Dispersion Modelling Techniques for Odour

Presentation to AWMA Ontario Section – Odour Workshop

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Overview of Presentation

- Industries under odour attention in Ontario
- Odour limits
- Odour dispersion modelling – minimum and maximum scenarios
- Modelling requirements for approvals and compliance
- Modelling Input:
  - ✓Sources
  - ✓Receptors
  - ✓Buildings
  - ✓Meteorological data
- Modelling Results
- Discussion

Odour Related Industries

- Landfills and waste processing
- Waste Water Treatment Plants
- Chemical and Pharmaceutical
- Ethanol production and corn processing
- Oil refineries
- Food industry
- Automotive industry
- Painting operations at various facilities
- Agricultural operations – about 50% of all complaints are odour related

Odour limits

1 ou/m^3 – What is Behind this Limit

- Imposed in Ontario and often included into ECA requirements
- Other jurisdictions – a variety of approaches and limits
- No guarantee that complaints will not be filed

POIs and Guidelines ($\mu g/m^3$)– What is Behind these Limits

- For 60 out of 341 contaminants included in Summary of Standards and Guidelines (MOE PIBS No.6569) odour is listed as a limiting effect (Schedule 3 and Guidelines for section 20)
- Not all of these contaminants have 10 minutes averaging time limit
- Some of these contaminants may need in future the development of health- based standards (MOE comment)

Odour Dispersion Modelling

METHODOLOGY FOR MODELLING ASSESSMENTS OF CONTAMINANTS WITH 10-MINUTE AVERAGE STANDARDS AND GUIDELINES under O. Reg. 419/05

- Part of a much broader modelling exercise
- Tiered approach for the assessment of 10-minute odour-based standards
- Modelling software:
  - ✓ SCREEN3
  - ✓ ISCPRIME or AERMOD
  - ✓ CALPUFF – alternative model (MOE preapproval is required)

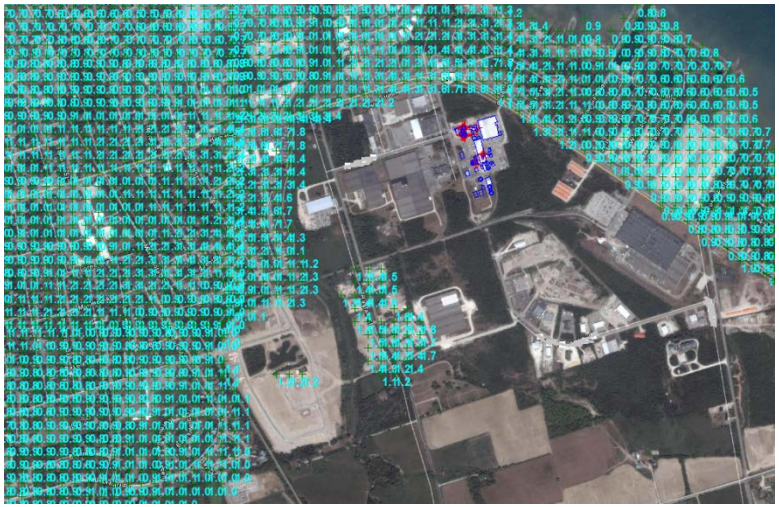
Tiered Modelling

- Software – from SCREEN3 to AERMOD
- Meteorological file – from regional met data to a site specific meteorological file
- Compliance – from meeting the standard/guideline everywhere within the domain to meeting the standard at human receptors
- Compliance – from meeting the standard/guideline itself to meeting the allowed number of exceedences over the standard/guideline per year

Receptors

- Receptors where human activities regularly occur:
  - Residences;
  - Health care facilities;
  - Senior citizen’s residences or long-term care facilities;
  - Child care facilities;
  - Camping grounds;
  - Schools;
  - Community centres;
  - Day care centres;
  - Recreational centres and sport facilities;
  - Outdoor public recreational areas; or
  - Other locations as specified by the Ministry.

Receptors – from a few to a lot…..



Modelling Sources of Odour Emissions

- Point sources
  - ✓ Stacks
  - ✓ Tanks
- Area sources
  - ✓ Shipping/receiving areas
  - ✓ Loading areas
  - ✓ Sewer grates
- Volume sources
  - ✓ Buildings
  - ✓ Production areas

Odour modelling for an ECA Application and Further Compliance with the ECA Requirements

ECA Application:

- A facility is under design
- No test data is available
- To use a chemical composition based on emissions inventory , or
- To use a real testing results obtained from the best available similar industrial facility

ECA Requirements:

- The facility is in operation
- Test data is available
- Modelling is performed based on test data
- A revised list of sources could be included into the modelling

Modelling Results

- Inconsistency of production and *surprising* modelling results
- Individual impact of previously overlooked sources
- Modelling as a tool to create an odour control system and a Best Management Practice Plan

Thank You.

Questions?