RISK PRESENTATION

to the District of North Vancouver

Council Workshop

March 13, 2018
Agenda

1. Introduction
2. Risk Level and What it Means
3. 2006 Risk Assessment for Canexus and TCP Project
4. Established Risk Contours and Application to Maplewood Area
5. Coordinated Emergency Planning & Response
6. Closing Comments
7. Discussion
Introduction

Everything we do has some level of risk involved.

**Why Are We At This Point**

- 1976 Seveso Italy
- 1984 Bophal India
- 1986 Chernobyl
- 1989 Exxon Valdez
Risk Level and “What it Means”

**Annual Probability of a Fatality**

- Provides a means to describe risk
- Provides a means to determine acceptable and unacceptable risk levels
- Provides for a means to have company designs and operations managed
- Provides a means for jurisdictions to approve industrial projects

<table>
<thead>
<tr>
<th>Probability</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>$1 \times 10^{-9}$</td>
<td>One in a billion From being hit by a meteor in a lifetime</td>
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<tr>
<td>$1 \times 10^{-8}$</td>
<td>One in a hundred million From being hit by a crashing airplane</td>
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<tr>
<td>$1 \times 10^{-7}$</td>
<td>One in ten million From being hit by lightening</td>
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<tr>
<td>$1 \times 10^{-6}$</td>
<td>One in a million From traveling by commercial air, rail or bus</td>
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<td>$1 \times 10^{-5}$</td>
<td>One in a hundred thousand From being a pedestrian</td>
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<td>$1 \times 10^{-4}$</td>
<td>One in ten thousand From working in a manufacturing facility</td>
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<td>$1 \times 10^{-3}$</td>
<td>One in a thousand Average annual risk from all causes.</td>
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<tr>
<td>$1 \times 10^{-2}$</td>
<td>One in a hundred From being an astronaut</td>
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<tr>
<td>$1 \times 10^{-1}$</td>
<td>One in ten From being 84 years old</td>
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Additionally death due to a:

- Motor vehicle accident $2.2 \times 10^{-4}$
- Truck driving accident $1.0 \times 10^{-4}$
- Falls $7.7 \times 10^{-5}$
- Home accidents $1.2 \times 10^{-5}$
Risk Management Process

1. Management Reviews for Hazards
2. Identify Hazards
3. Reduce the Risk
   - Can the Risk be Reduced?
     - Yes: Assess the Risk
       - Is the Risk Acceptable?
         - Yes: Manage the Residual Risk "Through the use of key elements"
         - No: Discontinue the Activity
     - No: Discontinue the Activity
   - No: Assess the Risk
     - Is the Risk Acceptable?
       - Yes: Manage the Residual Risk "Through the use of key elements"
       - No: Discontinue the Activity

"Safety & Loss Management"
"Risk Management"
The Risk involved is defined as the probability of a fatality imposed on an individual by an industrial operation.

Everything we do includes some possibility of causing unwanted outcomes. However, as a society we are willing to accept a certain level of risk in order to enjoy our standard of living.

The acceptable level of risk is measured as the probability (likelihood) of a fatality to an individual located in one position for an entire year. Globally the acceptable level is one chance in a million of a fatality to that individual over a one year period.

Expressed as $1 \times 10^{-6}$.

Important to community jurisdictions for land use planning and due diligence.

Important to industry to have set values to design and operate to and their due-diligence.
Acceptable Level of Risk in Canada

As defined through the Major Industrial Accidents Council of Canada (MIACC)

Canada's best practice

Annual Individual Risk
Chance of fatality per year

100 in a million ($10^{-6}$)

10 in a million ($10^{-5}$)

1 in a million ($10^{-3}$)

0.3 in a million ($0.3 \times 10^{-3}$)

Risk source
No other land use
Manufacturing, warehouses, open space (e.g., parkland, golf courses, etc.)
Low-density residential (up to 10 units with ground level access, per net hectare) and commercial, including offices, retail centers, restaurants, entertainment centers, sporting complexes
High-density residential and commercial, including places of continuous occupancy such as hotels and tourist resorts
Sensitive developments (e.g., hospitals, child care facilities and aged care housing developments)

Allowable Land Uses
Original Risk Assessment done by Alp and Associates – 2006
Prior to the Canexus TCP project
UNIVAR Canada Site

*Risk Level = 1 X 10^-5*

Radiant Heat of 4 kW/m² at 155 metres

HTEC Site

*Risk Level = 1 X 10^-6 to 6 X 10^-8*

Overpressure of 1.0psi at 200 metres

Radiant Heat of 4 kW/m² at 100 metres
Terra Pure Environmental Site
Risk Level = $1 \times 10^{-5}$ to $6 \times 10^{-7}$

- ERPG-2 for H₂S at 65 metres
- Overpressure of 1.0 psi at 31 metres
- Radiant Heat of 4 kW/m² at 86 metres

ERCO Worldwide Site
Risk Level = Nil

- No flammable or toxic hazards.
Planning –

- Maplewood Local Plan, 2002
- Maplewood Project, 2004 Eco-Industrial Networking
- Land Use Designations for Maplewood, OCP, 2011
- Implementation Planning Process Concept Plan
- Land Use Designations for Maplewood, OCP, 2018
Planning – Maplewood Village Centre and Innovation District Implementation Plan & Design Guidelines, 2017

• Balanced land uses throughout
• Complete Community; people can live, work, learn, play, and meet most of their daily needs in their own neighbourhood
• Local jobs
• Variety of housing options
Planning – OCP Land Use Designations and Risk Contours
Any Questions?