ENVIRONMENTAL LOADING OF LEVEL I SUBSTANCES IN COMBUSTION RESIDUES

SUMMARY OF ONTARIO SOURCES

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COMBUSTION SOURCES

- MSW Incineration (3 over past 4 yrs)
  - 1 facility remains operational
- Coal-fired Power Generation (6 fossil fuel)
  - 5 facilities
- Hazardous Waste Incineration (4 over past 4 yrs)
  - 3 facilities remain operational
- Sewage Sludge Incineration (5 over past 4 yrs)
  - 4 facilities remain operational
- Biomedical Incinerators (70 operating 4 yrs ago)
  - 28 small units operational (2002)
  - 1 large regional centre in operation

GM CANADA (Oshawa)

- Two-stage system with rotary kiln
- 80 tonne/day capacity
- Handled in-plant waste only
- Previously processed about 7,000 tonnes/yr
- Waste minimization in parts shipping
- Closed in 2000

SWARU (Hamilton)

- 2 Semi-suspension combustion units
- 545 tonne/day capacity with energy recovery
- Coarse RDF
- Processed about 140,000 tonnes/yr
- Generated about 32,000 tonnes of bottom ash
- Generated about 7,200 tonnes of APC residue
- Ash landfilled at Glanbrook landfill
- Closed Dec of 2002

SWARU LOADING

- Bottom Ash
  - 0.0002 ng TEQ/g - All hepta & octa congeners
  - < 0.007 grams per year deposited in BA
- APC Residue
  - 55.4 ng TEQ/g, > 2:1 ratio of PCDD:PCDF
  - Annual loadings
    - 1999 = 220 grams TEQ
    - 2000 = 224 grams TEQ
    - 2001 = 202 grams TEQ
    - 2002 = 178 grams TEQ
- HCB = 388 - 488 g/yr PCB = 770 - 968 g/yr
- Hg in APC Residues
  - Estimate about 373 kg/yr deposited in landfill

KMS PEEL EFW (Brampton)

- Two-stage combustion systems
- 500 tonne/day capacity (5 x 100 tonne/day units)
- Mixed residential and commercial waste
- Processes about 160,000 tonnes/yr
- Generates 40,000 tonnes of bottom ash
- Currently landfilled, utilisation planned
- Generates about 3,000 tonnes of APC residue
- Haz waste landfill now, stabilisation planned

KMS Peel LOADING

- Bottom Ash
  - No leachable PCDD/F using TCLP
  - Difficult to estimate actual loading
- APC Residue
  - Conc. of 0.170 ng TEQ/g
  - Annual Loadings
    - 1999 = 0.337 grams TEQ
    - 2000 = 0.361 grams TEQ
    - 2001 = 0.392 grams TEQ
    - 2002 = 0.498 grams TEQ
- HCB and PCB data not available
- Hg Loading
  - Estimated 2 - 3 kg per year loading

ONTARIO POWER GENERATION

- Five Coal-fired Generating Stations
  - Atikokan
    - 1 boiler rated at 215 MW, low NOx & ESP
  - Thunder Bay
    - 2 boilers rated at 310 MW, ESPs
  - Lambton
    - 4 boilers rated at 1,974 MW, low NOx, ESPs, FGD (2 units, SCR being constructed on 2 units
  - Nanticoke
    - 8 boilers rated at 4512 MW, low NOx, ESPs
  - Lakeview
    - 8 boilers (4 used) at 1,200 MW, low NOx, ESPs

OPG LOADING

- PCDD/PCDF Data
  - <0.001 - 2.4 pg TEQ/g (globally)
  - 0.30 pg/g or 0.03 pg TEQ/g (Environment Canada)
- Estimated Loading
  - 3 facilities estimated transfers of PCDD/PCDF to recycling of 0.04 g TEQ per yr
  - 390,000 tonnes of ash recycled = 0.103 pg TEQ/g
- HCB or PCB below detection
- Hg Loading
  - Estimated 113 - 156 kg per year loading to recycling

HAZARDOUS WASTE INCINERATION

- 2 two-stage units designed to decontaminate equipment and destroy PCB liquids (<500 ppm)
  - Gary Steacy Dismantling, Material Resource Recovery
  - No appreciable residues
- OPG - Kincardine, Bruce Power Plant
  - Low level waste
  - Old unit replaced in 2002 (capacity <5,000 lbs/day)
  - Only operated at 35% of capacity
  - No loadings reported to land or for recycling
- Clean Harbors Ltd.
  - Yet to receive response

SEWAGE SLUDGE INCINERATION

- Multiple and fluidized bed units
  - London, Lakeview, Ashbridges Bay (closed 2002), Highland Creek, Duffin Creek
- Operational facilities did not respond
  - No PCDD/F loadings reported to air or land on NPRI
  - Environment Canada report (multiple hearth) indicated no detectable PCDD/F in residues
  - No HCB or PCB detected in ash or scrubber water
- Hg Loading (based on NPRI)
  - 2001 - total of 56.5 kg transferred for disposal
  - Loading varied widely between facilities

ENVIRONMENTAL CONSIDERATIONS

Bottom Ash - Landfill/Utilisation

- Fugitive dust
  - Deposited wet, covered = adequate mitigation
- Leaching of PCDD/PCDF
  - Non-polar organics are not water soluble
  - Colloidal particles only potential for migration
  - Leachate collection should prevent off-site migration
- Loss on Ignition = >3%
  - Stablility problems - settling, bacterial activity, gases
  - Ash placement least 1 metre above high groundwater

ENVIRONMENTAL CONSIDERATIONS

Fly Ash/APC Residues

- Fugitive dust
  - Contained, deposited damp = adequate mitigation
- Leaching of PCDD/PCDF
  - Non-polar organics are not water soluble
  - Most APC residues disposed in hazardous waste landfill = should prevent off-site migration
- Hg
  - Potential issue - revolatilization of Hg
  - Carbon acts as reducing agent or Hg can be methylated

SUMMARY

- PCDD/PCDF
  - Single largest point source was closed in Dec. 2002
- Fugitive Dust Emissions
  - Simple mitigation measures are used
- Leaching of PCDD/PCDF
  - Non-polar organics are not water soluble
  - Most APC residues disposed in hazardous waste landfill = should prevent off-site migration
- Hg
  - Potential issue - revolatilization of Hg
  - Carbon acts as reducing agent or Hg can be methylated