

"Persistent Organic Pollutants and Waste and
Chemicals Policy"

Brandýs nad Labem (Czech Republic)
May 5 - 7, 2004

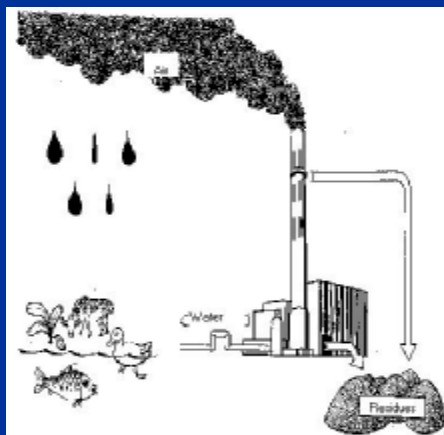
Waste Incinerators Fly Ash - Source of Contamination

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Environmental Impact of Waste Incinerators

- Air
- Water
- Waste/
Residues
- Others



Different kinds of residues

- Bottom ash
- Fly ash
- Filter cake
- Sorbalit
- Sludge
- Slag
- Soot
- Boiler ash
- Scrubber water
- etc.

One incinerator can have more different residues from cleaning flue gases

Example of MWI in Liberec:

- fly ash is washed and goes further as two separated different residues: washed fly ash and filter cake
- Filter cake goes to hazardous waste landfill
- Washed fly ash is mixed with bottom ash/slag and is used as a raw material in building industry
- There is also boiler ash generated by this incinerator
- PCDD/Fs are not measured at this point in any of these residues, but they were in the past





Municipal Waste Incinerators - Czech Rep.

- 3 MWI (Praha, Brno, Liberec)
- in 2002 they have burned 410.700 t of municipal solid waste
- they generate 240 kg of slag by burning 1 t of waste
- and 40 kg of fly ash
- by burning 1 t of solid waste these incinerators produce approximately 45 ng TEQ of PCDD/Fs
- 0,7 ng TEQ PCDD/Fs was released into the air
- together these 3 incinerators produce cca 20 g TEQ PCDD/Fs/ year, that means 5 g TEQ PCDD/Fs per 100.000 tones burned waste



Hazardous Waste Incinerators - Czech Rep.

- 64 hazardous waste incinerators (including hospital waste incinerators) - some of them were and/or will be shut down
- in 2002 they have burned 51.743 t of waste
- in fly ash were measured dioxins in range 0,82 - 82,4 ng TEQ/g fly ash
- HWI at Lysa has emission factor 145.000 ng TEQ/t burned waste (by worse incinerators it can be even 20-times higher)
- they produce 7,5 - 150 g TEQ PCDD/Fs per year

MWI TERMIZO Liberec

- MWI capacity is 96.000 tones/year
- solid residues production 35.700 t/year
- INGEO company put them on general municipal solid waste landfill in Košťálov, bigger part was used by the company GEMEC UNION to fulfill the old coal mine with a waste
- In 2002 TERMIZO (owner of the MWI) got certificates from TZÚS - *Mixture of ashes for recultivation and landscape improvement* according to the rules used for evaluation of fly ashes from brown coal power plants. Dioxins contents was not taken into account.
- Mixture was used in Č. Dub on unprotected landfill



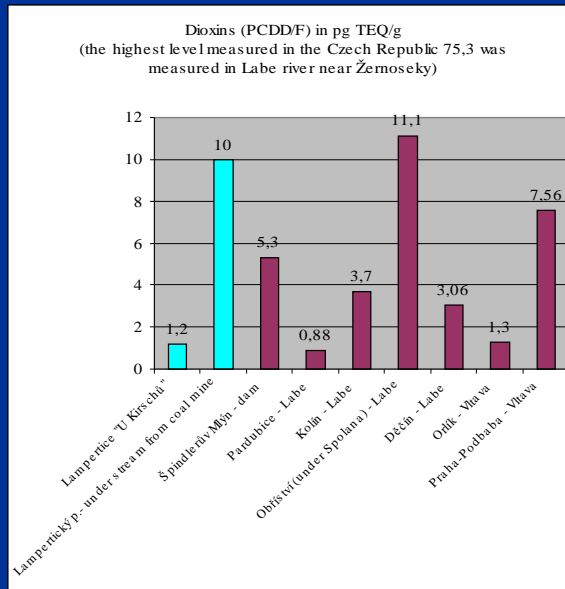
Case study Coal Mine Jana Švermy in Žacléř

- Wastes including fly ash are used for so called filling substrate.
- in 2000 - 2001 there were cca 8.750 t of fly ash used to fill the old mine
- certificates given by TZÚS for mixing different wastes and to use them as a product since 30. 12. 2002 based on geological survey, no PCDD/Fs content measurements required
- fly ash used atleast from waste incinerators in Praha - Malešice, Liberec and Lysá nad Labem
- this disposal way doesn't meet MOE decree No. 383/2001 Sb.



Mine Case

- Dioxins in sediments from creek were measured
- levels found under the stream from coal mine were 10times higher



Lysá nad Labem case study <http://bezjedu.arnika.org/lysa>

- Hazardous waste incinerator (1/5 - 1/4 capacity used to burn medical waste) - maximum capacity 3500 t/year
- Fly ash together with other residues from flue gases cleaning is stored in bags.
- Sorbalit - 2,19 - 6,31 ngTEQ/g
- All residues including slag or bottom ash go to the landfill in Benátky n. Jiz. and then to the company GEMEC - UNION a. s. in Žacléř („coal mine reclamation“).
- High concentrations of PCDD/Fs a PCBs in poultry, farmed game and fish were measured in Lysá



National Implementation Plan of Stockholm Conv.

Draft proposal of the Czech NIP:

- There should be required a more strict legislation concerning handling fly ashes from waste incinerators, because they are significant source of PCDD/Fs, PCBs and heavy metals
- It is necessary to look at landfills where fly ashes were dumped as on new POPs hot spots

Waste and Environment - Netherlands' country report on ashes

According to information from the operators of the Dutch waste incinerators in 1997 (table 1) [6], and based on an annual production of 79000 - 81000 tons of fly ash, annual dioxin quantity is estimated 190 -195 grams (in TEQ). These figures differ strongly from the official estimates from Dutch EPA, and University of Amsterdam. (Arne Schoevers 2004)

Argentina - pictures



PCDD/Fs leachability

Effect of dissolved humic matters (DHM) on the leachability of PCDD/F from fly ash (Chemosphere 47 (2002) 599-605, Chemosphere 48 (2002) 849-856)

- Results of studies:
- Concentration of DHM and pH influence the leachability of PCDD/F significantly.
- Ratio of min. and max. concentration PCDD/F in leachate was 262,3 in the study.
- The highest leachability was shown at the highest pH

PCDD/Fs leachability

- The higher concentrations of DHM showed the higher leachability of PCDD/F.
- It is highly probable that humic matters derive from the unburned carbon in the bottom ash.
- The leachability of PCDD/F was enhanced by mixing with bottom ash.
- Because the leaching behavior of PCDD/F is different from that of heavy metals in fly ash, some of the present treatment methods for fly ash prior to landfill should be reconsidered.