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**ECONOMIC COMMISSION FOR EUROPE**

**EXECUTIVE BODY FOR THE CONVENTION ON  
LONG-RANGE TRANSBOUNDARY AIR POLLUTION**  
Working Group on Strategies and Review  
(Thirty-sixth session, Geneva, 14 - 17 September 2004)

**SCIENTIFIC AND TECHNICAL WORKSHOP ON HEAVY METALS**

Summary report of the workshop prepared by the Chairman in consultation with the secretariat

**Introduction**

1. In accordance with the work-plan for the implementation of the Convention (ECE/EB.AIR/77/Add. 2, annex XIII, item 1.6) a workshop on heavy metals was held on 17 - 18 November 2003 in Langen (Germany). Its aim was to assess present knowledge about the heavy metals currently covered by the 1998 Protocol on Heavy Metals (cadmium, lead and mercury) in preparation for the review of the Protocol once it had entered into force.<sup>1/</sup> The workshop was hosted by the German Federal Environment Agency. The conclusions and recommendations of the workshop are given below. The presentations are listed in chronological order in the table.

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<sup>1/</sup> The Protocol entered into force on 29 December 2003. Twenty-one Parties to the Convention have ratified the Protocol, as of 18 February 2004: Austria, Bulgaria, Canada, the Czech Republic, Denmark, Finland, France, Germany, Liechtenstein, Luxembourg, Monaco, the Netherlands, Norway, the Republic of Moldova, Romania, Slovakia, Slovenia, Sweden, Switzerland, the United States and the European Community. The first meeting of the Parties will take place during the twenty-second session of the Executive Body (14-17 December 2004, Geneva).

2. Experts from Austria, Azerbaijan, Czech Republic, France, Germany, Italy, Netherlands, Latvia, Sweden and United Kingdom participated in the workshop. A representative of the European Community attended. The Meteorological Synthesizing Centre-East (MSC-E) was represented, as was the Convention's secretariat. Mr. Dieter Jost (Germany) chaired the workshop.

## **I. BACKGROUND AND OBJECTIVES**

3. The Working Group on Strategies and Review, at its thirty-fifth session, had considered the results of the first meeting of the Expert Group on Heavy Metals (EB.AIR/WG.5/2003/4) held on 21-22 March 2003 in Geneva. Mr. Dieter Jost, Chairman of the Expert Group, had stressed the need for further scientific discussions to address particular topics and noted that the Expert Group had identified the need for improving emission inventories for heavy metals, for developing an effects-based approach and for quantifying non-atmospheric inputs, especially of cadmium, to soil. Germany had offered to host a scientific and technical workshop to progress discussions in these areas in advance of the second meeting of the Expert Group, scheduled for 31 March-1 April 2004 in Brussels (EB.AIR/WG.5/76, paras. 19-29).

4. The Chairman noted that the workshop would consider the following key questions:

- (a) Would it be useful for the Expert Group to work on the speciation of mercury, cadmium or lead compounds for ambient air data, as well as for emission data?
- (b) In the review of the Protocol, what are the possibilities foreseen for a combination of effects-oriented emission reduction obligations and more technically-oriented emission reductions of heavy metals based on best available techniques?
- (c) What improvements in emission reporting activities would be necessary for an efficiency assessment of the obligations contained in the Protocol?
- (d) Is it necessary to consider the hemispheric or even the global background of heavy metals air pollution, as well as natural emissions?
- (e) Are technical or social developments envisaged which could make heavy metal emissions more significant than they were when the Protocol was signed?

## **II. SCIENTIFIC AND TECHNICAL PRESENTATIONS**

5. Nine presentations were made during the workshop. They covered research results from heavy metal emission monitoring and modelling programmes, a proposal for an improved emission database for heavy metals and persistent organic pollutants (POPs), research results on an effects-based approach for heavy metals and information on abatement techniques (see table).

### **III. CONCLUSIONS AND RECOMMENDATIONS**

#### **A. Importance of improved emission inventories**

6. In considering the present state of emission data on heavy metals and particulate matter, the workshop:

- (a) Welcomed the information presented by national experts on emission inventories which demonstrated that the Emission Inventory Guidebook and the Emission Reporting Guidelines could be successfully used by countries for reporting their emissions of heavy metals. The workshop considered that improving emission reporting should be a priority, and countries should be encouraged to report their heavy metal emissions, particularly once the Protocol had entered into force;
- (b) Agreed that training programmes on emission inventories should be developed for Parties in order to assist them in fulfilling their reporting obligations under the Protocol and to fill the gaps in heavy metals emission reporting. It further agreed that it would be useful to translate key documents, such as the Emission Inventory Guidebook, into other languages to facilitate the review of the Protocol;
- (c) Recognized that MSC-E expert estimates indicated that, on the hemispheric scale, almost half of the emissions of mercury could come from so-called natural emissions. These emissions included both recirculated anthropogenic and non-anthropogenic emissions; therefore further work on distinguishing the relative contribution of re-emissions to natural emissions was encouraged;
- (d) Underlined that high-quality emission data were crucial to the review of the Protocol, recognizing that, even with an improvement in data quality, expert estimates would continue to play an important role in assessing the reductions in heavy metals emissions;
- (e) Agreed that Parties should, as a minimum, apply the EMEP monitoring strategy, once adopted.

#### **B. Relevance of an effects-based approach**

7. In considering the potential for an effects-based approach for the review of the Protocol, the workshop:

- (a) Recognized that some scientific methodologies were available to support the work on an effects-based approach, including critical load and exceedance maps, although these methodologies must still be tested in national studies. Those maps should address effects on terrestrial and aquatic ecosystems structure and functions as well as effects on human health via the food chain;

(b) Agreed that the critical loads approach, and related timescales for effects, should be better conveyed to policy-makers; one possibility was via the upcoming substantive report of the Working Group on Effects in 2004;

(c) Noted that biomonitoring of heavy metals in mosses under the International Cooperative Programme on Vegetation (ICP Vegetation) had produced useful data on heavy metals distribution in Europe and should be taken into account, together with the results of EMEP, in assessing total deposition of heavy metals;

(d) Took note that the Joint Task Force on the Health Aspects of Air Pollution had confirmed that food was the main pathway for intake of the heavy metals in the Protocol;

(e) Invited the joint bureaux of the EMEP Steering Body and the Working Group on Effects to consider evaluation of both historical deposition data and episodic data. EMEP needed a clear message from the Working Group on Effects to identify which deposition data were needed for current and future work on the effects-based approach. In this context, the necessity of moving toward dynamic modelling for an effects-based approach was underlined.

### **C. Use of best available technologies (BAT)**

8. In discussing abatement measures, control technologies and their costs, the workshop:

(a) Welcomed a proposal introduced by the Netherlands for a study on the effectiveness of the Protocol on Heavy Metals and the Protocol on POPs and the costs of additional measures. This was seen as a positive effort towards developing scenarios on future emissions of heavy metals, including the application of control technologies and their costs. The study would provide important information for the review of the Protocol and the revision of the technical annexes. Links with the Expert Group on Techno-economic Issues and the European Commission's Clean Air for Europe (CAFE) Programme should be encouraged;

(b) Recommended that the Expert Group on Heavy Metals should consider the proposal for the revision of annexes III and V to the Protocol on Heavy Metals prepared by the French-German Institute for Environmental Research (DFIV/IFARE);

(c) Recommended that the Working Group on Strategies and Review should consider possible mechanisms for updating the technical annexes to the Protocol to reflect continuous technical and scientific progress.

### **D. Recommendations for further work**

9. In targeting future areas of work, the workshop:

(a) Noted that the question of the soil status (pH) in the calculation of critical loads was important; for pragmatic reasons data on the present status were used. It would be important for future dynamic modelling as well as for a multi-pollutant approach to take into account the development of soil status;

(b) Recognized that further work was needed to quantify the lead and cadmium input to soils from fertilizers. Possibilities for obtaining better data may be through the Expert Group on Ammonia Abatement, the agriculture panel of the Task Force on Emission Inventories and Projections or through their contacts with the European Fertilizer Manufacturers Association (EFMA). The Expert Group on Heavy Metals should be asked to cultivate these contacts, as well as to seek financial support for further study, such as from the European Commission, e.g. through its soil strategy;

(c) Agreed that the potential speciation of mercury should be further explored, regardless of whether the review of the Protocol would include this aspect. Speciation of other priority metals should not be excluded. The upcoming workshop, organized by the Nordic Council of Ministers, on mercury and the needs for further international environmental agreements (29 - 30 March 2004 in Brussels) may address this as well as other outstanding issues.

**Table. Scientific presentations**

<u>Title of presentation</u>	<u>Presenter and affiliation</u>
Emissions of heavy metals: state of the art and requirements	Sergey Dutchak, Meteorological Synthesizing Centre-East, Moscow
Heavy metal emission inventories in the Czech Republic	Barbara Cimbalnikova, Ministry of Environment, Czech Republic
Monitoring of heavy metals in Austria	Ute Kutschera, Federal Environment Agency, Austria
A study on the effectiveness of the Heavy Metals and POPs Protocols and costs of additional measures	Ton Blom, Ministry of Housing, Spatial Planning and Environment, Netherlands
Assessment of heavy metals long-range transport and deposition (modelling and monitoring results)	Sergey Dutchak
Common problems of effects research with respect to heavy metals	Heinz-Detlef Gregor, Federal Environment Agency, Germany
The effects-based approach for heavy metals (cadmium, lead and mercury)	Gudrun Schütze, ÖKO-DATA, Strausberg, Germany
Assessment of risks to human health and the environment from cadmium in fertilizers	Gudrun Schütze
Abatement of heavy metals emissions	Stefan Wenzel, DFIU/IFARE, University of Karlsruhe, Germany