

Odour Assessment and Odour Modelling to Determine Appropriate Mitigation

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Presentation focusses on the key odour issues for a very difficult land use situation in the core of Toronto...redevelopment of industrial lands on the harbor..remaining major industry, but City and developer desire to develop into residential and mixed use. Some key details and results are confidential, so we can only discuss the broader issues and approach.....

Background



Background

- Development and Shift from Industrial to Residential Neighbours could put Redpath operations out of compliance.
- Redpath operates 24 hours a day with heavy vehicles, ship movements. As a result of the process and movements there is traffic, odour, air emissions and noise.

This is a challenge for land use planning

Background



Ontario has guidelines for land use compatibility...referred to as the D1 to D6 guidelines...for a large industry, they suggest a 300 m zone with no-sensitive receptors...only in 300 to 1000 if study shows no impacts. 300m to west is other side of Yonge St slip, 300 m north is other side of Gardiner, 300 m east is just east of George Brown College... The white blocks are developments either proposed or approved..

Background

- Odour is regulated by Ontario Ministry of the Environment and Climate Change
- Odour is recognized as a contaminant under the EPA
- There are no specific standards for “odour”
- Managed by complaint (avoiding “adverse effect”)

The Challenge

- **Guidance documents exist for analysis**
- **Agreement on methodologies for analysis**
- **Units of measure – odour units (OU)**
- **FIDOL is used with Intensity and Offensiveness being the main factors**



The Challenge

- Historical threshold used by MOECC – 1 OU but not legislated and,
- This is not easy to link to potential future complaints or adverse effects

How do you predict the future complaints?

1 OU compliance is not an assurance of no complaints.....if 1 OU demonstrated, complaints still trump...so 1 OU is simply another compliance level....

Approach

- Future should be better than current, non-complaint odour levels
- MOECC agreed with approach, but could not provide assurances for future.
- Risk resides with industry and future tenants

Issues for all sides of land use planning dispute

Critical Locations



Approach

- Started with Nasal Ranger Assessment with simple AERMOD modelling
- Effective in providing understanding of a potential compatibility issue; sufficient when land use was commercial;
- Insufficient detail for MOECC when assessing potential future sensitive uses (due to complexity, elevations, worst-case and need for at-receptor mitigation)

Approach



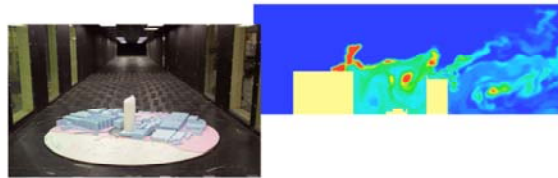
- Full odour assessment was completed with source testing (all odour sources; including fugitives)
- Odour panel for emissions quantification
- Cross check with Scentroid ambient odour measurements



We even tried hedonic tone, but results highly variable and very, very inconclusive.....appeared some really liked the odour, so didn't...at site, most characterize odour as a caramel, molasses type smell. Ship unloading can have an alcohol smell due to fermentation during transit

Approach

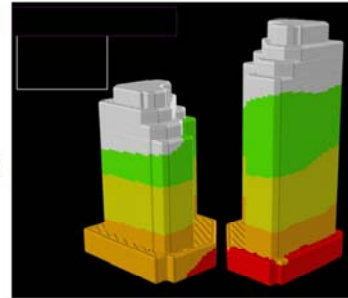
- Modelling using AERMOD for compliance
- Both existing and future increased production modelled
- Some research using Wind Tunnel and Computational Fluid Dynamics as 'checks' and determining wake effects
- Helped determined ranking of areas to make improvements and levels of at-receptor mitigation



Working Solution

Two areas agreed to by parties in this case:

1. **Emission related mitigation (at-source)**
High strength, key point sources; but many are low strength and/or fugitive
2. **Exposure Risk reduction mitigation to reduce potential for future complaints (at-receptor)**



The Solution

- **Developed based on comparison to existing levels**
- **At Source**
 - elimination of a number of key point sources
 - Many sources fugitive or no feasible control
- **At receptor impact mitigation**
 - Site design to use buffer commercial space
 - Ensure odour free indoor space (air filtration/odour filters)
 - At highest impact locations, sealed units (no open balconies)

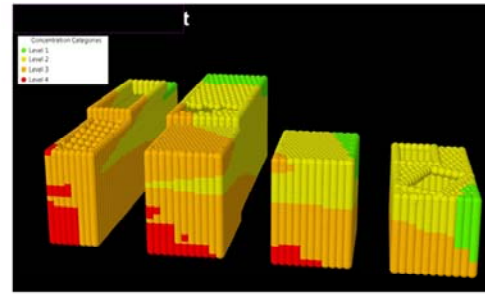


Avoidance Mitigation



- **At receptor “avoidance” mitigation**

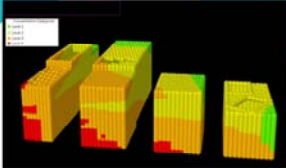
- Design to minimize exposure
- Small balconies
- Self closing doors
- Barriers (visual and enhanced turbulence)



Approach is to minimize opportunity for complaints, reduce expectations of sensitive use...small balconies to limit use, self closing doors to avoid indoor odours (i.e. expectation of “outdoor rooms”
Turbulence...undertook some studies to show that concentrations behind barriers and buildings were reduced due to increased mixing and dilution..

Future Challenges

- Challenges of dealing with modelled numbers as a surrogate for predicting future annoyance or acceptance
- Lack of future regulatory certainty for Redpath and residents
- Ensuring mitigation and “avoidance” design are implemented and maintained



Technically challenging project.....but even more difficult tying down legal and in agreements with developers, City, industry...