

Toxic Emissions From Uncontrolled Combustion Sources in the Great Lakes Region: Summary of Issue Papers

*Presentation to the
Dioxin/furan Workgroup Meeting
Binational Toxics Strategy Stakeholders Meeting
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Presentation overview

- Introduce EHS
- Background
- General methodology
- Summary of Issue Papers
 - Description and common practices
 - Release Estimates
 - Regulations and Programs
 - Conclusions and Recommendations

EHS Mission and Clients

- *To provide scientific, technical and economic advice to government and private sector clients to assist decision-making in the area of protection of human health and the environment*
- *EHS works for regulators and for industry*
- *Regulators*
 - *Environment Canada*
 - *Health Canada*
 - *Ontario Ministry of the Environment*
- *Industry*
 - *Industry associations*
 - *Private sector companies*

Background

- Binational Toxics Strategy
- Uncontrolled combustion identified as potential source category
- EHS contracted to prepare Issue Papers
- Sources examined: agricultural burning, structure fires, tire fires, and wildfires and prescribed burning
- Sources excluded: landfill fires and backyard barrel burning
- Toxics considered: dioxins and furans (PCDD/F), BAP, PAHs, Hg, dioxin-like PCBs, and HCB
- Scope: Ontario and 8 Great Lakes states

General Methodology

- Release information
 - Scientific publications: *Dialogue* search engine,
 - Public documents: Internet, contacts, references
- Common practices, activity levels, regulations and programs
 - contacts with government agencies, Internet
- Release estimates
 - activity data
 - emission factors

Agricultural Burning

Definition and Common Practices

- Refers to open burning of stubble, animal carcasses, agricultural plastics
- Agricultural plastics: silage bags, mulch and greenhouse film, bale wraps, nursery trays and flats...
- Stubble and open carcass burning uncommon in GLB
- Plastics: polyethylene, polystyrene, polypropylene
- Plastics burning common

Agricultural Burning Release Estimate

	BAP kg/y	PAHs kg/y	PCDD/F g TEQ/y	Inventory (PCDD/F)
Ontario	0.3	6	0.7	48
8 G.L. States	2	47	5	1,100
GLB Total	2	53	6	

- PCDD/F emissions estimate speculative, for discussion purposes
- Quantities burned unknown, calculated from study
- BAP and PAHs emission factors from open burning tests, rated C (average)

Agricultural Burning Regulations and Programs

Ontario

- Agricultural plastics burning not permitted
- Clean HDPE and polystyrene nursery flats recycled
- Pilot recycling program discontinued

8 G.L. States

- Agricultural plastics burning permitted in some states
- Limited recycling programs in place

Agricultural Burning

Conclusions and Recommendations

- Stubble, carcass burning uncommon in GLB
- Significant quantities of agricultural plastics burned in GLB
- Study required to identify quantities, types, practices
- Emission testing required
- Need for recycling programs
- Need for regulatory control

Structure Fires

Definition and Assumptions

- Refers to accidental burning of buildings
- Industrial fires excluded due to limited data
- 75% fires residential homes, 9.5 % loss
- Average residential home: 180 kg PVC, 21,000 kg wood construction materials
- Only PCDD/F emission factors available
- BAP and PAH emission factors obtained from residential wood combustion experiments

Structure Fires Release Estimate

	BAP kg/y	PAHs kg/y	PCDD/F g TEQ/y	Inventory (PCDD/F)
Ontario	15	350	0.3	48
8 G.L. States	130	3,200	2.8	1,100
GLB Total	145	3,550	3	

- Release Estimates less than 1% of inventory values
- Emission factors rated U (considerable uncertainty)
- Exclude emissions from dwelling contents

Structure Fires

Regulations and Programs

Ontario

- Fire Prevention and Protection Act
- Fire code

8 G.L. States

- Similar to Ontario

Structure Fires

Conclusions and Recommendations

- Release estimates < 1% of inventory values
- Considerable uncertainty in the estimates
- Revisions recommended when additional emission factor data available
- Estimate releases from vehicle fires

Tire Fires

Definition and Common Practices

- Refers to unplanned fires occurring in stockpiles of tires

Ontario

- Strict vigilance and control implemented
- Recycling, export, use as fuel, no large stockpiles
- No fires occurred in several years

8 G.L States

- Similar practices
- Large tire fires in recent years in some states
- Poor tracking in some states

Tire Fires Release Estimate

	BAP kg/y	PAHs kg/y	BAP Inv. kg/y
Ontario	0	0	12,000
8 G.L. States	3	30	
GLB Total	3	30	

- Based on laboratory-conducted simulations
- Emission factors rated D (order-of-magnitude)
- Based on 2002 data

Tire Fires

Regulations and Programs

Ontario

- Fire prevention measures
- Permit required
- Waste tire diversion program

8 G.L States

- Fire prevention measures
- Abatement and diversion programs

Tire Fires

Conclusions and Recommendations

- No significant tire burning in Ontario
- Substantial tire fires in some states in recent years
- Revisions recommended when additional emission factor and activity data available
- Record keeping and further information on tire management programs required for some states

Wildfires and Prescribed Burning Definitions

- Wildfires: unplanned, uncontrolled in forest or grasslands
- Prescribed burns: planned and controlled, land management
- Brush fires: burning brush, land clearing operations

Wildfires and Prescribed Burns

Current Conditions

Ontario

- 80% forest fires non-anthropogenic origin, northern Ontario, largest contributor to emissions
- Limited grasslands and prescribed burns
- Brush fires: slash from logging operations

8 G.L. States

- Most wildfires of anthropogenic origin
- Prescribed burning commonly practiced
- 50% less biomass burned than in Ontario

Wildfires and Prescribed Burning Release Estimate

	BAP kg/y	PAHs kg/y	Hg kg/y	PCDD/F g TEQ/y	Inventory (PCDD/F)
Ontario	4,100	161,000	620	110	48
8 G.L. States	2,100	84,000	320	60	1,100
GLB total	6,200	245,000	940	170	

- Emission factors preliminary, order-of-magnitude
- Laboratory-derived emission factors (except Hg)
- Ontario contribution twice that of U.S. G.L. states

Wildfires and Prescribed Burning Regulations and Programs

Ontario

- Forest Fire Prevention Act
- Woods Modification Guidelines
- OMNR prevention activities

8 G.L. States

- Forest fire prevention regulations
- Strict control over open burning

Wildfires and Prescribed Burning

Conclusions and Recommendations

- Emissions significant, majority non-anthropogenic
- Evaluate risk to health and environment in GLB
- Measures in place to minimize forest fires, open burning
- Revisions required when new data available
- Investigate high quantity of biomass burning (wildfires and prescribed burning) in Minnesota (82% of 8 G.L. states)

Summary of Priority Conclusions/Recommendations

- Significant source of toxics from non-anthropogenic wildfires, risk evaluation recommended
- Emissions from agricultural plastics burning require further examination
- Emissions from tire and structure fires small compared to total emissions inventories