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**EXECUTIVE BODY FOR THE CONVENTION ON  
LONG-RANGE TRANSBOUNDARY AIR POLLUTION**

Working Group on Strategies and Review  
(Thirty-sixth session, Geneva, 13-16 September 2004)  
Item 2 of the provisional agenda

**HEAVY METALS**

Report of the second meeting of the Expert Group on Heavy Metals prepared by the  
Chairman in collaboration with the secretariat

**Introduction**

1. The second meeting of the Expert Group on Heavy Metals was held from 31 March to 1 April 2004 in Brussels. It continued to take stock of relevant scientific information on heavy metals. The Expert Group also considered draft methods and procedures for reviewing the Protocol on Heavy Metals, evaluating certain limit values and considering proposals for additional heavy metals, product control measures or products or product groups (EB.AIR/WG.5/2004/4). As the Protocol had entered into force and the Expert Group had advanced its preparatory work for the review of the Protocol, it was anticipated that this would be the Expert Group's last meeting. The Expert Group was presented with, and considered, text prepared by the secretariat for a draft Executive Body decision on the establishment of a task force on heavy metals as well as elements for a draft work-plan for such a task force (see annex). The Working Group on Strategies and Review may wish to submit the present report

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and the draft document on methods and procedures for the review of the Protocol to the Executive Body at its twenty-second session, 29 November - 3 December 2004, when the first meeting of the Parties to the Protocol will take place.

2. Experts from Austria, Belgium, Canada, Czech Republic, Finland, France, Germany, Italy, Latvia, Netherlands, Sweden, Switzerland, United Kingdom and the United States of America participated. The European Commission was also represented. A representative from the Meteorological Synthesizing Centre East (MSC-E) of EMEP was present, as was a member of the secretariat. Representatives of the French-German Institute for Environmental Research (IFARE), the Chemicals Industry Association, Lead Development Association International, the International Cadmium Association and the World Chlorine Council were also present.

3. Mr. Dieter JOST (Germany) chaired the meeting. He thanked the European Commission for hosting it.

4. Mr. Richard BALLAMAN, the Chairman of the Working Group on Strategies and Review, recalled that, at its thirty-fifth session, the Working Group had welcomed the start made by the Expert Group to address preparations for the review of the Protocol, including work-plan elements. It had confirmed that the Expert Group should give priority to cadmium, lead and mercury, though future work should not be restricted to these. It had welcomed the involvement of other subsidiary bodies and their programmes and centres and requested the Expert Group to agree a clear timetable for developing and evaluating an effects-based approach (EB.AIR/WG.5/76, paras. 29 (a)-(d)).

5. Mr. Ballaman noted that the Expert Group's mandate was to collect and evaluate available information (within and outside the framework of the Convention) on the effects of heavy metals pollution and, in collaboration with the relevant bodies under the Working Group on Effects and the EMEP Steering Body, assess the potential for using an effects-based approach for the review and possible revision of the Protocol. In addition, the Expert Group was requested to review information on abatement options and their costs, taking into account synergies with the abatement of particulate matter and work carried out by the Expert Group on Techno-economic Issues, to assess measures scheduled for evaluation in the Protocol and to review information on heavy metals not yet included in the Protocol. He highlighted that the scheduled evaluations of limit values for existing chlor-alkali plants and for mercury-containing emissions from medical waste incineration, in accordance with the Protocol, annex V, paragraphs 19 and 23 (c) respectively, should be completed no later than two years after the entry into force of the Protocol.

6. The secretariat provided information on the status of ratifications of the Protocol on Heavy Metals and the twenty-first session of the Executive Body. The Protocol had entered

into force on 29 December 2003. As of 14 February 2004, 21 countries had ratified it. At its twenty-first session, the Executive Body had expressed satisfaction with the work of the Expert Group and invited it to continue its preparatory work reporting to the Working Group on Strategies and Review. It had requested the Convention's subsidiary bodies to continue to provide support to the Expert Group and urged Parties to provide information required for the development of a work-plan related to heavy metals. It had requested the Chair of the Expert Group, in collaboration with the secretariat, to develop methods and procedures for reviewing the Protocol, possibly along the lines of those developed for the Protocol on persistent organic pollutants (POPs) (ECE/EB.AIR/79, para. 41).

## **I. RESULTS OF RECENT SCIENTIFIC WORKSHOPS ON HEAVY METALS**

### **A. Conclusions from the workshop on heavy metals**

7. The secretariat provided information on the results of the workshop on heavy metals, organized by Germany on 17-18 November 2003 in Langen (Germany). The conclusions are reported in document EB.AIR/WG.5/2004/2.

### **B. Results of the workshop on critical loads of heavy metals**

8. A representative of the Working Group on Effects provided information on the results of the workshop on critical loads of heavy metals, organized by Germany on 4-5 March 2004 in Potsdam (Germany). The workshop discussed the revisions to the methodologies for mapping critical loads of cadmium, lead and mercury since the first preliminary mapping exercise in 2002. The most important changes concerned: the inclusion of human health aspects; the elaboration of effects-based methodologies for mercury; the introduction of critical limits for lead and cadmium in terrestrial ecosystems related to free metal ions in soil solution; and the exclusion of estimates of weathering rates from the mass balance equations used. There was strong support among the workshop's participants for the use of an effects-based approach for lead, cadmium and mercury. The workshop considered the science behind the effects-based approach including critical limits, transfer functions, chemical speciation and critical loads to be well developed ([www.icpmapping.org](http://www.icpmapping.org)).

9. Some members of the Expert Group commented that uncertainties in critical loads and deposition maps would need to be considered in order to inform future policy discussions on whether to use critical load exceedance in integrated assessment modelling.

10. A representative of Lead Development Association International noted that, in the case of lead, industry was conducting a risk assessment under the guidance of the Government of the Netherlands and would make data and results available.

**C. Workshop on mercury: need for further international environmental agreements?**

11. The Expert Group was informed about the workshop on mercury, held on 29-30 March 2004 in Brussels. The workshop had been organized by the Nordic Council and the Swedish Environmental Institute (IVL) as input into the forthcoming European Union (EU) strategy on mercury, as well as in concert with the work under the Protocol on Heavy Metals and the Governing Council of the United Nations Environment Programme (UNEP). The aim of the workshop was to identify the need for future international actions needed to further reduce the negative impact of mercury on human health and the environment.

12. The workshop also discussed: the need for assistance and financing for developing countries and countries with economies in transition, including the need for a clearing house on mercury abatement strategies; the need to encourage non-mercury mining techniques; efforts to reduce mercury from the coal sector; the importance of improved emission inventories on mercury; and the relevance of the effects-based approach and the use of critical load maps and exceedances which identify sensitive areas in Europe (<http://www.ivl.se/nytt/konferenser/mercury/>).

**II. RESULTS FROM EMEP**

13. MSC-East presented the activities of EMEP related to heavy metal pollution in three areas: collecting and storing information on anthropogenic emissions in Europe; monitoring and measuring heavy metal concentrations in air and in precipitation; and modelling long-range atmospheric transport and transboundary pollution of heavy metals. Approximately two thirds of Parties currently reported national annual emissions of cadmium, lead and mercury; expert estimates were used for others. Information on additional metals (arsenic, chromium, copper, nickel and zinc) was also collected. The monitoring network for heavy metals covered Northern and Central Europe only; EMEP had no information from monitoring heavy metals in Eastern and Southern Europe. The EMEP monitoring system was currently under review, pending agreement of the EMEP draft monitoring strategy which aimed at intensifying monitoring with respect to area coverage and to species monitored. MSC-East had developed country-specific emission deposition balances. Depending on the quality of emission data, EMEP was ready to provide national and area-related heavy metals atmospheric export and import maps.

**III. RESULTS FROM THE WORKING GROUP ON EFFECTS**

14. Mr. Heinz GREGOR, the Chairman of the Working Group on Effects, presented the updated work-plan of the International Cooperative Programmes (ICPs) and the Joint Task Force on Health Aspects, which had been harmonized with EMEP. On the basis of observed

effects or existing ecotoxicological data, all ICPs included heavy metals in their monitoring activities and were preparing updated assessment reports concerning risks from heavy metals. Monitoring results indicated that the input from the atmosphere and other sources to ecosystems exceeded outputs in many areas and accumulation was observed in soils and catchments. Further information was available in EB.AIR/WG.1/2003/3 and at <http://www.unece.org/env/wge/welcome.html>.

15. The Expert Group members of the EMEP region underlined the importance to their countries of developing critical loads for cadmium, lead and mercury and supported the call for data. Experts from Canada and the United States stated that the critical loads approach for heavy metals was not used in their countries.

#### IV. WORK OF OTHER ORGANIZATIONS AND REGIONS

16. European Commission (Environment Directorate). A representative of the European Commission reported on the status of the draft daughter directive on heavy metals and poly aromatic hydrocarbons (PAHs) (to the current Air Quality Framework Directive, 96/62/EC), which would propose air quality standards for arsenic, cadmium, mercury, nickel and PAHs. The draft directive called for background monitoring, irrespective of concentration levels, with a spatial resolution similar to what was recommended for level 2 in the EMEP draft monitoring strategy. The directive would be legally binding and was consistent with the EMEP monitoring strategy.

17. Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR). Although there was no representative present from OSPAR, the organization had indicated its interest in and support for the work of the Expert Group.

18. Arctic Monitoring and Assessment Programme (AMAP). Although there was no participation from AMAP, the organization had transmitted a letter to the Expert Group indicating its interest in and support for its activities.

19. North American activities. The Expert Group was informed about mercury management in Canada, including the current status of anthropogenic atmospheric emissions (around 8 metric tons annually) (see [www.ccme.ca/ccme](http://www.ccme.ca/ccme); [www.ec.gc.ca/mercury](http://www.ec.gc.ca/mercury)). The Expert Group was informed about measures used in the United States to reduce heavy metal air emissions. A national programme established emission standards for over 170 stationary source categories that reflected the use of maximum achievable control technologies (MACT), a concept similar to best available technologies (BAT). Product management measures regarding mercury-containing products specified in annex VII to the Protocol included both regulatory and voluntary programmes implemented at the national, state or local level.

20. A report by Switzerland on the Assessment of Risks to Health and the Environment from Cadmium in Mineral Fertilizers was presented to the Expert Group (<http://www.umwelt-schweiz.ch/buwal/shop/shop.php>).

**V. CONSIDERATION OF NEW TECHNOLOGICAL DEVELOPMENTS AND COSTS FOR ABATEMENT OF HEAVY METAL POLLUTION**

**A. Preliminary information concerning the scheduled evaluations of emission limit values on existing chlor-alkali plants and mercury-containing emissions from medical waste incineration and other source categories in annexes III and V to the Protocol**

21. The Expert Group was informed about the work carried out by IFARE with Germany as lead country on materials for the review of information relevant to the technical annexes. The aim of the work was to review BAT for controlling emissions of heavy metals and their compounds from the sources listed in annex II to the Protocol, and their costs, and to review the timescales of the application of limit values as required by the Protocol, both in the chlor-alkali industry and in medical and hazardous waste incineration. To this end, IFARE had carried out a study on the current state of knowledge on heavy metals currently covered by the Protocol, particulate matter and dust. The report of the study was available in full at: [http://www-iip.wiwi.uni-karlsruhe.de/forschung/emission\\_html/UNECE.htm](http://www-iip.wiwi.uni-karlsruhe.de/forschung/emission_html/UNECE.htm).

22. A representative of Lead Development Association International noted he had checked with industry about the validity and feasibility of some of the emission limit values (ELVs) proposed and he had received mixed reviews.

23. A representative of the European Commission's Directorate General on Environment (Unit G2 industry) noted that, when the European Community had ratified the Protocol, it had not transposed the emission limit values of the Protocol but declared the integrated pollution prevention and control (IPPC) approach as a "different emission reduction strategy" in the meaning of article 3, paragraph 2.

24. The United States had just finalized rules for new and existing sources in a number of categories listed in the Protocol's annexes that had requirements with compliance dates in future. The United States had concerns about modifications to the ELVs in the Protocol, especially since these new rules had not yet been fully implemented in the United States.

25. The Expert Group agreed that it was not within its mandate to consider revisions to the Protocol and its annexes until the first meeting of Parties had taken place and requested IFARE

to restructure its report to present the information on the current status of ELVs in the various sectors, rather than as proposed revisions to the technical annexes.

26. The Expert Group agreed that experts would transmit relevant information on the technical annexes to IFARE by 1 June 2004 for the two selected sectors mentioned above, and by 1 November 2004 for other sectors. Depending on the state of the draft technical document by September, it could be made available as an informal document for discussion during the Working Group on Strategies and Review.

#### **B. Possible synergies with particulate matter emission controls**

27. A suggestion was made to follow the procedure of developing guidance documents used with the Gothenburg Protocol for the review of the Protocol on Heavy Metals, including on particulate matter. The Chairman underlined the benefit of having information on BAT for both heavy metals and particulate matter, though this would be a policy decision beyond the mandate of the Expert Group.

28. Some experts expressed an interest in a clearing house on BAT, an idea discussed during the mercury workshop.

### **VI. CONSIDERATION OF THE SUFFICIENCY AND EFFECTIVENESS OF THE PROTOCOL**

29. The Expert Group was informed about a project conducted by the Netherlands Organisation for Applied Scientific Research (TNO), commissioned by the Netherlands, entitled “The effectiveness of the Protocols on Heavy Metals and POPs and costs of additional measures”. The aim of the project was to improve the quality of existing emission inventories for heavy metals and POPs and to fill statistical gaps to provide a basis for emission scenarios. In its first phase, the project would produce national emission totals and sectoral information for Europe. The second phase would involve calculations for emission reductions and costs depending on requests from the possible forthcoming task force on heavy metals. Results would be made available to the EMEP Steering Body and to the possible task force once it had started its work.

30. As the project was presented for the first time to the Expert Group, it was not discussed in detail. Some experts indicated that the study would provide detailed information on emission inventories for heavy metals which could be important for determining future emission reductions and that they saw the study as a positive step toward attaining more comprehensive data, information on abatement technologies and other information on heavy metals, all of which could be used by the forthcoming task force, depending on its data needs.

Others pointed out that once the task force agreed a work-plan, information sources could be identified. Until then, it was premature to select information sources.

## **VII. METHODS AND PROCEDURES FOR REVIEWING THE PROTOCOL**

31. The Chairman introduced the draft document on draft decision on methods and procedures for reviewing the Protocol on Heavy Metals, evaluating certain limit values and considering proposals for additional heavy metals (EB.AIR/WG.5/2004/4). The Expert Group agreed to transmit comments to the secretariat by 1 June 2004 so that the draft document could be transmitted to the Working Group on Strategies and Review for its consideration.



**Annex**

**ELEMENTS FOR A 2005-2006 WORK-PLAN FOR A POSSIBLE TASK FORCE ON  
HEAVY METALS**

- (a) Plan and conduct technical work necessary for the scheduled evaluations of emission limit values (no later than two years after the date of entry into force of the Protocol) for:
  - (i) Existing chlor-alkali plants (annex V, para. 19);
  - (ii) Medical waste incineration (annex V, para. 23 (c)).
- (b) Plan and conduct technical work necessary for the review of sufficiency and effectiveness of the obligations set out in the Protocol taking into account the best available scientific information on:
  - (i) The effects of depositions of heavy metals [including information on emissions, depositions, critical loads, maps of exceedances];
  - (ii) Assessments of technological developments [including their costs with projects by lead countries in course];
  - (iii) Changing economic conditions [(material from the European Commission and from other regions available)].
- (c) Plan and conduct the technical work necessary to assess the extent to which a satisfactory basis exists for the application of an effects-based approach. This will draw on the work carried out under (b) (i) above.