UNITED
NATIONS

SC

UNEP/POPS/EGBATBEP.2/4

Distr.: General
24 November 2006

Original: English

United Nations
Environment
Programme

Expert Group on Best Available Techniques and Best Environmental Practices
Second meeting
Geneva, 19–24 November 2006

Report of the second meeting of the Expert Group on Best Available Techniques and Best Environmental Practices

K0653928 060207

Annex II

Response to the request by the Conference of the Parties to the Basel Convention at its seventh meeting

1. The Expert Group on Best Available Techniques and Best Environmental Practices has considered the request by the Conference of the Parties to the Basel Convention at its seventh meeting inviting bodies of the Stockholm Convention to consider best available techniques and best environmental practices with respect to unintentionally produced persistent organic pollutants, including the more recent technologies for destruction and irreversible transformation listed in the general technical guidelines (see decision VII/13 of the Conference of the Parties to the Basel Convention).

2. The Basel Convention has identified ten processes that are listed in the general technical guidelines for the purpose of destruction and irreversible transformation of the persistent organic pollutant content in wastes when applied in such a way as to ensure that the remaining wastes and releases do not exhibit the characteristics of persistent organic pollutants.

3. The Expert Group notes that two processes (cement kiln co-incineration[1] and hazardous waste incineration) are already covered in the current draft guidelines on best available techniques and provisional guidance on best environmental practices.

4. At its first meeting, in November 2005, the Expert Group established a working group to assess the remaining processes. It found, however, that there were insufficient data on the releases of unintentionally produced persistent organic pollutants from these processes to undertake this assessment.

5. At its first meeting, the Expert Group invited Parties and others to provide any data on releases of unintentionally produced persistent organic pollutants, and any other relevant operation information they had available, on any of the following processes operating in their country (see report of the first meeting of the Expert Group, contained in document UNEP/POPS/EGBATBEP.1/5):

- Alkali metal reduction
- Base catalysed decomposition (BCD)
- Catalytic hydro-dechlorination (CHD)
- Gas phase chemical reduction (GPCR)
- Photochemical dechlorination (PCD) and catalytic dechlorination (CD) reaction
- Plasma arc
- Potassium tert-Butoxide (t-BuOK) method
- Supercritical water oxidation (SCWO) and subcritical water oxidation

6. In response to this request and subsequent intersessional requests to Parties and other organizations, the Expert Group received reports and data from several countries having processes that had ceased operation or were currently operating on a pilot or commercial basis. Information on processes that are under development and not listed above was also provided, but was not assessed.

7. At its second meeting, the Expert Group assessed that information. Its findings are attached in the appendix to the present document.

[1] "Cement kiln co-incineration" is the term used in the general technical guidelines of the Basel Convention, while Annex C, part II (b) of the Stockholm Convention refers to "cement kilns firing hazardous waste".

Appendix

Assessment of eight processes for the destruction and irreversible transformation of the persistent organic pollutant content in wastes

The following information is provided for commercially operating plants, unless indicated.

A. Alkali metal reduction

1. Of the eight processes assessed, the alkali metal reduction process had the greatest number of plants operating, most of these in Japan. The plants were treating oils contaminated with polychlorinated biphenyls (PCB). A number of plants treated PCB with concentrations in the range of 100 parts per million, while some plants were treating concentrations up to 10 per cent. In all plants, the exhaust gas was treated with activated carbon.

2. Information provided by Japan showed that emissions of dioxin (PCDD), furan (PCDF) and dioxin-like PCBs to air and water were very low, in the order of <0.002 ng TEQ/m^3N in air and 0.00005–0.0001 ng TEQ/L in waste water. Levels in solid residues were also low (1.7–54 µg/kg for PCB and 0.0018 µg TEQ/kg for PCDD/PCDF/dioxin-like PCBs). No data are yet available on air pollution control residues (activated carbon), but these are expected to be low as the input to the treatment was itself very low in PCDD/PCDF.

B. Catalytic hydro-dechlorination

3. There are currently only two plants operating, both in Japan, and limited emission data are available. One has been operating only since October 2006 and has a capacity to treat 2 tons of PCB per day. Two performance test measurements provided by Japan showed that emissions of PCDD/PCDF/dioxin-like PCBs to air for this plant were very low, in the order of 0.0001 ng TEQ/m^3N. The other plant has a capacity of 30 kg/day at concentrations of 10 per cent and has no emissions of exhaust gas and no discharge to water, as the main product is biphenyl, which has levels of PCDD/PCDF/dioxin-like PCBs of around 0.00001-0.0001 ng TEQ/g. The treated oil, including biphenyls, is incinerated.

C. Base catalysed decomposition (BCD)

4. Data on emissions from base catalysed decomposition for two plants operating in Japan, one plant operating in Australia and one plant operating in the Czech Republic were provided. They all treated PCB at varying levels up to 10 per cent. It was noted that a former plant which treated soil contaminated with a range of persistent organic pollutants at the Sydney Olympic site in Australia had been decommissioned in 2003. Information on the only plant currently operating in Australia showed that the levels of emissions of PCDD/PCDF to air were very low, in the order of 0.0119-0.05 ng TEQ/m^3N.

5. The levels of emissions of PCDD/PCDF to air was <0.01 ng TEQ/m^3N at one small plant in Japan, treating 10kg/4 hours of high (10%) concentrations of PCB.

6. For the plant in the Czech Republic, the residual amounts of PCDD/PCDF in the output oil were less than 0.016 ng TEQ/g and hexachlorobenzene (HCB) <0.2 µg/g. Levels of PCDD/PCDF in the process off-gas (combined off-gas from soil treatment and BCD reactors) ranged between 0.013 and 0.031 ng TEQ/m^3N; for PCBs between 0.005 and 0.0014 ng TEQ/m^3N; for HCB between <6.7 and 187 ng/m^3N; and for $\sum$ of organochlorine pesticides, between 17 and 235 µg/m^3N.

D. Gas phase chemical reduction (GPCR)

7. It was noted that the only gas phase chemical reduction plant in Australia closed in 2002 and there were no emissions data available for this plant. A Danish review (2004) noted that emissions of PCDD/PCDF from the gas phase chemical reduction process to all media were lower than those from the base catalysed decomposition process. While there was some uncertainty of the current status of the licence for this process and its availability, it was noted that there is a plant in Japan that is close to commercial operation.

E. Photochemical dechlorination (PCD) and catalytic dechlorination (CD) reaction

8. Only one small plant was commercially operating and it was located in Japan. It was noted that it had a very small capacity of 4.6 kg/2 days of high concentration PCB. The levels of emissions of PCDD/PCDF/dioxin-like PCBs to air were very low, in the order of 0.00007 ng TEQ/m^3N.

F. Plasma arc

9. It was noted that the Plascon™ process was operating in Australia, in the same facility as the base catalysed decomposition process, and that the levels of PCB in effluent discharge to waste water were less than 2 parts per billion.

G. Potassium tert-Butoxide (t-BuOK) method

10. This process is used in Japan on a commercial level for oils with low concentrations of PCB (reported to be 17–180 mg/kg). One commercial plant with a capacity of 36m^3/day generated no gaseous emissions. Concentrations of PCB in the treated oils are in the range of < 5 ng/g. Sludges from water cleaning are incinerated.

H. Supercritical water oxidation (SCWO) and subcritical water oxidation

11. Information was provided on three plants operating in Japan. One commercial plant, treating 0.25 kg/hour (as 100 per cent PCB) using supercritical water oxidation, had emissions to air of PCDD/PCDF/dioxin-like PCBs of 0.001–0.002 ng TEQ/m^3 and to water of 0.0000005 ng TEQ/L.

12. One commercial plant, with a capacity of 12 kg/day (as 100 per cent PCB) using subcritical water oxidation, had emissions of PCDD/PCDF/dioxin-like PCBs to air of 0.00009 ng TEQ/m^3 and to water of 0.0006–0.004 ng TEQ/L. The remaining plant also uses subcritical water oxidation: there are no data as it has just begun operation.