

Contributions to DOXIN 2004 – Review by Prof. Dr. Dr. Parlar

– Summary –

The summary starts chronologically with the presentation of Mr. Ole Schleicher and colleagues, who have presented two studies. The aim was to get background data for the estimation of the annual dioxin emission from the use of oil shale in pyrolysis processes in power stations of Estonia to improve the estimation. All the dioxin concentrations emitted from the oil plant were very low, much lower than the EU emission limit value. The authors indicated that dioxins are likely to be formed in the combustion process and pointed out that the heat exchange system could function as an effective dioxin abatement by adsorbing the dioxins to the oil shale particles.

The second project aimed to gather data for the estimation of the annual dioxin emission for improving the estimation for emissions. All dioxin emission concentrations from the two power plants and the oil plant were very low with exception of one – close to the EU emission limit – measurement, which was most likely due to start up and operational problems. As to the authors, then very low dioxin emissions are due to efficiently led combustion processes in the furnaces. They found that the annual dioxin emission to the air was more than ten times lower as previous estimations. The total annual dioxin emission with the ashes was close to zero, which, however, may depend on unstable combustion conditions.

Hamm et al. reported on the applied method of analysis of Polybrominated Diphenyl Ethers (PDEs) in sewage sludge and effluents of sewage plants from a central region of Germany. The study has shown that the effluents of the sewage treatment plants still contain some particle-bound PBDEs, which are released into the aquatic environment. The amount of particulate suspended matter of effluents, so the authors, should be taken into account in order to assess whether such emissions are relevant compared to other emissions.

Dr. de Souza Pereira and Dr. Kuch compared the heavy metal, PCDD/PCDF, contents in sewage sludge from urban and agricultural areas in Rio de Janeiro, Brazil, to those observed in Baden-Württemberg, South Germany. The authors indicated that such congener contamination pool stems mainly from depositional sources. The observed high concentration of HpCDD/F-OCDD/F groups in the samples could be explained through transport and adsorptions phenomena.

An Assessment of dioxin levels in processed ball clay from the United States has been the subject of a study exerted by Josef Ferrario and colleagues. A range of dioxin levels could be observed, but the authors complained that the lack of marketing data and limited sampling precluded a definitive determination for characterization. Over 100 times greater average dioxin levels were identified compared to an assessment in the year 2000, which may lead to human exposure. The authors' study overall confirmed that elevated dioxin levels are commonly found in commercially processed ball clays.

A communication presented by Mr. Kazutoshi Nose et al. showed preliminary data on the composition of chloronaphtalenes in various Halowax formulations after HRGC-HRMS analysis. Obtained data revealed distinct variation in abundance of particular homologue groups and congeners. The authors stressed that a new analytical and toxicological approach to receive data on CNs, including their technical formulations, is of increasing importance, since those mixtures are considered as equipotent to planar chlorobiphenyls (CBs) or even as a main source of dioxin-like activity in recent decades.

Mr. Hyo Bong Hong and colleagues presented the analysis of polybrominated biphenyl ether in silicone and EPDM rubber. A liquid-liquid extraction method combined with soxhlet extraction was adopted to measure the content of PBDEs in two polymers and the efficiency of the extraction was compared with that of soxhlet only. The results showed that soxhlet extraction alone was not effective to measure the content of PBDEs. Four BDEs in silicone rubber and thirteen BDEs in EPDM rubber could be identified, plus the existence of BDEs in both samples.

Mr. Takashi Yamamoto preliminary attempted in his study to examine whether chlorobenzenes and chlorophenols are formed during synthesis of chloronaphthalenes, which contributes as toxic impurities in a final product. His findings indicated that mixtures contributed in part to environmental releases of CPhs.

A study performed by Mr. Marc Deschamps assessed 2003 the emissions of PCDDs-PCDFs from the Copesul petrochemical complex located in Southern Brazil, aiming to validate and to confirm the previous 2000 EAPPs results. The researcher focused the monitoring only on sampling points and matrices considered more potential for these compounds. The emissions of PCDDs-PCDFs from potential sources of the petrochemical complex were insignificant, as were the monitoring for PCDDs/PCDFs in soils and aquatic sediments, except for one sediment sampling point, located at a tertiary treatment point of the waste water treatment facility. There, the concentration was above the Canadian guideline (Threshold Effect Level) but below the PEL guideline, indicating that adverse biological effects are possible to occur. The author suggested to investigate interconnections with adjacent aquatic ecosystems, and to start identifying the different biological components and interactions. Furthermore, additional data should be gained for a more definite assessment and monitoring of potential environmental impacts of PCDDs-PCDFs.

Dr. Jinsong Liu in his study collected fly ash samples from four MSW incinerators in Zhejiang equipped with different furnaces and air pollution control devices for investigating the concentration of PCDD/Fs and the distribution of the PCDD/Fs congeners. The influence of active carbon to fly ash was also considered. Similar distribution of PCDD/Fs congeners found in the fly ash samples A, C and D showed that PCDD/F formations was less dependent to the type of incinerator and the air pollution control device used. Different distribution of PCDD/Fs congeners in the fly ashes B and C showed the different dioxin synthesis mechanism of the furnaces B and C. Injection of the active carbon powder into the stack has effectively decreased the concentration of the PCDD/Fs in the flue gas and increased the concentration in fly ash, but could not influence the distribution patterns of the PCDD/Fs congeners in the fly ash.

Mr. Yukio Noma has exerted a study about chlorophenyls in chloronaphthalene Halowax formulations, as nothing is known whether technical CN formulations can contain by-side CBs that could contribute to environmental diffusion of chlorophenyls. Data on concentration and composition of by-side CBs in Halowax chloronaphthalene formulations manufactured in the USA were presented by the author, including all 209 congeners. The author assumed that a specific composition of by-side CBs found in Halowaxes when compared to original CB formulations could be due to the presence of biphenyl as an impurity in technical naphthalene, as well as due to differences in the temperature regime applied during manufacture of both groups of chemicals.

The scope of the research presented by Mr. Mladen Picer was to investigate PCBs pollution in deeper layers of soil samples collected inside the electric transformer station (ETS) of Zadar, Croatia, and sediments from the near Marine. The author speculated about possibilities whether PCBs entered into the Marine aquatorium from ETS Zadar via underground, but the results indicated that it was more probable due to a previous contamination of the Marine aquatorium by PCBs.

The study of Prof. Jian-Hua Yan collected two fly ash samples produced from typical municipal solid waste incinerators in China from bag filters of different types of incinerators, to characterise Polychlorinated dibenzo-p-dioxins and Dibenzofurans. The homologue profiles of PCDD/Fs and the effect factors of PCDD/Fs levels were also studied. The author firstly found that the levels of PCDD/Fs in fractionated fly ash samples increased with decreasing particle size. The levels of 2,3,7,8-substituted PCDD/Fs and the I-TEQ values of that showed the same property. Secondly, the homologue profile of PCDD/Fs in fly ash samples produced from different furnace types were similar. However, the ratio of PCDDs/PCDFs was different. PCDDs were predominated PCDFs for the grate incinerator, but was in contrary for the circulated fluidised bed.

Mr. Wenbin Liu investigated the levels of polychlorinated biphenyls in 1,4-Dichlorobenzene mothballs in China. The author found the study to be important for providing data on the concentrations of PCBs therein. Although the levels of WHO-TEQ in the samples were relatively

low, the concentrations of PCBs were high in all samples, suggesting that the risk of using p-DCB products should be re-estimated, especially for those products which are in daily use such as mothballs.

Mr. Marti Nadal from Spain monitored the concentrations of PCDD/Fs in soil and vegetation samples collected in the vicinity of the hazardous waste incinerator (HWI) after five years regular operation. He found that the concentrations of PCDD/Fs in soil and herbage samples collected in the surroundings of the HWI in 1998 and 2003 did not increase significantly and indicated therefore that to date, this facility is not an important source of environmental PCDD/Fs contamination in this area.