



**Minutes**  
**of the**  
**First Regional Workshop**  
**on**  
**Sources and Environmental Levels of PTS substances**  
4-6 March 2002, Campinas (Brazil)

Rapporteur:

Dr. R.Barra  
Regional Coordinator  
EULA-Chile Center  
University of Concepción  
Concepción, Chile

E-mail:ricbarra@udec.cl

**Organizational details**

The Workshop was held in Campinas Brazil, at the Cassa do Profesor Visitante de FUNCAMP, from 4-6 March 2002, with the technical assistance of the local coordinator prof. Wilson Jardim, Team member.

The Workshop was attended by 20 participants (Annex 1) who contributed with oral presentations and discussions within the working groups.

The Agenda of the Workshop was as follows:

**Agenda of 1<sup>st</sup> TW:**

<b>Sunday March 03, 2002</b>		
Afternoon or evening	Arrival, accommodation	Casa do Professor Visitante da FUNCAMP
<b>Monday, March 04, 2002</b>		
09.00-10.15	Introduction and Welcome to the participants–Dr. Celio Pasquini Director IQAM. 10 min	
	Local Organizer welcome Wilson Jardim 10 min	
	Introductory words: Ricardo Barra Regional Coordinator Region XI South America 15 min	
	Overview of GEF RBA PTS Project – P. Whyllie Advances at global level (UNEP-Chemicals)– 15 min.	
	Overview of Stockholm Convention – R.Romero Chile– 10 min.	
	Background document No. 1) –. Wilson Jardim, Structure of Final report related to Sources 20 min	
10.15	Coffee break	
10.35 - 11.30	Background document No. 2 (Juan Carlos Colombo) Structure of final report related to Environmental Levels of PTS substances 30 min	
	Discussion	
11.30 - 12.00	Sources of Persistent Toxic Substances in Latin American Countries Claudio Zaror	
12.00-13.00	Lunch	

13.00-18.00	<ul style="list-style-type: none"> <li>The contribution of participants (themes) (15-20 min.):</li> </ul> <p>Sources and levels of PTS in the patagonian zone of Argentina. José Luis Estevez (Argentina)</p> <p>Persistent Toxic Substances in the Wide Bahía Blanca Region (Argentine Republic) Hugo Freije, Argentina</p> <p>An overview of certain persistent organic pollutants in Brazil: 30 years of research".Heloisa Toledo (Instituto Adolfo Lutz, Brazil)</p> <p>Sources of Dioxins and Dioxin-like compounds to the Environment Fernanda V. de Almeida (UNICAMP, Brazil)</p> <p>Polychlorinated biphenyls and Chlorinated pesticides in Chile: A review of existing data Ricardo Barra (Chile)</p> <p>Polychlorinated biphenyls in urban environments: The case of Santiago de Chile. Rodrigo Romero (Chile)</p> <p>National Survey of PCBs in Chile Gonzalo Mendoza (Chile)</p> <p>Informe de acopio de datos sobre Sustancias Tóxicas Persistentes en Perú Nadia Gamboa, PUCP Perú.</p> <p>Gestión de Sustancias Tóxicas Persistentes en el Perú, Evaluación de Fuentes y Niveles Ana María González DIGESA Perú.</p> <p>PTS Sources and Environmental Concentrations in Uruguay: A Review Gabriela Eguren, Uruguay</p> <p>You can use for your presentation overheads or LVD projector, please prepare a copy of your presentation for the rest of participants</p>	
15.00 – 15.15	Coffee break	
17.00-17.15		
18.00 – 18.30	The participants will be broken into two (or three) groups to analyse the presentations and make recommendations to plenary regarding sources and environmental concentrations priority PTS and key data gaps	
	Working group 1 (Barra, Jardim) Working group 2 (Colombo, Eguren, Gamboa)	Working group strategy (WG 1 – by compounds; WG2 – by compartments) – based on the structure of Final Report – evaluation of existing/lack of information, hot spots
<b>Tuesday, March 5, 2002</b>		
09.00-12.30	Working group 1 (chairs – Barra, Jardim)	
	Working group 2 (chairs Colombo, Eguren, Gamboa)	Air, deposition, water/sediments
12.30-14.00	Lunch	
14.00-17.00	Working group 1 (chairs Barra, Jardim)	
	Working group 2 (chairs Colombo, Eguren, Gamboa)	Soils, biota
17.00-18.00	Plenary session – overview of working group results – chairs	
19.30	Common dinner	

<b>Wednesday, March 6, 2002</b>		
09.00-12.30	Working group 1 (chairs Barra, Jardim) Working group 2 (chairs –Colombo, Eguren, Gamboa)	Hot spots, regional priorities...
12.30-14.00	Lunch	
14.00-18.00	The presentation of group reports, final discussion	
<b>Thursday, March 7, 2002</b>		
Morning	Departures of participants	

### **Working Groups**

Two WG were established, one for sources, and one for environmental levels in biotic and abiotic compartments.

According to the topics presented in the previous sessions, the following issues to be discussed were identified:

#### **- Sources:**

- Emission factors (strengths and weaknesses)
- Existing Inventories
- Data gaps

### **General conclusions**

#### **Sources:**

Working Group: Sources

C.Zaror (Chile)

W.Jardim (Brasil)

Antonio Barbosa (Brasil)

Ana Maria Gonzalez (Perú)

Maria Lourdes Maya(Ecuador)

Gloria León (Paraguay)

Fernanda Vasconcelos (Brasil)

José Luis Estévez (Argentina)

Hugo Freije (Argentina)

Group Discussion starts with the analysis of the scoring system proposed by UNEP, it was agreed in to use this tool to facilitate the discussion. The analysis starts with dioxins and furans.

## **Dioxins and Furans**

The working group recognizes the existence of all know sources of emission of dioxins and furans in all countries within the region, therefore the emission problem could potentially be considered as a regional problem. In that sense it is widely acknowledged that the absence on environmental data that confirms effectively the existence of a relationship between sources and environmental levels.

The working group indeed discussed on the type of sources more relevant to the region, it was agreed that one of the most important sources is the combustion of biomass used as energy source extensively along the countries within the region. In particular due to the technologies used in these process are of low performance. Burning of agricultural and forestry residues is other commonly used practice within the region, indeed exist a growing evidence that forest fires affected surface is increasing, even thought is not totally clear that this process releases dioxins and furans to the environment being a controversial matter.

If wood burning is a source of dioxins and furans to the environment, then the wood burning is a very important source at regional level, together with waste burning. In practice there is no segregation of wastes within the countries of the region, therefore, the burning of these products and emissions from landfills or waste disposal sites could be an important source.

Wood burning of Pentachlorophenol treated wood was recognized as an important source of emission of dioxins and furans within the region.

Other widely distributed problem within the region is the combustion of hospital residues, under poor conditions, however a quantitative figure was difficult to obtain.

Summarizing and probably as a characteristic of the region XI, it was considered that uncontrolled combustion process as a potential emission of dioxins and furans to the regional environment.

Other potential sources within the region are: petrochemical industry, cellulose industry, chloro-soda production, steel industry were coal are burned mixed with oils.

Main emissions should be the atmosphere and in residual ash remaining combustion.

One of the recommendations made by this group was the use of the Toolkit proposed by UNEP-Chemicals, even though is recognized that a validations of emission factors should be made.

Within the region some countries are advancing in an emission inventory

Dr. Claudio Zaror, starting with official information regarding coal and wood consumption made a preliminary estimation of emissions within the countries of the region, starting with information presented at the workshop (Zaror, 2002)

## Emissions of Dioxins and Furans, TCDD,TCDF

Sources:

Wood combustion

Solid waste combustion

Cellulose production

Coal consumption

Using the UNEP-Chemicals Toolkit and production data from FAO

Table Estimated Emissions of TCDD/TCDF (Kg TCDD/TCDF TEQ /year)

	Air (kg)	Water (kg)	Solid waste (kg)
Wood combustion	0.008-15.5	-	0.02-0.08
Solid waste combustion*	0.04-14	-	<0.01-0.31
Coal combustion	0.02-0.2	-	0.004-0.007
Cellulose production	-	0.001-0.04	0.002-0.04
TOTAL	0.12-30	<0.04	0.03-0.40

\* assuming that 10% of total urban residues are subjected to combustion.

In synthesis it is estimated that as superior threshold regional emissions accounts 30 kg TEQ TCDD/year. This is a preliminary estimation that should be improved at national level with other available information.

## PAHs

Associated to combustion process it was discussed the emission of PAHs to the environment, in general it was observed from country presentations that PAHs levels are much higher than reported chlorinated compounds levels. It is considered main emission sources, both pyrolytic and petrogenic. It was established that emission factors are well validated and better known.

Considering only the potential emissions of PAHs from wood and coal burning and using USEPA emission factors , the following results are obtained.

Table 2 Estimated emissions of Benzo (a)pyrene in the XI region

	Ton/year
Wood	16-465
Coal	36-94
Total	52-509

## PCBs

At global level production of PCBs reached 1.200.000 tons, 70-80% are still in use.

Other problem considered of regional level is referred to as PCBs, they have been widely used within the region, however is difficult to obtain a quantitative figure of the total amount both in use or stored in the countries within the region, even several countries are beginning surveys or inventories such as Argentina, Peru and Chile. In Peru for instance a preliminary

estimation accounted about 11 ton of PCBs stored and about 1000 tons in use. In general it is important to note that countries within the region have not a prohibition to import PCBs.

It was discussed that main uses of PCBs are as dielectric fluids, however one of the potential pathways of entry into the environment are the recycling of used oils deriving in multiple uses as wood impregnators and thermal fluids etc.

This is a widely geographically distributed compound, besides the uncertainties in the knowledge of how they are circulating. Some hot spots given by environmental levels or stored amounts found in huge metropolitan areas within the region and other areas where the industry requires huge amounts of energy.

### **Chlorinated Pesticides**

In general the group recognized that problems associated to chlorinated pesticides has relevance during the eighties and nineties within the region, nowadays in practice almost all countries has adopted the prohibition of these products.

Besides the previous consideration one problem that can have regional implications is the illegal use of these products within the region, there were several examples in that sense, but also it was considered that this kind of problems are highly related to human health causing problems.

Other general problem is the complete absence of data regarding old non-used pesticides stored since the 80's being some of them permitted under restrictive use regime. Probably most of them have been almost used in agricultural activities since most of the prohibitions had a progressive application.

### **DDT**

In some countries within the regions DDT is still used for sanitary reasons, in the rest of the countries DDT is forbidden, however it has been informed of illegal entry of DDT in other countries which final destination is unknown. This illegal circuit of DDT cycling can potentially be a problem at local or regional level, unfortunately there are no quantitative figures on the use of DDT within the region.

There are an opinion that pesticides use to be a problem at regional level, but probably not anymore with the same intensity. However it was discussed that other pesticide products such as DICOFOL could contain certain impurities as DDT traces. DICOFOL volumes are unknown and it could be a recent source of entry of DDT to the environment.

Some contributors think that the problem of cyclodienes could be afforded by estimating the amount of production/import of cyclopentadiene compounds, solving the uncertainties regarding production or national level uses.

## **HCB**

In general, HCB was not used as pesticide within the region, but as industrial product in PVC and rubber production . It was discussed the emission of HCB derived as plastic combustion, and it was mentioned that exist a good correlation between dioxin emissions and HCB emissions

## **MIREX**

This product is not forbidden in some countries within the region, because there were not registered at all. In some countries has produced some local problems.

**TOXAPHENE:** There is no evidence of use within the region (Need to be confirmed)

## **LINDANE**

In old factories of HCH it might exist environmental passives (please ask for data on production, functioning period etc.). Main uses are unknown for attendees (livestock, public health) We need data from all region countries.

## **PCP**

Was used in important amounts, taking into account that 100,000 to 200,000 tonn of saw wood as minimun it is important t have an idea of the amount of impregnated wood. In several coutries PCP was forbidden (Chile,Paraguay). One of the mentioned problems was the storage of wood contaminated with PCP in open deposits and the use of

## **ENDOSULFAN:**

It is not forbidden, but still presents some problems due to unadequate use.

**DRAFT****REGIONALLY BASED ASSESSMENT OF PERSISTENT TOXIC SUBSTANCES****Table 1. Scoring for Prioritising PTS for Sources, Environmental Levels, Effects and Data gaps****Country/Region:**

<b>Chemical</b>	<b>Sources</b>	<b>Data Gaps</b>	<b>Comments</b>
Aldrin	1	2	It is not made and is forbidden in all countries within the region. Amounts used are unknown
Chlordane	1	2	
DDT	2	2	Some use for health reasons, illegal circulation of the products within the region. Other pesticides could act as new sources (i.e. dicofol) but this is unknown
Dieldrin	1	2	
Endrin	1	2	
Heptachlor	1	2	
HCB*	2	2	Associated to emissions of plastic burning, there were mentioned correlations with dioxin emission (please add references)
Mirex	0	2	It is not used in most of the countries within the region
Toxaphene	0	2	Not recorded use within the region
PCBs	2	1	Disperse use within the region, scarce information about amounts, however countries are advancing in national inventories.
Dioxins*	2	2	All described sources exist within the region, one important difference with other regions could be the biomass burning that should be an important source
Furans*	2	2	Idem
HCH	1	1	Still used in several countries, agricultural uses are restricted, but it is unknown HCH uses.
PCP	2	2	Saw wood

PAHs	2	1	<b>Combustión widely distributed within the region</b>
Phthalates			
Endosulphan	1	1	<b>Still used, but few data on amounts</b>

\*Assuming that combustion process is important and that emission factors used are correct

### **Home work**

- Completing important lacking quantitative information. Amount of pesticides used by country, if they were fabricated how much were produced. How much it was used in agriculture.
- Dicofol uses at national level
- Specific uses of each pesticide within the country (lindane, Endosulfan, PCP)
- Estimate the amounts of PCBs at national level
- To indicate the amount of industrial process associated to Dioxins and furans emissions, production volumes
- % of saw wood treated or impregnated with PCP

### - Levels:

- UNEP Scoring system
- Selection criteria for accepting data
- Report format
- Quality Assurance issues for comparing data
- Establishment of a limit data for sending information

Participants : JC Colombo (rapporteur), G. Eguren, H.Toledo, J.Torres, R.Romero, N.Gamboa, Mbissinoti. C.Resabala, N. de Fernicola, A.Barbosa

### **Levels of PTS**

1. Scoring System: the discussion was centred on environmental levels and countries presentation, and the regional perception of data presented. Results are then qualitative, susceptible to be changed in function of new data coming from different countries. The proposed score is therefore internally relative i.e. assigned numbers reflects the best or worst situations of each compound within the region. It is expected that scoring of environmental levels have a good relationship with ecotox and tox effects.

## **2 Discussion on criteria for acceptability/selection on data for questionnaires**

Considering the relative lack of data regarding quality control/quality assurance of lab gathering data of PTS substances within the region, that constitutes a good amount of information for the region, it was decided to adopt a qualitative system of three categories: a) QA/QC assigned to data gathered in peer reviewed journals or indexed journals b) Accreditation, corresponding to laboratories of long trajectories and recognized prestige c) Intercalibration assigned to reports from governmental agencies, with the assumption that any laboratory has a minimum quality control (standards, replicates, blanks etc.) Considering these criteria It was considered of utmost importance to perform an intercalibration exercise within the region.

## **3. Discussion about the report format**

It was decided that report format should include a chapter on statistics of submitted data (formularies grouped by environmental compartment and by geographical areas). Besides, it was agreed a internal structure based on the discussion by compartment , for each individual country including tables and figures with a final discussion on trends and countries differences for each compartment. Data tables will be compiled by average data  $\pm$  standard deviation for each area according UNEP codes. Individual data will be annexed from information stored in Geneva. Accepted formats are included below:

## **4.Establishment of report format, norms systems and deadlines**

The table format is shown in section 3. Results discussion must include spatial and temporal patterns, acknowledgments of critical points by comparison with levels reported according USEPA , Canada or UE regulations. Each country must prepare the report and send it as soon as possible to Juan Carlos Colombo in Argentina.

## Scoring for Prioritising PTS for Sources and Environmental Levels

### South American Region

<b>Chemical</b>	<b>Environ. Levels</b>	<b>Data gaps</b>
Dieldrin and Aldrin	1	1
Endrin	1	1
Chlordane	1	1
Heptachlor	1	1
DDT	1	0
Toxaphene	0	2
Mirex	0	1
Hexachlorobenzene	1	1
PCBs	2	1
Dioxins and Furans	1	2
HCH	1	0
Endosulfan	1	1
PCP	1	1
PAHs	2	1
Org. Mercury Compds.	1	1
Org. Tin Compds	0	2
PDBE	0	2
Phtalates	0	2
Atrazine	0	2
Chlordecone	0	2
Octylphenols	0	2
Octylphenols	0	2
Nonylphenols	0	2
Chlorinated Paraffins	0	2

## **Annex 1. List of participants**

Dr. Claudio Zaror  
Chemical Engineering Department  
University of Concepción  
CHILE

[czaror@diq.udec.cl](mailto:czaror@diq.udec.cl)

Dr. Rodrigo Romero  
Private Consultant  
Santiago  
CHILE

[rromerom@entelchile.net](mailto:rromerom@entelchile.net)

Dr. Juan Carlos Colombo  
Universidad de la Plata  
Laboratorio de Química Ambiental  
La Plata  
ARGENTINA

[laqab@arnet.com.ar](mailto:laqab@arnet.com.ar)

Prof. Dr. Wilson Jardim  
Universidade de Campinas  
Campinas  
BRAZIL

[wfjardim@iqm.unicamp.br](mailto:wfjardim@iqm.unicamp.br)

Dr. Jose Luis Esteves  
Conicet  
Puerto Madryn  
ARGENTINA

[esteves@cenpat.edu.ar](mailto:esteves@cenpat.edu.ar)

Mirtes Suda  
ABIQUIM  
BRAZIL

[mirtes@abiquim.org.br](mailto:mirtes@abiquim.org.br)

Marcia Bissinoti  
University of Campinas  
Campinas  
BRAZIL

[bisinoti@iqm.unicamp.br](mailto:bisinoti@iqm.unicamp.br)

Nilda A.C.G. de Fernicola  
CETESBI,  
Sao Paulo  
BRAZIL

[nilda@cetesb.sp.gov.br](mailto:nilda@cetesb.sp.gov.br)

Fernanda Vasconcelos  
University of Campinas  
Campinas  
BRAZIL

[falmeida@iqm.uniamp.br](mailto:falmeida@iqm.uniamp.br)

Heloisa de Toledo  
Instituto Adolfo Lutz  
SP.  
BRAZIL

[hetoledo@hotmail.com](mailto:hetoledo@hotmail.com)

Maria de Lourdes Maya  
Ministry of Environment  
Environmental Management  
Guayaquil  
ECUADOR

[mariadelourde10@hotmail.com](mailto:mariadelourde10@hotmail.com)

Carola Resabala  
ESPOL  
Guayaquil  
ECUADOR

[cresabal@goliat.espol.edu.ec](mailto:cresabal@goliat.espol.edu.ec)

Dr. Nadia Gamboa  
PUCP  
Lima,  
PERÚ

[ngamboa@pucp.edu.pe](mailto:ngamboa@pucp.edu.pe)

Ana María González del Valle  
DIGESA  
Lima,  
PERU

[agonzale@digesa.sld.pe](mailto:agonzale@digesa.sld.pe)

Gloria León  
SEAM, Asunción  
PARAGUAY

[gloriabeatrizleon@yahoo.es](mailto:gloriabeatrizleon@yahoo.es)

Antonio Carneiro Barbosa  
IBAMA, Brasilia  
BRAZIL

[bantonio@sede.ibama.gov.br](mailto:bantonio@sede.ibama.gov.br)

Joao Paulo Machado Torres  
Universidade Federal do Rio de Janeiro  
BRAZIL

[jptorres@biof.ufrj.br](mailto:jptorres@biof.ufrj.br)

Gabriela Eguren  
University of La Republica  
Montevideo  
URUGUAY

[geguren@fcien.edu.uy](mailto:geguren@fcien.edu.uy)

Gonzalo Mendoza  
University of Concepción  
Concepción  
CHILE

[rmendoza@udec.cl](mailto:rmendoza@udec.cl)

Ricardo Barra  
University of Concepción  
Concepción  
CHILE

ricbarra@udec.cl