Implementing MIACC Criteria into Risk Based Land Use Planning Bylaws Requires Several Activities to be Successful

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CSChE-PSM (MIACC) Land Use Planning Criteria

How do we make this work??

Annual Individual Risk
Chance of fatality per year

1 in a million (10^-6)
5 in a million (10^-5)
1 in a million (10^-5)
0.5 in a million (6.3 X 10^-6)

Low-density residential
High-density residential and commercial
Institutional occupancies

Manufacturing, wholesale, retail trade, hospitals, churches, amusement parks, schools, community centers, entertainment centers, sporting complexes

Allowable Land Uses

Peak source
No other land use
Why a Bylaw

Have found a joint need:
• For the County development officers guidance
• For industry to locate and exist on good terms
• For developers to have a “level playing field”
What I would like to talk about is how this was done back in 2001, is it working and my experience with other jurisdictions.
Strathcona County AB

Bylaw Development Involvement
- Risk Assessment expert
- City planning expert
- Emergency management
- Developers
- Public
- Industry representatives
- Strathcona elected officials
- Representatives from Edmonton
- Representative from the Province (observers)

Also a noise study was used in the project.
Strathcona County AB
Challenges

- What does “risk” mean?
- Ethical, Professional approach and Due-diligence
- OH&S Acts (...... what does practicable mean?)
- ALARP
- What distances for the individual MIACC risk zones?
- What is the balance between industry and the community?
- Cost.
- Who is impacted?
- A management tool for development officers.
What does “risk” mean?

What does “risk” mean to everyone else but us?

- No idea
- Fear
- Not in my backyard
- “Death Zone”
Ethical, Professional Approach and Due-diligence

- Risk assessments are done by professionals
  - For validation
  - As a profession (P.Eng.) it is a requirement to look after the health, safety, environment and clients best interests (Professions Act).
- Highlights the concept of risk which no-one else understands.
- Provides a basis for:
  - Peer analysis
  - Risk management programs
  - Jurisdictional oversight
  - Knowledge growth
  - For industry to survive
OH&S Acts and ALARP

- The health and safety or workers and the public.
- The term practicable means a responsibility to make choices wisely
- As Low As Reasonably Practicable (ALARP)
  - A professional opinion
  - Open to scrutiny
  - Realistic and do-able
OH&S Law

2(1) Every employer shall ensure, as far as it is reasonably practicable for him to do so,

(a) The health and safety of workers engaged in the work of that employer, and
Reasonably Practicable

This general statutory obligation conveys a message to the courts that the standard of care within OH&S Legislation is not an absolute obligation, but, a strict obligation. Once a danger is likely to be considered a known and foreseeable hazard it should become reasonably practicable to do something about it.

In the eyes of the law, if something is reasonably practicable, then it must be done. It is up to the employer to find a reasonable and practicable means to reach the objective and to continue to keep up-to-date on new developments in the field. (If it can be done, it must be done to the technology of today).
Liabilities & Due-diligence

**ABSOLUTE LIABILITY**: Obligation or command to do something. You don’t have a choice, you must do it.

**STRICT LIABILITY**: Express possibility of right to choose to do something. You have the option of deciding if you do or don’t proceed based upon the circumstances.  

*Strict liability laws express the possibility of rational decision making, depending upon the circumstances.*

*Instead of complying with the specific provision in the law, you could do everything “reasonably practicable” and demonstrate DUE DILIGENCE.*

**REMEMBER**: due diligence is the level of judgement, care, prudence, determination, and activity that a person would reasonably be expected to do under particular circumstances.
An Early Summary

Throughout the process of developing the bylaw it became very apparent this needed to have a strong basis.

As you can see that from my point of view this is not just about “applying science” it is more in line with being a part of a larger process.

Professional Engineers are needed to make this valid enough to become the basis for building open, solid and meaningful ways to implement the “CSChE-PSM (MIACC) Risk-based Land Use Planning criteria”.
Distances for Each Risk Zone

- Assumption the risk level within the company property line will not exceed $1 \times 10^{-4}$ at the property line.

- What type of “Heavy Industry” are we considering?
  - Fixed
  - Railroads, highway transport, pipelines
  - Dense gas (toxic), flammable, explosive impacts

- What does the jurisdiction want in terms of industrial development?
Distances for Each Risk Zone (cont’d)

- What impacts does industry not want to deal with?
  - Injury or fatalities
  - Nuisance complaints
  - Potential legal involvement with community, developers, citizens

- What distances between industry and community exist?

- How fast will a toxic or flammable cloud travel?

- Can an emergency plan be effectively enacted in time?
Distances for Each Risk Zone (cont’d)

• Not to be forgotten is possible “grand fathering” of existing facilities and a plan to rectify.

• Cost (a big one talked about later)
Balance between Industry and Community

A fundamental starting point
- Will industry want to be close to residents?
- Does the jurisdiction desire to have industry in the area?

<table>
<thead>
<tr>
<th>Industry</th>
<th>Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long term commitment</td>
<td>A tax base</td>
</tr>
<tr>
<td>Need to grow</td>
<td>Local economy</td>
</tr>
<tr>
<td>Need to be current with demands for their product/services</td>
<td>Quality of life</td>
</tr>
<tr>
<td>Need for proximity to utilities, roads, rail and pipelines</td>
<td>Jobs</td>
</tr>
<tr>
<td>Need for an employee pool</td>
<td>Growth</td>
</tr>
<tr>
<td>Need for local suppliers</td>
<td>Facilities</td>
</tr>
</tbody>
</table>
Cost

- From a community point of view uses up valuable land.
- From an industry point of view consumes more capital depending on risk zone distances.
- More risk management activities based on risk zone distances.
- Restrictions on what industrial activities can take place within the allocated distances.
- Emergency planning needs.
- Etc.
Some Additional Examples

- Strathcona County Industrial Heartland
- City of Fort Saskatchewan
- Sturgeon County
- City of Edmonton
- Leduc County
- City of Medicine Hat
- District of North Vancouver
- City of Auckland NZ
- Guelph ON / Union Gas and the Ontario Technical Standards and Safety Authority
Strathcona Heartland Area
City of Fort Saskatchewan
The City of Edmonton Bylaw:
14.6 Assessment of Risk for Industrial Activities
Bylaw 14127
January 11, 2006
When an application for a Development Permit is for an activity involving the use or storage of hazardous substances, the Development Officer may require the application to contain an Assessment of Risk prepared by an environmental professional such as an engineer, biologist, planner, geologist or hydrogeologist, and the Development Officer may impose any conditions necessary to mitigate the risks associated with the use or storage of hazard substances identified in the assessment.

The Assessment of Risk shall:
1. Identify hazardous substances and their quantities;
2. Estimate the expected frequency of the occurrence of a hazardous event;
3. Assess the possible consequences of such an event;
4. Determine annual individual risk and compare to MACK’s risk acceptability criteria;
5. Demonstrate how the proposed facility and operations shall contribute to the following risk management objectives:
   - risk reduction at source (e.g. facility modifications to processes, conformity to legislation e.g. The Safety Codes Act, the Dangerous Goods Act, monitoring, technical changes, training, etc.);
   - risk reduction through land use planning around Industrial Sites and pipeline and Dangerous Goods corridors;
   - emergency preparedness;
   - emergency response;
   - risk communication and public participation; and
   - identify and recommend risk-based separation distances and other mitigative measures to reduce risk.
District of North Vancouver
<table>
<thead>
<tr>
<th>COMPANY</th>
<th>CHEMICAL</th>
<th>IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canexus</td>
<td>Chlorine</td>
<td>As described in the Alp Risk Assessment report the risk of a fatality will be ((1 \times 10^{-6})) just north of Front Street.</td>
</tr>
<tr>
<td></td>
<td>Hydrogen Chloride (gas)</td>
<td>A release will impact beyond the Canexus property line but within the impact distances for Chlorine.</td>
</tr>
<tr>
<td></td>
<td>Hydrogen (explosion)</td>
<td>An impact of up to 28 metres from inside the site with no impact beyond the property line.</td>
</tr>
<tr>
<td>NEWALTA</td>
<td>H₂S</td>
<td>A release from the Hydro-treater unit will not be impactful beyond the property line.</td>
</tr>
<tr>
<td></td>
<td>Lubricating Oil</td>
<td>A lubricating oil spill and possible fire will not impact beyond the property line.</td>
</tr>
<tr>
<td>UNIVAR</td>
<td>Ethanol</td>
<td>A major tanks spill to the diked area will have a radiant heat impact about 155 metres from the tanks but will not impact the Maplewood Village area.</td>
</tr>
<tr>
<td>HTEC</td>
<td>Hydrogen (explosion)</td>
<td>Can impact up to 200 metres from the site location and will not impact beyond the property line.</td>
</tr>
<tr>
<td></td>
<td>Hydrogen (fire)</td>
<td>An impact of up to 100 metres with no impact beyond the property line.</td>
</tr>
<tr>
<td>ERCO Worldwide</td>
<td>None of note</td>
<td>None of note</td>
</tr>
</tbody>
</table>
District of North Vancouver

- Proposed Upgraded community of Maplewood
- Risk Assessment centered on the Canexux Chlorine Facility
District of North Vancouver
City of Medicine Hat Alberta

Industrial “Buffer” Distances
Auckland NZ Reclamation Project
Auckland NZ Reclamation Project

The result of implementing Layer of Protection Analysis (LOPA) will result in lowering risk levels.
Guelph High Pressure Natural Gas Pipeline

Technical Standards and Safety Authority of Ontario (TSSA)
- Intervener

Existing 3,500kPa (500psi) natural gas pipeline

New development proposal
Summary

• Everyone is Different.

• A recognized “best practice” guideline for bylaws is suggested including criteria for risk assessments and the skills needed for doing them.

• Additionally consider moving towards including requirements for “risk management programs” for industry.
Any Questions?