strategy to manage asthma, COPD and other lung diseases
  - A draft proposal of the strategy is to be presented to Alberta Health this fall
- Examining ways to effectively use web sites for education
- Advocate governments for smoke free legislation

### **AllerGen NCE Inc., Network of Centres of Excellence**

- Sponsored by the Federal Ministry of Industry
- Funded by the federal TriCouncils (Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC))
- IAQ is a central issue for the National Birth Cohort for Allergic Diseases and is pending funding
  - Investigate the development and prevalence of allergic disease in Canada (gene –environment interactions)
- AllerGen is planning to hold a symposium on air quality and allergic diseases, including asthma

- The next annual scientific meeting of AllerGen will be held in Banff in February 2008

## Questions

- Has the environment changed significantly in the last 20 years so as to account for the rise in allergic diseases?
  - This is the current view held by the field since genes have not changed but it is a complex issue.
  - Related explanations include:
    - Environment is too clean thus immune systems do not develop appropriate regulation mechanisms early in life
    - Stress
- Is radon a significant issue in Alberta?
  - The Lung Association does not have this information; however, other members indicated that it is not a significant issue in major centers in Alberta but may be more abundant in Northern Alberta.
- There are also 'lifestyle factors' associated with certain diseases. However, the association / correlation between environmental factors and health effects should not be underestimated.

## ***DF Technical & Consulting Ltd.***

### **Roles and Responsibilities**

- Understand client IAQ concerns
- Present data in a way that the client can understand and use
- If issues are present, identify potential corrective measures and connect the client with the appropriate professionals

### **Current and Emerging Issues**

- Defining air quality is a significant challenge
  - The symptoms experienced as a result of poor air quality are shared with manifestations of stress, ergonomic challenges, and other factors
- The consultant must determine which testing and reporting practices (ASHRAE, Health Canada, GOA Infrastructure, WHS, CCA, IICRC, NYC-DOH) are appropriate for a particular client
- Consultants have a limited ability to initiate change in the workplace environment because they lack enforcement authority

### **Interventions and Related Activities**

- The consultant must identify appropriate sample collection and data analysis techniques

### **IAQ Issues and Opportunities**

- The opportunity should be taken for all stakeholders to use common language, criteria and prescribed actions for IAQ issues
- The lack of appropriately skilled workers in the consulting industry results in incomplete, inconclusive and incorrect data
  - As of 2010, Florida will require that all remediation consultants are certified for detection and removal of mould.
- Non-IAQ issues will have similar symptoms (noise, lighting, ergonomics, psychological factors)

## ***Canada Mortgage & Housing Corporation***

### **Roles and Responsibilities**

- “Committed to housing quality, affordability and choice for Canadians”
- Four pillars of CMHC:
  - Housing Finance - mortgages
  - Assisted Housing – includes channelling money from the federal government to Aboriginal bands
  - International – encompasses export of Canadian expertise and building supplies
  - Research and Information Transfer – information shared with researchers, builders and the public

### **Interventions and Related Activities**

- Research
  - Funding of \$8.1 million per year
  - Research topics can be anything related to housing
  - Research ideas can come from industry, international organizations or the public
- Information and Technology Transfer
  - Research highlights are published on the CMHC web site with links to full reports
  - Publications, seminars and workshops are provided for homeowners, housing professionals, task forces and work groups
- Responsive Programs and Institutional Support
  - Grants available through the External Research Program (ERP)
  - Affordability and Choice Today (ACT) program
  - Housing Awards Program (HAP)
  - Intergovernmental Committee on Urban and Regional Research (ICURR)

### **IAQ Issues and Opportunities**

- CASA can propose research ideas to CMHC
- CMHC can fund CASA research initiatives
- CMHC and CASA can jointly organize an IAQ conference
- CMHC can provide completed research for the CASA library

## ***Residents for Accountability in Power Industry Development (RAPID)***

### **Current and Emerging IAQ Issues**

- It is assumed that we all want fresh air inside
- NGOs want to know the consequences of poor indoor air quality. Although identifying the pathology is complex, this information would aid in motivating people to affect change.
- There is a need to define when breathing protection is necessary for industry workers
- What about IAQ in housing facilities provided by employers (e.g. Fort McMurray work camps)?
- Jurisdictional morass
  - Difficult to discern what organization is responsible for particular issues and which standards or guidelines apply in particular scenarios

### **IAQ Issues and Opportunities**

- A strategic plan is required and may be developed by first considering the desired outcome, then the process and finally the structure.
- Discussion with other NGOs has yielded two alternatives for IAQ issues:
  - Develop standards that work for residential, commercial and industrial situations
  - Develop guidelines for builders (HVAC, home manufacturers, furnishing manufacturers)

## Identification of Opportunities and Limitations

- The IAQ program strategy was discussed as follows:
  1. Standards/Guidelines
  2. Assessment
  3. Research
  4. Education
  5. Technology Transfer
  6. Program Evaluation
- A brainstorming session yielded four directions for the CASA IAQ project team:
  1. **Decision tree**
    - Designed to provide a clear understanding of different organizations for the benefit of consumers, builders, day care operators, etc.
    - Illustrates which standards apply in particular scenarios
    - Calgary Health Authority and others have developed a document with a flow chart that may be helpful here
    - A preface to the decision tree could be the development of an issues paper to identify “jurisdictional morass” in IAQ regulation with multi-stakeholder input
  2. **IAQ Symposium**
    - CASA should facilitate an educational symposium on IAQ issues
  3. **Standards**
    - Are the present standards adequate? Should a team evaluate this?
    - Role for precaution versus risk management in IAQ guidelines
    - Should the approach be evidence-based or precautionary?
      - The precautionary approach means where there is insufficient evidence to establish a cause-effect relationship, but sufficient evidence to take protective or mitigating actions.
    - Not within CASA’s mandate? The WHO, Health Canada, etc have prepared standards and stakeholders use this information to choose which are appropriate for application in Alberta
    - Are values and measurement techniques appropriate according to the stakeholders present?
    - Identify absence of administrative processes to deal with standards
  4. **Knowledge transfer**
    - There is a role for CASA to disseminate information between stakeholders
- Other issues raised during the brainstorming session:
  - Research grants available from CMHC. If gaps are identified that require further investigation, research money may be available to address these gaps.
  - Investigate documents prepared by other groups on IAQ so as not to reinvent the wheel

## Future Directions

- The project team membership requires the addition of:
  - Safety codes personnel
  - Municipalities
  - Canadian Standards Association
  - National Research Council
  
- Future dates:
  - A project team meeting will be scheduled for early September
  - A progress report to the CASA board is due in September. The report will be presented by the co-chairs and will include the draft terms of reference.