

AVIATION OPERATIONAL MEASURES FOR
FUEL AND EMISSIONS REDUCTION
WORKSHOP

Airport Ground Side Emissions
Reductions

Randy McGill

Manager, Environment

Greater Toronto Airports Authority



Toronto Airport - Who are we?

- 28 Million Passengers
- 425,000 Aircraft Movements
- \$4.4 Billion Construction Program
- ISO 14001 Certified
- Kyoto Goal 6 % Reduction
- Temperate Climate -30 to +35 Celsius



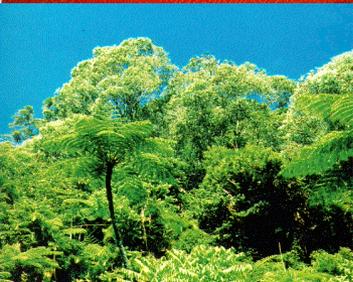
Background

- 1990 Environmental Assessment for the Addition of 3 Runways
- Air Emissions not to Increase
- No Measured Increase in Air Emissions
- 1990 Emphasis on Criteria Pollutants
- 2000 Emphasis on VOC's and PM10
- Health Issues



Aldehydes & Ketones

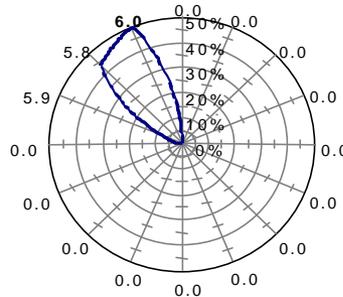
Perth/Ruskin



Carbonyl	Jet Emission: Range % Idle-Taxi	Diesel: Ranking	Combined
Formaldehyde	37-70%	1 (LD = 45%, HD = 26%)	LD = 63-75% HD = 50%
Acetaldehyde	9-41%	2	
Acetone	4-45%	3	
Acrolein	3.7-16%	11	
Propanal	1.4-7.5%	13	
Crotonaldehyde	0.7-5.1%	4	



Carbonyls – Formaldehyde ($\mu\text{g}/\text{m}^3$) September 11



6.5

n/a

6.8
5.8

MOE 24-h AAQC = $65\mu\text{g}/\text{m}^3$



10 Years of Emission Reductions

- Airside
- Efficiency
- Private Vehicles
- Ground Side Vehicles
- Fixed Sources



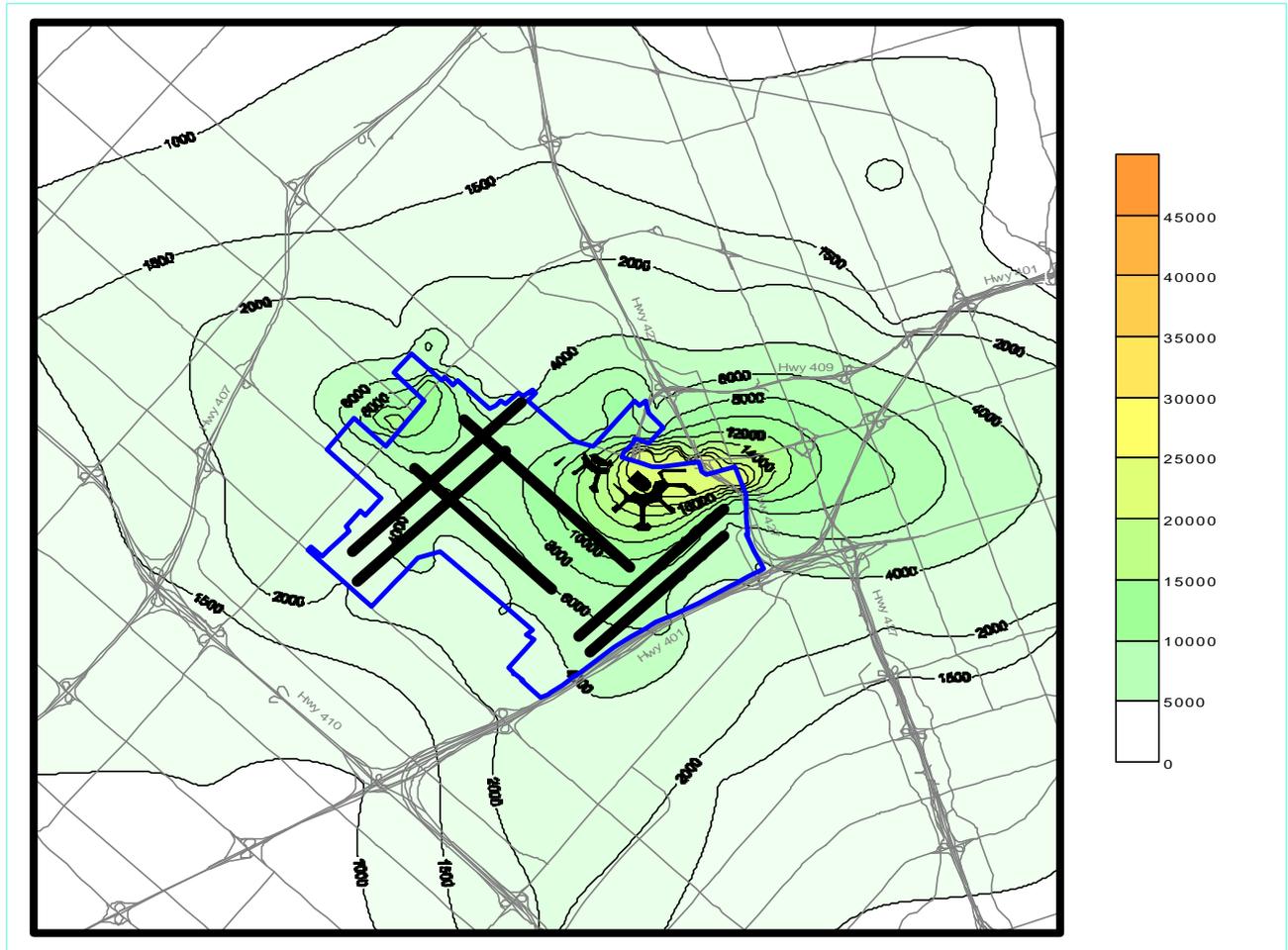
Ground Side Emission Sources

- Passenger & Staff Vehicle Use On and Off-Site
- Mass Transit
- Fixed Sources
- Parking - 18% of Revenue
- Tenant Deliveries
- Roadways/Highways





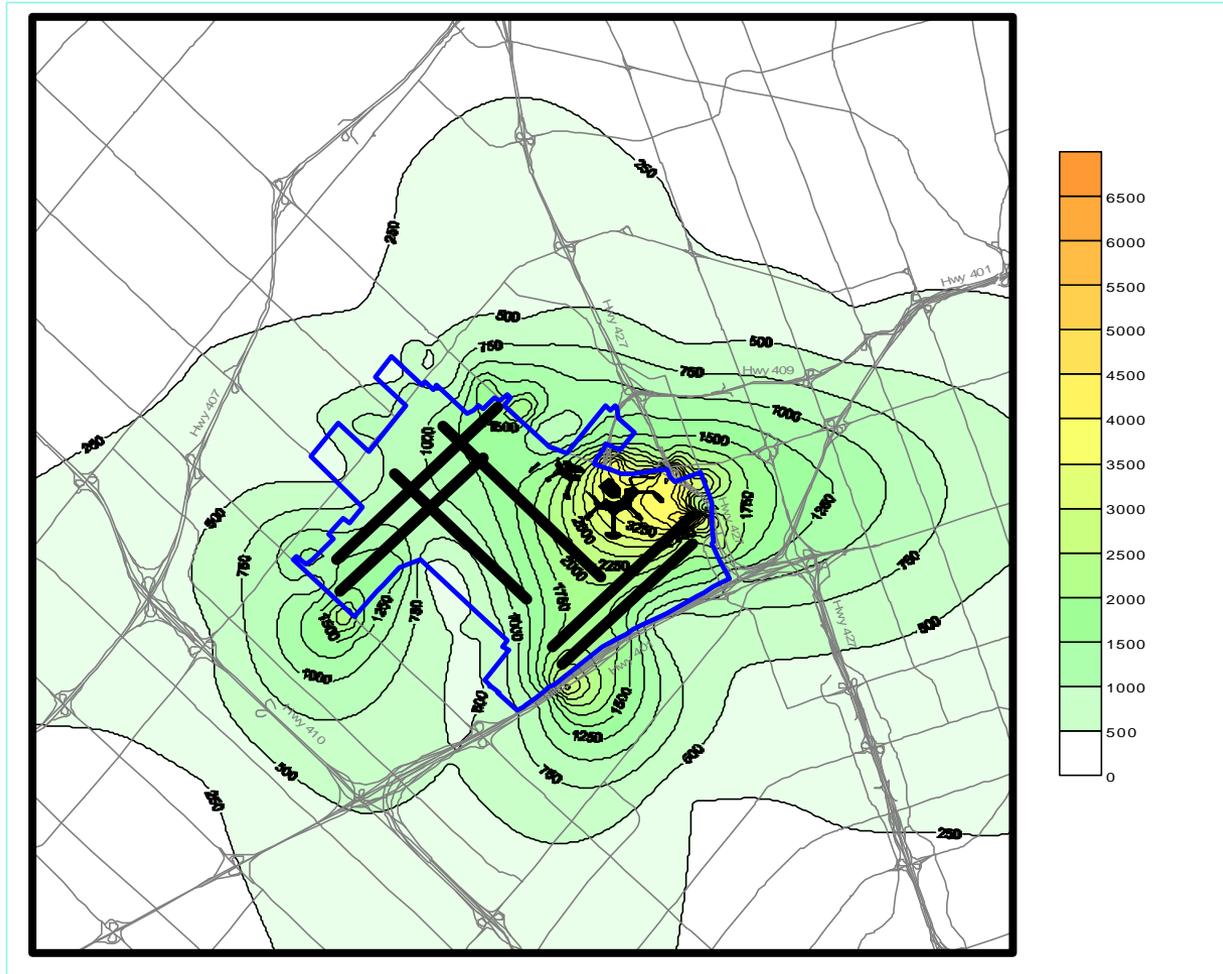
2015 Maximum 1 - Hour CO



Airport Panel – Part 2
Ottawa, 5-6 November 2002



2015 Maximum 1- Hour NO



Airport Panel – Part 2
Ottawa, 5-6 November 2002



Emission Reduction Strategy

- Based on Modeling
- Based on Community Concerns
- Based on Smell and Aircraft Plume?
- Based on Kyoto
- Based on Cost, Technology and Potential Reduction, Health
- Chasing Technology



Emission Reduction Opportunities

- Transportation To and From the Airport, People and Cargo
 - Roadway Limit Access Points - Spaghetti
 - Idling at the Curb
 - Parking Price Structure, Limit Greeters
 - Rail, People Movers, Off-site Parking
 - Buses - CNG, Hybrid Electric
 - Offsite Central Tenant Warehousing



Building Design Opportunities

- LEED - Building Performance Assessment
- Life Cycle Management
- Ozone Depleting Substances Elimination
- Interior Finishes
- Energy Audits
- Vegetation
- Land Use Zoning



Airport Operator and Tenant Opportunities

- Vehicle Fleet Changes
 - Electric
 - Hybrid Electric
 - CNG
- Attitude Changes
 - Turn Off the Vehicle
 - Turn Off the Lights



Building Energy Reduction Opportunities

- Solar
- Wind
- Photo voltaic
- Co-generation heat and electricity
- Onsite verses Offsite Emissions
- Green Energy Purchases



Conclusion

- There is No One Way to Obtain Fuel and Emission Reductions
- Need A Strategy
- Need A Will
- Need a Commitment

