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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

#### Fiftieth session

Geneva, 10–14 September 2012

Item 4 of the provisional agenda

**Draft guidance document on best available techniques for controlling  
emissions of heavy metals and their compounds from the source**

**Categories listed in Annex II**

## **Report by the Task Force on Heavy Metals on the workshop to promote the ratification of the Protocol on Heavy Metals\***

### **I. Introductory remarks**

1. This report was prepared by the Chair of the Task Force on Heavy Metals, as mandated by the 2012-2013 workplan for the implementation of the Convention on Long-range Transboundary Air Pollution, item 7 (ECE/EB.AIR/109/Add.2). The “Workshop to promote the ratification of the Protocol on Heavy Metals and discussion of the future guidance document”, held under the auspices of the Task Force on Heavy Metals, took place from 12 to 13 April 2012 in Berlin, Germany. It was organized and financed by the German Environment Agency (UBA) and the German Ministry for the Environment, Nature Protection and Nuclear Safety, which hosted the meeting.

#### **A. Attendance**

2. Thirty experts from the following Parties to the Convention attended the meeting: Austria, Azerbaijan, Belarus, Czech Republic, France, Germany, Ireland, Kazakhstan, Kyrgyzstan, Netherlands, Norway, Romania, Russian Federation, Sweden, Ukraine, United States of America, Uzbekistan. Also present were representatives of the following industry associations or companies: International Cadmium Association, International Lead Association, Eurofer, and Albemarle.

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\* The present document is being issued without formal editing.

## **B. Organization of work**

3. The Chair of the Task Force on Heavy Metals, and a representative of the German Ministry of Environment Protection, Nature Conservation and Nuclear Safety welcomed the participants. There were two discussion groups on best available techniques (BAT), in the sectors for large combustion plants (LCPs) and the non-ferrous-metals (NFM) industry. These groups were chaired by representatives of the Netherlands and Sweden, respectively.

## **II. Objectives and main discussion points of the meeting**

4. The objectives of the workshop were the following:

(a) To promote the ratification of the Protocol on Heavy Metals and the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol);

(b) To raise awareness and generate interest of the countries in Eastern Europe, the Caucasus and Central Asia and involve them in further activities of the Convention to improve air quality, with a focus on activities to upgrade technologies and technical measures for emission reduction, monitoring networks, emission inventories and legal obligations in these countries;

(c) To provide information on the technical and legal measures needed for the implementation of the Protocol on Heavy Metals and the Gothenburg Protocol, as well as to highlight co-benefits and synergies of technical measures for different pollutants of both Protocols;

(d) To identify further steps for the countries for the implementation of the Protocols;

(e) To discuss in depth the technical measures of the Annex III of the Protocol on Heavy Metals under revision (Draft guidance document on best available techniques for controlling emissions of heavy metals and their compounds from the source categories listed in Annex II, see ECE/EB.AIR/WG.5/2012/1, especially the paragraphs on LCPs and NFM);

(f) To discuss whether to include the categories for manganese production and secondary aluminum industry in Annex II of the Protocol on Heavy Metals.

## **III. Summary of the presentations and discussions**

5. In the following, the issues presented and discussed at the workshop are highlighted and summarized. The presentations given are available on the Convention's website<sup>1</sup>:

6. The Chair of the Task Force on Heavy Metals gave as introduction a short overview of the Protocol's obligations and the status of the discussion on its revisions. She focused on:

(a) Still occurring exceedances of heavy metals in Europe and related environmental and health effects;

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<sup>1</sup> <http://www.unece.org/index.php?id=28923>.

(b) Projects in Eastern Europe, the Caucasus and Central Asia and South-East Europe to support the ratification of the Protocols; (c) the contents and objectives of the workshop and

(c) The overlap and differences with the negotiations of a global legally binding treaty on mercury.

7. A representative of the Netherlands presented on mercury emissions from coal fired power plants (CFPPs), stressing the following items: Combustion of coal (CFPPs and residential burning of coal) contributed about 50 per cent to the worldwide emissions of mercury. Specific mercury control measures by using activated carbon could reduce mercury emissions by 80 per cent whereas a multi-pollutant approach (selective catalytic reduction (SCR), electrostatic precipitator (ESP), flue gas desulfurization (FGD)) could lead to an overall reduction efficiency of about 90 per cent. He indicated examples of plants meeting an emission limit value (ELV) for mercury of less than three microgramme per cubic metre ( $\mu\text{g}/\text{m}^3$ ). The rules for toxic emissions proposed by the United States Environment Protection Agency would meet an ELV of  $3\mu\text{g}/\text{m}^3$  for existing CFPPs, or less for new CFPPs. The investment costs for these measures would range between 'no costs' where a multi pollutant approach was already realized, as for example within most countries of the European Union, and six to 30 million euros (0,0001 euro per kilowatt hour) for installations using injection of activated carbon. The discussion following the presentation reflected the situation in the different countries. Most countries did not have ELVs for mercury so far and used a limit value for particulate matter (PM) as a surrogate. The value of  $30\mu\text{g}/\text{m}^3$  as proposed in the draft for a revised Annex V of the Protocol on Heavy Metals would not encourage further abatement of mercury emissions. The investment costs for activated carbon injection would be about one million euros per installation.

8. A representative of the company Albemarle reported on mercury sorbents that allowed the continued use of fly ash in the production of concrete. He presented performance data for mercury removal and concrete performance. Albemarle equipped CFPPs and waste incineration plants with mercury emission control devices using brominated activated carbon, leading to an increased efficiency of mercury reduction (more than 90 per cent of mercury from the flue gas). Fly ash was used as a substitute of concrete in cement which, if containing activated carbon, could interfere with the production process for cement. The sorbent developed by Albemarle allowed fly ash to be used in concrete production with no post-processing.

9. A representative of Belarus presented on the sources of heavy metals in Belarus, trends of emissions and steps towards accession to the Protocol on Heavy Metals. Many of the Protocol's obligations were already analyzed or fulfilled, e.g. inventories of sources, determination of relevant sectors and emission factors, and critical loads assessment. The statistical data were not yet complete but progress is being made by using the principles of the Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP). The emission trends in the various sectors were presented. Since 1990, only 1 per cent of total energy was produced from coal. In principle, no significant barriers to acceding to the Protocol on Heavy Metals existed. Negotiating a revised Protocol and the deferral of political action had led to a delay in the accession process.

10. A representative of the Russian Federation reported on the results of a UNEP coal project on mercury emissions from coal combustion in the energy sector of the Russian Federation. The research project covered a statistically based and experimental assessment of coal for the determination of mercury emissions from CFPPs in order to build a profile of the sector. Coal represented 85% of the fuels in the energy sector. The projected coal consumption would increase during the next few years. Most sources had a relatively low

content of mercury and other heavy metals leading in most cases to mercury emissions of less than five  $\mu\text{g}/\text{m}^3$  (three per cent oxygen ( $\text{O}_2$ )) without any additional measures. Due to an increased energy demand, a rise of mercury emissions from CFPPs was expected. Upcoming project activities were improving inventories, and refining projections, as well as identifying trends in energy use and emissions. The Russian Federation would apply BAT for new CFPPs from 2016 and for existing ones from 2021 onwards.

11. A representative of Ukraine reported on the national situation of sectors contributing to emissions of the main air pollutants. In 2001, Ukraine had adopted a law on the protection of atmospheric air and is in the process of adapting national legislation on emissions from large combustion plants in line with European Union legislation. All three metals covered by the Protocol on Heavy Metals, dust and several others are subject to registration and accounting. For all major stationary sources (new and retrofitted ones) limit values were set and adapted to new technical developments whilst taking into account BAT. The energy sector was relatively old, with the newest 3000 mega watt power plant built in 1988, and some smaller ones constructed around 1940. It was planned to build up new capacities and retrofit existing power plants until 2020. A “green energy production” was planned until 2030, using modern technology standards and dedusting. A national action plan for environmental protection in 2015 had been developed. Permits for installations contained, besides ELVs, a list of actions for the implementation of BAT, good management practices and requirements to monitor emissions to ensure compliance with the permits.

12. A representative of Kazakhstan gave an overview of the energy sector in Kazakhstan and emissions of heavy metals. Kazakhstan had joined the Convention in 2009 and intended to ratify the Protocol on Heavy Metals in 2015. Due to its large territory and the low reduction efficiency of the equipment there was still room for reducing emissions. The master plan for energy consumption projected an increase of energy consumption by 45 per cent up to 2030. Kazakhstan had large coal resources (in the top ten of the world) but with a higher content of mercury than the Russian Federation. It aimed to increase the efficiency and to modernize the coal sector. Another main sector was the cement industry. Four new plants had been built. The sector used mainly wet scrubbers to reduce dust (efficiency about 97 per cent). Due to the necessary investments for power plants, the energy costs would increase by a factor of 1.5 which was therefore not seen as feasible at that stage in time. A modernization programme and strategic plan for the development of Kazakhstan (until 2020) had been developed. The emissions by sixteen pollutants were being regulated, with fees per ton to be paid for the allowed amounts.

#### **IV. Further steps to conclude the work on the future guidance document**

13. In several working groups, participants discussed in detail the parts of the draft guidance document on BAT on NFMs industry and CFPPs. A representative of Sweden led the sub-group discussion on the NFMs industry. A new structure of the chapter had been provided before the workshop for the group’s consideration. Some amendments were agreed upon and issues that needed clarification and further work identified. The group recommended that references be added, cost data reviewed and specific mercury removal techniques reviewed. Industry representatives volunteered to assess whether there was additional information specific to the different NFMs sectors of added value, and, if so, to provide that information.

14. The sub-group on CFPPs was led by a representative of the Netherlands. In the sub-group, experts from governmental bodies and from industry worked on the chapters concerning control techniques and large combustion plants (paragraph 11 to 28 of the draft

guidance document, see ECE/EB.AIR/WG.5/2012/1). The group evaluated the comments provided on the last proposal by the Chair of the Task Force, focussing on cost data and on emission data. Most of the comments were accepted and some new information was added when a sound reference was available. The group decided to take all concentration levels out of table 3, so that the table would only show reduction efficiencies of abatement techniques. This was done to achieve consistency and clarity about the quality of the data. Data on emission concentrations that can be achieved using different abatement techniques are now provided in the text of the guidance document, with additional information about applicability and costs if necessary.

15. The discussion of the sectors on manganese production and secondary aluminum industry led to the following advice from experts present at the meeting:

(a) The manganese industry was a possible large emitter of mercury emissions depending on the origin of the ores and the processes used. Although only Norway was known as a producer of manganese at present, other countries in the UNECE region could become producers in the future. Therefore, it was recommended that this sector be included in Annex II of the revised Protocol on Heavy Metals;

(b) The secondary aluminum industry was seen as a possible minor emitter of mercury compared to other sectors, such as the non-ferrous metal industries or the production of iron and steel. No new evidence (eg reports, data from measuring) had been presented. Therefore, it was recommended not to include this sector in Annex II of the Protocol on Heavy Metals.

16. The results of the group work were presented and discussed with all participants. The new draft was circulated to the participants of the workshop requesting that comments be submitted by 15 May 2012. The final draft reflecting the results of both working groups and including comments on chapters other than CFPPs and NFM, would be presented to the Working Group on Strategies and Review, (ECE/EB.AIR/WG.5/2012/1).

## V. Conclusions and recommendations

17. The participants warmly thanked the host government, Germany, and the organizers from the Federal Environment Agency for organizing this workshop. They expressed their appreciation for the cordial and open atmosphere which had led to a frank and fruitful debate, along with a beneficial exchange of information and experiences.

18. The workshop was seen as a continuation of the workshops in Yerevan, Armenia, held in 2008, and Saint Petersburg, Russian Federation, held in 2009. A great deal of progress had been achieved in the activities geared towards ratification of and accession to the Protocol on Heavy Metals and the Gothenburg Protocol. Furthermore, improvements in dialogue and information exchange, especially between countries in Eastern Europe, the Caucasus and Central Asia, were noticeable. The experts from countries in Eastern Europe, the Caucasus and Central Asia expressed their intention to ratify the latest three Protocols or their revised versions. Regarding the national implementation, countries had made significant progress compared to the situation in 2009. By 2015 at the latest, several of the countries in Eastern Europe, the Caucasus and Central Asia were expected to be Parties to the POPs, the Heavy Metals and Gothenburg Protocols.

19. All experts from the Eastern Europe, the Caucasus and Central Asia who presented during the meeting, reported on improvements and adjustments made to their national legislation on air pollution, although in many cases further work was still needed to reach compliance with the Protocol's obligations. The experts emphasized that progress with implementation and ratification of the Protocol depends on the economic situation and

political development. The region was less affected by the recent economic crises than countries in Western Europe. Several experts reported on rising emissions for main pollutants due to the fast economic growth in their countries, resulting in a rapidly growing energy demand. The use of BAT, first for new installations and a few years later, for existing ones, becomes common. It is often already introduced when issuing a permit for an industrial installation.

20. All experts from Eastern Europe, the Caucasus and Central Asia were interested in taking an active role in or participate already in multilateral assistance projects and capacity-building workshops, with the provision that financial support was made available. The same applies for technical working groups under the Convention like the Expert Group on Techno-economic Issues (EGTEI) or the Task Force on Heavy Metals (TFHM). Some key issues raised to improve their dialogue and participation in the Convention's work were:

- (a) Intensifying the discussion between countries of Eastern Europe, the Caucasus and Central Asia to develop a regional position;
- (b) Providing assistance to implement requirements into national legislation;
- (c) Developing and enhancing existing inventories as until present, different methods or emission factors had been used;
- (d) Easing the language problem, by addressing the lack of translation of documents for colleagues in the region;
- (e) Providing assistance in developing projection of emissions.

21. Progress was made for several sub-chapters of the future guidance document on BAT. Due to the continuous development of documents on BAT for different sectors, the guidance document on BAT can only present the status of the discussion at the time. An adaptation to the development of new BAT is recommended every ten years, or when proposed by a Party to the Protocol. The inclusion of links to documentation like best reference documents (BREF) of the European Union or the maximum achievable control technology (MACT) standards used in the United States can keep the document concise and informative.

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