# Air Quality Study Update

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GTAA

**Toronto Pearson**
International Airport | Aéroport International

# Air Quality Study Objective

Update emissions inventory, dispersion modeling and human health risk assessment to better quantify and assess the current and projected future air quality (2022 and 2032) associated with and around the airport
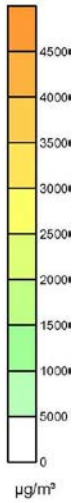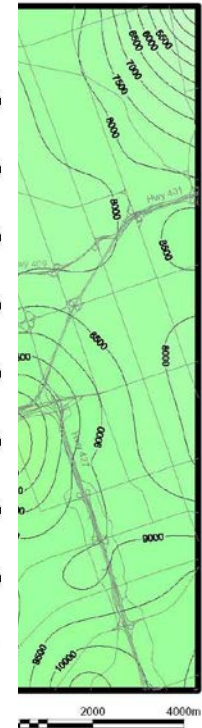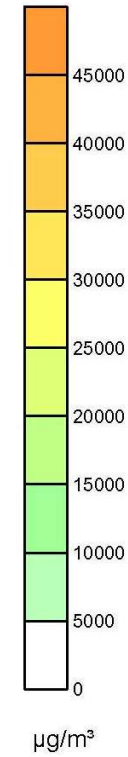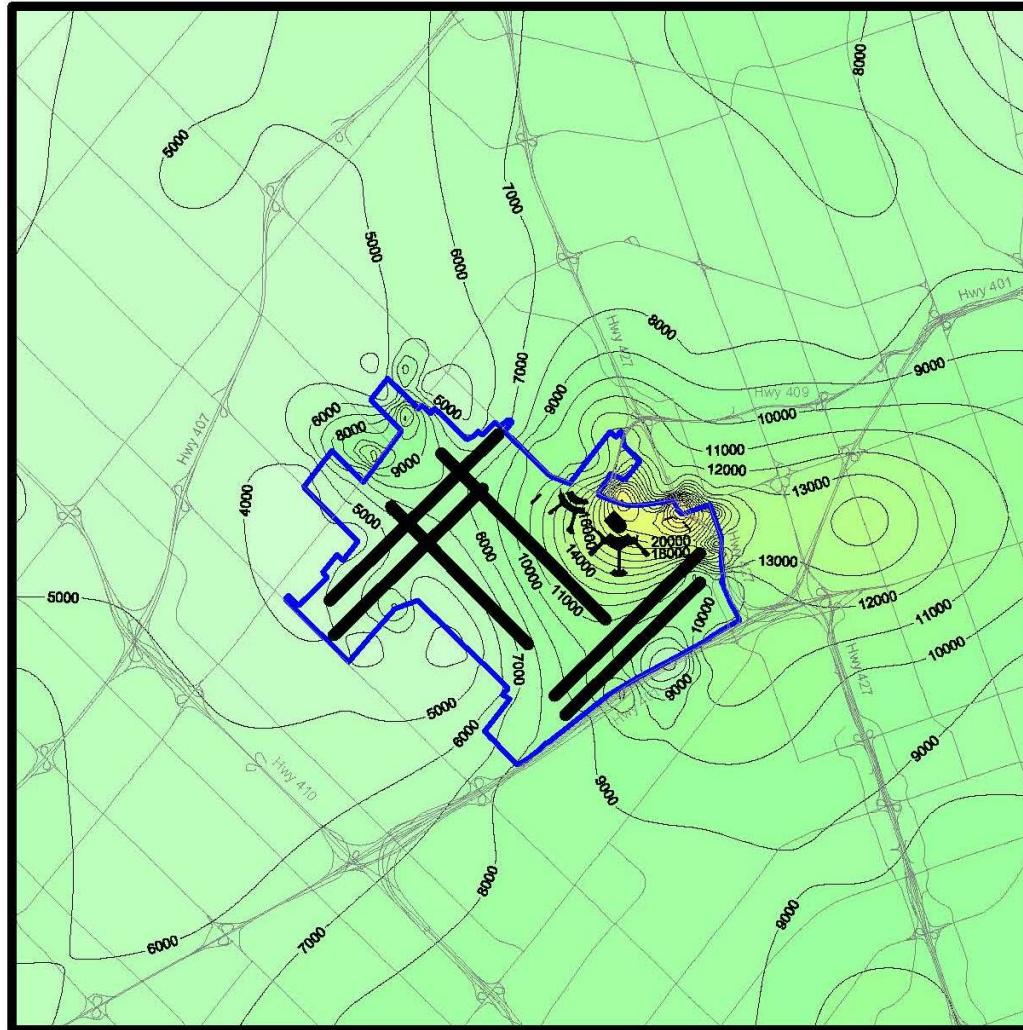
Previous studies

- 1990/1991
- 2003/2004

    http://torontopearson.com/en/aboutpearson/environment/#

- 2010/2011 (minor internal updates)

# Results from 2003 Study

# Scope and Schedule

**Phase 1**

- Develop airport emissions inventories
- Complete

**Phase 2**

- Off site emission inventory
- Complete

**Phase 3**

- Emissions and Dispersion Modeling System and area modeling
- Completion  - year end

# Schedule

**Phase 4**

- Human Health Risk Assessment (HHRA)

- Working with subcommittee

  - Full report to CENAC - Q2 2015

# Phase 1 and 2 results

| Compound | Toronto Pearson Alone | | Regional Emissions | |
|---|---|---|---|---|
| | 2011 (tonnes/yr) | 2010 (from 2003 study) (tonnes/yr) | 2011 (tonnes/yr) | 2010 (from 2003 study) (tonnes/yr) |
| NOx | 1,554 | 2,846 | 16,945 | 25,189 |
| SOx | 113 | 169 | 2,049 | 22,225 |
| CO | 2,611 | 6,762 | 98,457 | 47,925 |
| $PM_{10}$ | 24 | 28 | 10,959 | 14,134 |
| $PM_{2.5}$ | 23 | N/D | 4,296 | N/D |
| VOC | 207 | 589 | 21,303 | 29,747 |

# Emissions and Dispersion Modeling System

- Emissions Dispersion Modelling System (EDMS) model created and maintained by the FAA

- EDMS includes an extensive updated list of aircraft and engines, chemical compounds released including emissions for time-in-mode (e.g., taxiing, idling, take-off, climb-out, landing) for aircraft

- Includes emissions from ancillary stationary sources such as generators, cooling towers, heating equipment, etc.

- Other mobile sources such as roads and parking garages

- Integrated with U.S. EPA's AERMOD model for simulating the transport and dispersion of compounds

- Utilizes hourly meteorological data from Environment Canada's station at Toronto Pearson (2008 to 2012)

# Monitoring vs. Modelling

| Monitoring | Modelling |
|---|---|
| Collects actual air quality in the community | Predicts air quality based on estimated emissions and actual meteorology |
| Concentrations only valid at location they were collected, but can estimate concentrations between 2 or more stations | Concentrations predicted over a broad area, number of locations only limited by length of time for the model run |
| Can only tell you what has happened | Can be used to look at what has happened, but can also predict the future |
| Requires special equipment, equipment must be regularly maintained in order to provide useful data | Uses computers to model but also requires some calibration and "ground truthing" |

# Scenarios

- Scenarios being modelled:
    - Airport Alone – 2011 actual activity level
    - Airport Alone – 2022 forecast activity level
    - Airport Alone – 2032 forecast activity level
    - Regional Background – 2010 actual emissions (most up-to-date from Environment Canada without Pearson Airport)
    - Regional Background – future forecast emissions (based on emissions trends from last 20 years, forecast out to 2022)
    - Ozone Limiting Method was applied to NOx modelling results to make them comparable to ambient and health risk criteria
    - Hourly ozone data from 125 Resources Rd. monitoring station were used for OLM calculations

# Phase 4 – Human Health Risk Assessment

- HHRA will address these questions:
  - What are the potential health risks to the general community uniquely associated with emissions from airport operations alone?
  - What incremental difference do the airport emissions make to the overall potential health risks expected in the community working or residing within a 7.5 km radius?
- Will be similar in approach to the previous health risk assessment from 2004
- Comparisons will be made whenever possible to the results of the previous study

# Receptor Locations

# Thank you

"The great enemy of the truth is very often not the lie - deliberate, contrived, and dishonest - but the myth - persistent, persuasive and unrealistic.

Too often we hold fast to the clichés of our forebears.  We subject all facts to a prefabricated set of interpretations.

We enjoy the comfort of opinion without the discomfort of thought."

John F. Kennedy

# Questions?

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