



Dioxin Toolkit Briefing Paper

March 2009

By Pat Costner, IPEN Science Advisor

Background

UNEP Chemical's Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases was proposed for formal endorsement at the Stockholm Convention's first Conference of Parties (COP1) in 2005. IPEN played a defining role in deferring adoption of the Toolkit by documenting the Toolkit's shortcomings and lobbying Parties to oppose its adoption. At COP2, the Parties requested the Secretariat to *"initiate an open, transparent process to review, revise and update"* the Toolkit, in cooperation with UNEP Chemicals and *"in consultation with users and specialized experts in the field of emission factors and measurements."*¹ This decision, in effect, established the Toolkit Expert Group (EG), which has met once each year since 2006.

The predominant expertise of EG members and their work reflect the wording of the COP2 decision – *"experts in the field of emission factors and measurements."* As a consequence, the EG is largely focused on emission factors, although many other important issues have been raised by NGOs and Parties.²

Identification of Sources

Prior to the 2008 EG meeting, the Secretariat invited EG members to submit comments on the Toolkit. Seeing this as an opportunity to address certain other issues, IPEN's expert submitted detailed comments and was, indeed, the only participant to do so.³ Based on these comments, IPEN was asked to make a presentation on IPEN's perspective on the Toolkit at the 2008 meeting. In the presentation, IPEN recommended the addition of two new sub-chapters and provided suggested text for these proposed additions:

- "Identification of Sources," and
- "Minimization and Elimination of PCDD/PCDF Formation."

The EG gave unanimous approval to the addition of these two sub-chapters.

The EG's agreement to add the sub-chapter, "Identification of Sources," to the Toolkit is a major step forward in the effort that began in 2002 with Greenpeace's call for inclusion of a source identification strategy. Greenpeace repeated this request in 2003 and again in 2004, when it was also included in the IPEN recommendations. At COP1 in 2005, the

¹ Conference of the Parties of the Stockholm Convention on Persistent Organic Pollutants Second Meeting. Geneva, 1–5 May 2006. SC-2/5: Ongoing review and updating of the Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases.

² Greenpeace identified numerous limitations and errors in detailed reviews of the first drafts and first two editions of the Toolkit. Many of these were later iterated by IPEN and raised or supported by various Parties.

³ Copies of the comments submitted by IPEN are available on request from the IPEN Secretariat.

European Union⁴ and other Parties supported the inclusion of a source identification strategy in the Toolkit. Satisfactory completion of this effort depends, of course, on the final text, which is to be prepared by a consultant and presented to the EG for approval. As a related measure, the EG also established a task team on preliminary screening of unidentified sources. This task team, which is led by the IPEN expert, will work intersessionally on establishing a simple screening matrix for identifying new dioxin sources and will provide technical support in screening potential new dioxin sources notified to the EG.

Other Updates and Revisions Suggested by the Expert Group

At the introductory meeting in 2006, the EG was directed to give first consideration to the following:

- Emission Factors for Toolkit Category 3 Sources – Biomass and Fossil Fuel Combustion in Power Plants, Boilers, Stoves, *etc.*
- Emission Factors for Toolkit Category 6 Sources – Open Burning

Expert panels were established to work intersessionally on each of these source categories.

At the second EG meeting in 2007, the expert panel on emission factors for Category 3 Sources presented potential updates to the Toolkit in the following areas:

- Emission factors for heat and power generation plants and heat/energy generating plants in utility and industry fuelled with fossil fuels.
- Emission factors for clean biomass based power generation
- Emission factors for biomass based household heating and cooking.
- Emission factors for fossil fuel based domestic heating

The expert panel on Category 6 Sources (Open Burning) recommended revising the Toolkit's treatment of agricultural burning, forest fires, and grassland fires by further subdividing as to the type of fire (e.g., prescribed or uncontrolled, type of crop, etc.) and by other parameters such as fuel type (flaming wood, smouldering wood, flaming non-woody vegetation, or smouldering non-woody vegetation), chlorine content and species of the fuel, presence of catalyzing metals (e.g., copper), and agricultural chemicals used and their types.

For the Category 6 Sources (Open Burning) sub-category of waste burning and accidental fires, the expert panel recommended restructuring the subsidiary classifications under this subcategory as follows:

- Fires at dump and landfill sites
 - Input to site predominantly domestic / commercial.
 - Input to site predominantly manufactured or engineered.
 - Mixed.
- Backyard burning

⁴ Summary Note: Work of the EP-members in the EC-delegation to the First Conference of the Parties (COP-1) of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Uruguay, 2-6 May 2005. Committee on the Environment Public Health and Food Safety. The Secretariat. Brussels, 19 May 2005.

- Barrel burning
- Open piles, bonfires, etc.
- Burning of specific wastes of particular concern
 - Electrical and electronic wastes
 - Contaminated wood / demolition
 - Other 'problematic' wastes
- Fires in structures and transportation fires
 - Buildings
 - Domestic housing
 - Warehouses and depots

Other Ongoing Work of the Expert Group

In addition to continuing work already begun on Toolkit Source Categories 3 and 6, intersessional work on the following issues of concern are also in process or completed:

- Project on open burning of waste (partially funded by the World Chlorine Council) - results obtained in China, Mexico, US and Sweden will be presented at COP4.
- Brick production with a special emphasis on fuels used – results from South Africa, Kenya and Mexico are almost complete.
- Simple stoves (3-stone)
- Emission factors for vehicles using non-gasoline/diesel fuel and 2-stroke engines
- Charcoal production and use – a major energy source/sink in some countries, e.g., Brazil.
- Coke production – data from China show average concentrations of 1.4 ng TEQ/m³.
- Metal production – an expert reported that the Toolkit covers only eight metals, uses data that is, in some cases, more than ten years old, and includes only two non-ferrous metals (nickel and tin) although POPs are a concern for other metals not yet addressed (e.g., precious metals and ferroalloys).
- Catalyst regeneration
- Emission measurements for hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBs)
- Members with direct access to well-equipped dioxin laboratories will investigate the possibilities of analyzing a few indicative samples from identified priority source categories.

Information to be available via the UNEP webpage, tentatively by 25 March 2009 is as follows:

- Excel sheet to collect information on emission factors for categories 2, 3, and 6.
- Protocol for field sampling of ashes and soil.
- Category 3: information on fossil fuel including table with text as well as emission factor for HCB and PCB.
- Linkage to open burn projects.
- Category 2: gaps identified (end of Jan 2009).
- Category 4 – brick: report with ash data (EU report).
- Category 3 – simple stoves: report with results from simple stoves (EU report).
- Report with emission factors from two brick kilns (EU report)

A slide taken from a presentation given by Dr. Heidelore Fiedler, UNEP Chemical's dioxin expert and author of the Toolkit, at the Second International Conference on Waste Management and Technology, which took place on July 19, 2007, in Beijing, is included below. In accompanying slides, Dr. Fiedler described the methods used for the estimated releases shown in the table:

“PCDD/PCDF releases reported in 37 of 40 submitted NIPs;

- Of these: 25 used the Toolkit
 - 8 used the Toolkit along with other information
 - 4 used CLRTAP* methodology

PCDD/PCDF releases reported in 13 of 17 submitted national reports

- Of these: 4 used the Toolkit
 - 4 used the Toolkit along with other information
 - 5 CLRTAP* methodology”

*CLRTAP = Convention on Long-range Transboundary Air Pollution (UN-ECE region)

In another accompanying slide, Dr. Fiedler also noted “the next version of the Toolkit taking into account developing country conditions (expected in 2009 – COP-4).” Based on the Toolkit Expert Group meetings, this is not expected to occur.

Country	Pop. *mio.	Annual Release g TEQ/a		Annual Release µg TEQ/person*a		Reference Year
		Air	Total	Air	Total	
Albania	3.07	59	143	19	47	2004
Argentina	37.4	706	2,133	19	57	2003
Armenia	2.98	5.49	52.0	1.8	17	2001
Australia	19.7	495	1,799	25	91	2002
Belarus	9.75	37	142	3.7	15	2004
Brunei	0.340	0.749	1.40	2.2	4.1	2001
Burkina Faso	12.5	300	785	24	63	2002
Burundi	7.02	190	195	27	28	2004
Cambodia	13.4	273	607	20	45	0
Chile	15.1	51.7	85.7	3.4	5.7	2003
China	1,300	5,043	10,237	3.9	7.9	2004
CHN HKG	6.90	2.70	20.8	0.4	3.0	2003
Côte d'Ivoire	17.3	416	432	24	25	2002
Croatia	4.50	116	168	26	37	2001
Cuba	11.2	195	319	17	28	2000
Djibouti	0.60	50.8	119	85	199	2003?
Ecuador	12.2	65	97.6	5.3	8.0	2002
Estonia	1.42	14	29.2	9.9	21	0
Ethiopia	71.1	154	215	2.2	3.0	2003
Fiji	0.81	11.2	19.2	14	24	2002
Jordan	5.30	64.3	81.6	12	15	2003
Lebanon	3.75	79.0	166	21	44	2004
Lithuania	3.48	37.4	56.9	11	16	2005
Macedonia	2.05	163	175	80	85	2001
Mali	10.5	35.0	39.5	3.3	3.8	0
Mauritius	1.21	19.6	30.4	16	25	2003
Moldova	4.3	13	776	3.1	180	2001
Morocco	29.9	167	425	5.6	14	2003
Nicaragua	5.48	266	638	49	116	2004
Niue	0.002	0.392	0.563	181	259	2004
Paraguay	5.20	70.7	156	14	30	2002
Philippines	84.5	328	534	3.9	6.3	1999
Seychelles	0.081	4.1	5.41	51	67	2003
Slovenia	2.01	6.19	30.4	3.1	15	2005
Sri Lanka	19.9	172	257	8.6	13	2002
Tanzania	34.6	517	947	15	27	0
Thailand	62.4	286	1,070	4.6	17	2003
Tunisia	9.91	139	209	14	21	2004
Uruguay	3.30	18.7	48.5	5.7	15	2003
Vietnam	78.4	16.0	68.8	0.20	0.88	2002
Zambia	10.3	290	483	28	47	2004
TOTAL		10,878	23,795	14	24	

**PCDD/PCDF
Inventories
(Toolkit)**

41 countries

**Releases in
g TEQ/year**

Green: well below mean
Red: well above mean