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Item 4 (a) of the provisional agenda\*

**Policy issues: State of the environment**

**REPORT OF THE GLOBAL MERCURY ASSESSMENT WORKING GROUP  
ON THE WORK OF ITS FIRST MEETING**

**Note by the Executive Director**

Reproduced in the annex to the present document is the report of the Global Mercury Assessment Working Group on the work of its first meeting, held in Geneva from 9 to 13 September 2002 (also issued as document UNEP(DTIE)/GMA/WG.1/8).

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\* UNEP/GC.22/1.

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Annex

REPORT OF THE GLOBAL MERCURY ASSESSMENT WORKING GROUP  
ON THE WORK OF ITS FIRST MEETING

I. INTRODUCTION

A. Background

1. At its twenty-first session, in February 2001, the Governing Council of the United Nations Environment Programme (UNEP) considered the substantive progress that had been made during the previous biennium in respect of international chemicals management. It adopted five decisions addressing chemicals management issues, including decision 21/5, relating to mercury assessment.

2. In decision 21/5, the Governing Council, recognizing that scientific studies have established that mercury cycles on a global scale, decided to consider whether there was a need to address any significant global adverse impacts of mercury through international initiatives. In considering and adopting that decision, the Governing Council recalled the Barrow Declaration on the occasion of the Second Ministerial Meeting of the Arctic Council, in which the Arctic Council noted that releases of mercury have harmful effects on human health and may damage ecosystems of environmental and economic importance, and called upon UNEP to initiate a global assessment of mercury that could form the basis for appropriate international action in which the Arctic States would participate actively. The Governing Council also noted the decision taken at the eighteenth session of the Executive Body for the Convention on Long-range Transboundary Air Pollution (28 November-1 December 2000), arising from the concern of delegates about mercury as a global pollutant, to invite UNEP to initiate an assessment of mercury and to consider future action.

3. In order to have a sounder basis for considering whether any international action on mercury was called for, the Governing Council decided to initiate the development of a global assessment of mercury to facilitate the discussion on the issue at its session in February 2003.

B. Mandate: Governing Council decision 21/5

4. In its decision 21/5, the Governing Council requested UNEP to undertake a global assessment of mercury and its compounds, in cooperation with other members of the Inter-Organization Programme for the Sound Management of Chemicals (IOMC), to be presented to the Governing Council at its twenty-second session, in February 2003. The assessment would include contributions from Governments, intergovernmental and non-governmental organizations and the private sector, and was to cover the following elements:

(a) To summarize existing information including recent authoritative reviews of the chemistry, including transformation and methylation processes, toxicology, and impacts of mercury on human health and the environment;

(b) To compile and summarize existing information concerning the global natural and anthropogenic sources of mercury;

(c) To consolidate and analyse information regarding relevant environmental long-range transport and the origin, pathways, deposition and transformation of these substances on a global scale;

(d) To examine and describe the sources of release of mercury to the environment, and the current production and use patterns of mercury as a global commodity;

(e) To compile and summarize information about prevention and control technologies and practices, and their associated costs and effectiveness, that could reduce and/or eliminate releases of mercury, including the use of suitable substitutes, where applicable;

(f) To describe ongoing actions and compile information about future plans at the national, subregional or regional levels for controlling releases, and limiting use and exposures, including waste management practices;

(g) To provide, for elements (a) through (f), a summary description of scientific and technical information needs and data gaps.

5. The Governing Council also requested an outline of options for consideration at its twenty-second session addressing any significant global adverse impacts of mercury, inter alia, by reducing and/or eliminating the use, emissions, discharges and losses of mercury and its compounds; improving international cooperation; and seeking ways to enhance risk communication.

6. Lastly, the Governing Council agreed to consider at its twenty-second session whether there is a need for assessments of other heavy metals of possible global concern.

### C. Programme of work to implement Governing Council decision 21/5

7. As part of the implementation of Governing Council decision 21/5, UNEP established a Working Group to assist it in preparing for the Governing Council's discussions on the issue at its session in February 2003. On 10 April 2001, UNEP sent a letter to Governments, through UNEP official contact points, as well as to intergovernmental and non-governmental organizations inviting nominations for the Global Mercury Assessment Working Group. This original invitation was followed up by subsequent contacts and correspondence to ensure broad representation in the Group.

8. In the approach originally planned in April 2001, it was anticipated that the Working Group meeting would be held in English, French and Spanish and the cost of participation of one Working Group member per country that was not a member of the Organisation for Economic Co-operation and Development (OECD) would be covered by UNEP. The cost of organizing the meeting and supporting participation of members from non-OECD countries was estimated at \$410,000. The extrabudgetary resources needed to implement the project totalled \$634,000.

9. In drawing up the planned approach, it was assumed that the full cost of the project would be covered by extrabudgetary contributions from Governments to a Global Mercury Assessment (GMA) trust fund. In early March 2002, however, UNEP had received pledges or receipts of approximately \$230,000, meaning that there was a serious shortfall in the funds needed to cover the cost of the Working Group meeting as originally planned. Consequently, it was found necessary to revise the planned approach.

10. The original work plan and timetable were revised, in March 2002, in the light of the financial situation. After consultation with Working Group members, it was decided that, after a first review by correspondence, a meeting of the Working Group would be held to finalize the draft assessment report. This meeting would be held in English only, the meeting documents would be available in English only and participation of a Working Group member from each non-OECD country would be funded on a "first come, first served" basis until the available resources were exhausted. At this meeting, the Working Group would also consider and finalize the outline of options for addressing any significant global adverse impacts of mercury, as requested by the Governing Council in its decision 21/5.

11. A first draft of the global mercury assessment was circulated to Working Group members in late April 2002 for review, with a deadline for comments of 7 June 2002. Following incorporation of the comments received, the revised draft assessment report, a note on possible options for addressing any significant global adverse impacts of mercury and other relevant documents were circulated in late July 2002 for consideration by the Working Group at its September 2002 meeting.

12. The Working Group met in Geneva from 9 to 13 September 2002 to consider the draft text of the global mercury assessment and prepare an outline of possible options for forwarding to the Governing Council for its consideration.

## II. OPENING OF THE MEETING

13. The first meeting of the Global Mercury Assessment Working Group was held at the Palais des Nations, Geneva, from 9 to 13 September 2002. The meeting was opened at 10 a.m. on Monday, 9 September 2002 by Mr. Jim Willis, Director, UNEP Chemicals who outlined the background to the meeting, provided an overview of the work expected during the week, and described the process for submission of the results of the meeting to the Governing Council. He noted that the meeting was expected to finalize the draft assessment report together with a concise summary of key findings that would be useful for policy makers, conclusions with regard to any significant global adverse impacts of mercury and an outline of options for addressing such impacts.

14. Mr. Willis also drew the attention of the Working Group to the draft text of the Plan of Implementation of the World Summit on Sustainable Development held in Johannesburg, from 26 August to 4 September 2002 in which it was agreed to "Promote the reduction of the risks posed by heavy metals that are harmful to human health and the environment, including through a review of relevant studies, such as the UNEP global assessment of mercury and its compounds" (paragraph 22 (g)). He concluded by expressing his gratitude to the Governments of Burkina Faso, Canada, Denmark, France, Malta, Norway, Sweden, Switzerland and the United States of America for their financial contributions.

15. The meeting was attended by representatives of the following countries: Armenia, Austria, Bahamas, Belarus, Brazil, Bulgaria, Burkina Faso, Burundi, Canada, Central African Republic, Chad, China, Côte d'Ivoire, Croatia, Cuba, Denmark, Egypt, Ethiopia, Finland, France, Georgia, Germany, Ghana, Guinea, Honduras, India, Iran (Islamic Republic of), Italy, Jordan, Kazakhstan, Kenya, Kyrgyzstan, Lesotho, Madagascar, Mauritius, Morocco, Myanmar, Nepal, Niger, Nigeria, Norway, Pakistan, Panama, Peru, Philippines, Republic of Korea, Republic of Moldova, Romania, Sao Tome and Principe, Senegal, Slovakia, Slovenia, South Africa, Spain, Sudan, Suriname, Sweden, Switzerland, Thailand, Togo, Tonga, United Republic of Tanzania, United States of America, Uruguay, Venezuela and Zimbabwe.

16. Representatives of the following intergovernmental organizations and United Nations specialized agencies were also present: European Commission (EC), Meteorological Synthesizing Centre "East" (MSC-E), South Pacific Regional Environment Programme (SPREP), United Nations Industrial Development Organization (UNIDO) and the World Health Organization (WHO).

17. The following non-governmental organizations were also represented: Ban Mercury Working Group, Basel Action Network (BAN), Canadian Arctic Resources Committee (CARC), Centre for Metal Biology, Consumers for Dental Choice, Greenpeace, Minas de Almaden y Arrayanes, S.A., National Wildlife Federation (NWF) and the World Chlorine Council (WCC).

## III. ORGANIZATIONAL MATTERS

### A. Election of the Bureau

18. The following officers were elected to serve on the Bureau of the Working Group:

Co-Chairs: Mr. Gonzalo Casas Leguizamón (Uruguay)  
Mr. Lars Nørgaard (Denmark)

Rapporteur: Ms. Comfort A. Odunlami (Nigeria)

### B. Adoption of the agenda

19. At its opening meeting, the Working Group adopted the following agenda on the basis of the provisional agenda (UNEP/(DTIE)/GMA/WG.1/1/Rev.1):

1. Opening of the session.
  2. Organizational matters:
    - (a) Election of officers;
    - (b) Adoption of the agenda;
    - (c) Terms of reference for the Working Group;
    - (d) Organization of work.
  3. Review of the draft global mercury assessment report.
  4. Consideration of any significant global adverse impacts of mercury.
  5. Consideration of possible options for addressing any significant global adverse impacts of mercury, inter alia, by reducing and/or eliminating the use, emissions, discharges and losses of mercury and its compounds; improving international cooperation; and ways to enhance risk communication.
  6. Other matters.
  7. Adoption of the report.
  8. Closure of the session.
20. A list of meeting documents is given in annex III to the present report.

### C. Terms of reference for the Working Group

21. To guide it in its work, the Working Group considered the terms of reference proposed in document UNEP/(DTIE)/GMA/WG.1/2. The terms of reference as amended and adopted by the Working Group were as follows:

- (a) Review and provide written comments prior to the first meeting of the Working Group with regard to substantive and technical input on the first draft of the global mercury assessment report, which was circulated by mail or electronic mail to members of the Group;
- (b) Review, during the meeting of the Working Group in September 2002, the revised draft of the global mercury assessment report circulated in advance of the Working Group meeting, and finalize the assessment report, which is to be forwarded to the Governing Council for consideration at its session in February 2003;
- (c) On the basis of the information contained in the global mercury assessment report, consider and report to the Governing Council whether there are any significant global adverse impacts of mercury that might be addressed through a range of international initiatives;

(d) Consider and finalize an outline of possible options, for consideration by the Governing Council at its session in February 2003, addressing any significant global adverse impacts of mercury, inter alia, by reducing and/or eliminating the use, emissions, discharges and losses of mercury and its compounds; improving international cooperation; and seeking ways to enhance risk communication.

22. The Working Group decided that it would apply the rules of procedure of the UNEP Governing Council to its meeting, mutatis mutandi.

#### D. Organization of work

23. At its opening meeting, the Working Group decided to conduct its work in plenary session from 10 a.m. to 1 p.m. and 3 to 6 p.m. and to establish drafting groups and contact groups as necessary. The secretariat drew the Working Group's attention to some changes that had been made to one of the documents before the meeting (UNEP(DTIE)/GMA/WG.1/7/Rev.1) which contained an outline of a final report of the first meeting of the Working Group, in order to bring it more closely in line with the text of Governing Council decision 21/5. The Working Group agreed to use the outline contained in that document as a format for its final report.

#### IV. REVIEW OF THE DRAFT GLOBAL MERCURY ASSESSMENT REPORT

24. In its introduction of the agenda item, the secretariat described the process that had preceded the meeting, namely, collection of data as well as drafting and revision of the draft global mercury assessment report, on the basis of comments received.

25. The Working Group was of the view that the draft global mercury assessment was a good report and a sound basis from which to identify possible options for consideration as well as data gaps. It could be enriched by the inclusion of more up-to-date data, increased data on atmospheric transport and a better balance of data reporting on the different forms of mercury. A clearer definition of those forms as well as of their toxicology and global adverse impacts was necessary. Further, it was important to differentiate between anthropogenic and non-anthropogenic sources of mercury. Regarding fish stocks, the Working Group noted the importance of reflecting issues related to the consumption of fish as well as the need to protect fish stocks. Ecosystem loadings and environmental loadings should be clearly referenced as a source of environmental exposure. Members also indicated the need to address the issue of co-exposure and possible cumulative risks to different sources and forms of mercury.

26. With regard to the structure of the report, it was agreed that a summary of key findings should be developed to bring these to the attention of readers, including the Governing Council. Members further noted the need to review and refine chapter 10 dealing with information needs and data gaps.

27. The Working Group decided to establish a drafting group to review the draft global mercury assessment report and consider any comments not yet dealt with or new comments and textual proposals raised during the period of the meeting, and elected Mr. Ramesh Chandra Srivastava (India) and Mr. Bernard Schwetz (United States of America) as co-chairs of that drafting group. The drafting group was also requested to prepare an outline of key findings of the assessment report for review by the plenary.

28. The co-chairs of the drafting group reported back to plenary on its deliberations and explained the process that had led to the completion of the review of the draft global mercury assessment report. The Working Group agreed to a process to finalize the assessment report and requested the secretariat to circulate the revised version of the draft report by 4 October 2002 to members of the Working Group. It was agreed that members would be given three to four weeks to comment on that revised version and submit their comments to the secretariat by 1 November 2002. The secretariat would, in light of any additional comments, finalize the report and submit it to the Governing Council in December together with the key findings of the assessment.

29. The co-chairs of the drafting group also reported back to plenary on the proposed outline of key findings of the assessment report. Following a discussion in plenary the Working Group amended and agreed on an outline of key findings. The Working Group further agreed to entrust the secretariat, in consultation with the co-chairs and three other members of the Working Group, with the preparation of the text on key findings based on the outline agreed at the meeting and to circulate that text together with the revised draft assessment report for review by the members of the Working Group. The text would be submitted to the Governing Council at its twenty-second session along with the final global mercury assessment report. The outline of key findings is attached as annex II.

## V. CONSIDERATION OF ANY SIGNIFICANT GLOBAL ADVERSE IMPACTS OF MERCURY

30. In introducing the agenda item, the secretariat recalled that one of the tasks of the Working Group was to consider whether the assessment report provided sufficient evidence of any significant global adverse impacts of mercury that might be addressed by international action.

31. In its deliberations, the Working Group reviewed document UNEP(DTIE)/GMA/WG.1/5 which provided aspects of significant global adverse impacts of mercury that could be used as a basis for its discussions.

32. The Working Group confirmed the need for a global approach to address the issue of global adverse impacts of mercury, as there was evidence that mercury impacts on the environment have considerably increased globally due to human activities and that mercury was being transported globally to regions far from the source of release. Even in countries where national programmes had been established to reduce the use of mercury, increases in levels resulting from atmospheric and water transport had been registered. Industrial sites, historical or actual, were hotspots of mercury contamination and posed a risk of leaching in areas prone to extreme climatic conditions such as high rainfall and erosion thereby providing a direct entry point into the food chain as well as having possible impacts on agricultural production and land use. It was noted that poor management of water and land resources resulted in significant increases in the bioavailability of mercury. Risks arising from lack of adequate standards and safety measures also had the potential to contribute to an increase in mercury load in the environment. There was clear evidence of bioaccumulation of methylmercury in the food chain affecting both humans and ecosystems.

33. It was noted that increased monitoring of the sale and transport of mercury at both international and national levels as well as improved legislation for mercury control might be necessary. In addition, some measures could be implemented to govern and reduce the demand for mercury. The Working Group emphasized that proper management of mercury wastes when decommissioning industries that used, stored or emitted mercury in any form, as well as municipal waste of mercury from any source should be ensured. The continued recycling, transport and disposal of waste mercury might require the development of a policy to break the cycle of waste use and disposal. Further, the identification of alternatives to mercury was deemed essential to decrease the global circulation of mercury.

34. It was evident that without the necessary resources, public awareness campaigns in developing countries and countries with economies in transition would not be sufficiently far-reaching. Effective strategies to communicate the dangers of mercury throughout the world were advocated. The Working Group also noted that developing countries and countries with economies in transition required assistance to assess and control mercury releases into the environment. Due consideration to the initiation of best available techniques and best environmental practices was thought necessary. The need for capacity-building to measure mercury levels and to develop monitoring strategies and policy tools for mercury control was imperative.

35. The Group drew attention to the potential problem of human exposure to mercury resulting from dental amalgam and vaccines containing mercury. It also noted the problems related to human exposure to mercury resulting from pharmaceuticals and cosmetics containing mercury. In addition, considerable

concern was expressed about the effects on local populations engaged in or living near the areas of artisanal gold mining. The Working Group stressed the need to pay particular attention to vulnerable populations subject to special risk, namely children, pregnant women, and women of child bearing age as well as indigenous people, communities dependent on fish as a source of food and occupational exposure when addressing the global adverse impacts of mercury and its compounds. It was also noted that mercury could affect agricultural production, land and aquatic uses.

36. While it was important to have a better understanding of the issue, the Working Group emphasized that it was not necessary to have full consensus or complete evidence in order to take action and therefore potentially significant global adverse impacts should also be addressed.

37. The Working Group established a drafting group which, after considering the issue, submitted a draft paper in which it had outlined various global adverse impacts of mercury. On the basis of that paper and its deliberations, the Working Group concluded that there was sufficient evidence of significant global adverse impacts of mercury and mercury compounds to warrant international action. The conclusions of the Working Group based on its deliberations and on the paper prepared by that drafting group, are set out in annex I, part A to the present report.

## VI. CONSIDERATION OF POSSIBLE OPTIONS FOR ADDRESSING ANY SIGNIFICANT GLOBAL ADVERSE IMPACTS OF MERCURY

38. In introducing the agenda item, the secretariat noted that the Working Group was expected to finalize an outline of options on how to address any significant global adverse impacts of mercury.

39. In its deliberations, the Working Group reviewed document UNEP(DTIE)/GMA/WG.1/6 which contained a draft outline of possible options that could serve as a basis for its discussions, with some members putting forward a number of additional options that they deemed worthy of consideration.

40. The general view was that the management of mercury and mercury waste should be based on the cradle-to-grave or life-cycle approach. It was considered to be more effective, as an option, to address the problem of the introduction of new mercury into the biosphere separately from that of the consumption of mercury. Furthermore, the possibility of using existing binding instruments and of developing new ones could be explored. Equally non-binding agreements, such as the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, could serve as a useful model.

41. The issue of substitution of products and processes was one which required careful consideration given that alternative technologies or mercury substitutes were at present, in some cases, too costly for most developing countries and countries with economies in transition with economic sectors that depended on the use of mercury, such as small-scale mining. It was noted that in order to reduce mercury globally, a starting point could be the reduction of primary production. It was also noted that in the interim both financial and technical assistance would be necessary for developing countries and countries with economies in transition to enable them to phase out the use of mercury.

42. Collaboration between developed and developing countries as well as countries with economies in transition was essential in that regard and the Working Group welcomed and encouraged the ongoing regional initiatives through which countries with scant resources were being assisted. In view of the different levels of technology and capacity, it was also necessary to establish both short and long-term goals for the reduction of the use of mercury globally, bearing in mind the different speeds of implementation of the various countries while ensuring a proper management of present stocks of mercury. There was a need in addition to consider establishing measures that govern the transboundary transport of mercury and safeguard developing countries and countries with economies in transition from the dumping of mercury waste. It was noted that the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal covers both legal and illegal trade in mercury waste.

43. Further to its consideration of the possible options for dealing with the global adverse impacts of mercury, the Working Group agreed on a text containing its conclusions on the issue which is set out in annex I, part B to the present report.

44. In addition, members of the Working Group agreed to the need to submit to the Governing Council a range of possible immediate actions in light of their findings on the impacts of mercury. In the context of discussions on this issue the Working Group agreed that the mobilization of technical and financial resources referred to in paragraph 1 of the text for immediate actions agreed by the Working Group, would occur on a voluntary basis. The text containing the immediate actions may be found in annex I, part C to the present report.

## VII. RECOMMENDED ACTION BY THE GOVERNING COUNCIL

45. The Global Mercury Assessment Working Group, at its first meeting held from 9 to 13 September 2002, finalized the global mercury assessment report for presentation to the Governing Council at its twenty-second session. It considered the information in the global mercury assessment report and concluded that, in its view, there is evidence of significant global adverse impacts of mercury.

46. The Working Group therefore recommends that the Governing Council when considering any global adverse impacts of mercury at its next session, take into account the Working Group's conclusions with regard to significant global adverse impacts as set out in annex I, part A to the present report.

47. The Working Group further recommends that the Governing Council should consider the outline of options for addressing those significant global adverse impacts of mercury contained in annex I, part B to the present report.

48. In its deliberations, the Governing Council may also wish to give special priority to actions which the Working Group considers should be taken immediately and which appear in annex I, part C to the present report.

## VIII. OTHER MATTERS

49. The representative of Slovenia informed the meeting that a series of technical and scientific conferences on mercury had been held in the past for which assistance had been granted to ensure the participation of delegates from developing countries and thereby encourage the wide dissemination of knowledge on health and environmental problems related to mercury. She announced that the Seventh International Conference on Mercury as a Global Pollutant would be organized in Ljubljana, Slovenia, from 27 June to 2 July 2004. She noted that in the past there had unfortunately been few participants from African developing countries and encouraged members to publicize the conference in their regions.

50. The representative of the Bahamas, speaking on behalf of the Latin American and Caribbean Group (GRULAC) attending the Working Group, read out a declaration in which it was considered that follow-up work on a global mercury assessment should be conducted in synergy with the Basel Convention experience; that a new binding instrument should be created with the option of further extending such an instrument to other toxic metals and substances; that technical and financial support to conduct national and regional assessments should be sought; that strategies should be formulated to minimize the use of mercury and its compounds to control and reduce anthropogenic stocks as well as to define efforts and tools required for remediation; that international cooperation should be stressed to support the return of mercury to countries of origin for final disposal; that the Governing Council should establish control measures regarding international trade of mercury; and that the Intergovernmental Forum on Chemical Safety might create strategies to prevent illegal traffic in mercury. The GRULAC declaration was supported by representatives of Denmark, Norway and Sweden.

#### IX. ADOPTION OF THE REPORT

51. The Global Mercury Assessment Working Group adopted its report on the basis of the draft report contained in document UNEP(DTIE)/GMA/WG.1/L.1 which had been circulated during the meeting, as amended, and on the understanding that finalization of the report would be entrusted to the Rapporteur, working in conjunction with the secretariat.

#### X. CLOSURE OF THE SESSION

52. Following the customary exchange of courtesies the Co-Chair declared the meeting closed at 4.20 p.m. on Friday, 13 September 2002.

Annex IPart A

## CONCLUSIONS WITH RESPECT TO SIGNIFICANT GLOBAL ADVERSE IMPACTS OF MERCURY

1. For the reasons described below, the Global Mercury Assessment Working Group concluded that there was sufficient evidence of significant global adverse impacts to warrant international action to reduce the risks to human health and/or the environment arising from the release of mercury into the environment.

1. Hazardous properties of global relevance

2. Mercury and its compounds are highly toxic substances. The potential toxicity of mercury for humans and other organisms varies widely depending on the chemical form, the pathway of exposure, the amount, and the vulnerability of the person exposed.

3. An important factor about mercury is its ability to build up in organisms (bioaccumulate) and move up in the food chain (biomagnify). This is of particular relevance with respect to methylmercury, which accumulates to a greater extent than other forms of mercury and thus methylmercury is the primary species of concern.

4. Once mobilized, mercury persists in the environment where it circulates in air, water, sediments, soil and biota in various inorganic and organic forms. It is capable of being transported over long distances, and releases on one continent can be deposited in other continents and elsewhere. Depending on local mercury pollution load, substantial additional contributions to the intake of total mercury can occur through air and water.

2. Human populations and ecosystems most at risk

5. The general population is primarily exposed to methylmercury through diet and to elemental mercury through dental amalgam. Other routes of exposure include environmental releases and occupational activities. Exposure to mercury might also occur through the use of mercury-containing products, including vaccines containing mercury preservatives (Thimerosal/Thiomersal) and certain cosmetics.

6. Some populations are especially vulnerable to mercury contamination. These include pregnant women, the newborn, children and indigenous people exposed to methylmercury through the consumption of contaminated fish, and communities dependant on foods that may contain high levels of methylmercury, such as fish and marine mammals.

7. Workers who may be occupationally exposed to high levels of mercury are also at risk.

8. There are also particularly vulnerable ecosystems and wildlife populations. These include top predators in aquatic and terrestrial food webs (e.g., fish-eating birds and mammals), Arctic ecosystems, wetlands, tropical ecosystems and soil communities.

9. Mercury also gives rise to socio-economic effects on countries dependant on fisheries as an important activity, and may have impacts on agricultural production and land and aquatic uses.

3. Sources

10. There is clear evidence that mercury impacts on the environment have considerably increased globally due to human activities. The most significant environmental releases of mercury are air emissions, but mercury is released in other ways, including discharges from various sources to water and land. The relative contributions to the releases of mercury from different source types vary between countries.

11. Some examples of major sources of anthropogenic releases of mercury are:

(a) Releases from mobilization of mercury impurities:

- Coal-fired power and heat production (largest single source to atmospheric emissions)
- Energy production from other fossil carbon fuels
- Cement production (mercury in lime)
- Mining and other metallurgic activities involving the extraction and processing of virgin and recycling mineral materials, for instance production of:
  - iron and steel
  - ferromanganese
  - zinc
  - other non-ferrous metals
- Petroleum production

(b) Releases from intended extraction and use of mercury:

- Mercury mining
- Small-scale gold mining (amalgamation process)
- Chlor-alkali production
- Use of fluorescent lamps, instruments, dental amalgam fillings etc.
- Manufacturing of products containing mercury, for example:
  - thermometers
  - manometers and other instruments
  - electrical and electronic switches
- Biocides (e.g. seed-dressing, pesticides and slimicides)
- Use of other products, such as batteries, fireworks and laboratory chemicals

(c) Releases from waste treatment, cremation, etc. (originating from both impurities and intended use of mercury):

- Waste incineration (municipal, medical and hazardous wastes)
- Landfills
- Cremation
- Cemeteries (release to soil)
- Recycling and storage.

12. Concern was expressed that highly contaminated industrial sites and mining operations continue to release mercury. It was also noted that land, water and resource management activities such as forestry and agricultural practices and flooding can make mercury more bioavailable. Methylation and bioaccumulation are also influenced by high levels of nutrients and organic matter in water bodies. Frequent extreme weather events can contribute to release of mercury through flooding and soil erosion. Concern was also raised regarding potential releases from surplus stocks of mercury and the need for proper storage.

13. As uses are phased out in some parts of the world, mercury waste and recycling of mercury are on the increase. In this context, concerns have been identified regarding the export of mercury waste to other regions and the possible transfer of outdated technology to developing countries and countries with economies in transition.

#### 4. Magnitude of the threat

14. Mercury pollution has significant impacts at the local, national, regional and global levels. These impacts should be addressed through a range of actions at each of these levels, targeting both the supply of and demand for mercury.

15. Mercury and its compounds have caused a variety of documented, significant global adverse impacts on human health and the environment throughout the world. Exposure studies from numerous geographic areas indicate that a significant portion of humans and wildlife throughout the world are exposed to methylmercury at levels of concern. Elevated methylmercury levels also have been measured in numerous freshwater and marine species throughout the world. Even areas with minimal local and national mercury releases, such as in the Arctic, are adversely affected due to the transcontinental and global transport of mercury.

16. Some effects of mercury are linked to long-range transport while others are more local in character. Exposure through long-range environmental transport occurs where mercury released into air or water circulates and is transformed into methylmercury, which then comes into contact with humans and wildlife (e.g., through consumption of mercury-contaminated fish and mammals). By comparison, high exposures to inorganic mercury can occur through contact with mercury or mercury vapours at or near the source of use or release.

## Part B

### I. CONCLUSIONS WITH RESPECT TO POSSIBLE OPTIONS FOR ADDRESSING ANY SIGNIFICANT GLOBAL IMPACTS OF MERCURY

17. This outline lists possible options for recommendation on measures to address global adverse impacts of mercury at the global, regional, national and local levels. They can correspond to short, medium and long-term goals. Specific options may be adopted at different times in different countries or can be applied sequentially. In deciding which measures are most appropriate and effective at global, regional or national levels, varying socio-economic impacts should also be taken into account.

#### A. Measures to reduce and/or eliminate the use, emissions, discharges and losses of mercury and its compounds

##### 1. Substituting products and processes

18. Measures that involve substituting products and processes that contain or use mercury might include:

- (a) Limiting or preventing use of mercury in products where alternatives exist and promoting development of appropriate alternatives for remaining essential uses;
- (b) Limiting or preventing the intended use of mercury except in artisanal mining activities until appropriate and affordable technology is transferred to the said sector;
- (c) Limiting or preventing use of obsolete technology and requiring use of best available techniques and best environmental practices to reduce or prevent mercury releases into air and water;
- (d) Gradual phasing-out of mercury already in use and mercury-containing products, after promoting the development of effective and affordable mercury substitutes and alternative technology.

##### 2. Reducing mobilization of new mercury into the biosphere

19. Measures to reduce production of raw materials and products that generate mercury releases might include:

- (a) Reutilization of recovered or recycled mercury for essential use in a strictly controlled manner as opposed to mining and smelting of virgin mercury and careless use and discharge of mercury;

- (b) Limiting or preventing the content of mercury present as impurities in fuels;
- (c) Reducing and, where feasible, phasing out the mining of virgin mercury.

### 3. Reducing consumption

20. Measures to reduce consumption of raw materials and products that generate mercury releases might include:

- (a) Limiting or eliminating content of mercury present as such or as impurities in high volume materials, (for example, packaging);
- (b) Limiting or preventing products containing mercury from being marketed nationally;
- (c) Limiting or preventing products (for example, batteries, pharmaceuticals, cosmetics, etc.) containing mercury from being exported and imported;
- (d) Limiting or preventing the marketing of used or commodity-grade mercury;
- (e) Establishing a “mercury bank” in order to keep account of the use of virgin mercury, recovered or recycled mercury in a strictly controlled system.

### 4. Controlling and monitoring emissions and releases

21. Monitoring strategies should be defined with particular attention to the technical and economic capacities of countries. Each country may take measures to control mercury emissions and releases including through:

- (a) Limiting or preventing mercury from processes from being released directly into the environment, air, water and soil through emission control techniques (for example, industrial point sources, including the chlor-alkali industry, oil and gas production, metallurgic industry, etc., other sources such as municipal and medical waste incinerations, and activities such as small-scale mining);
- (b) Limiting or preventing emissions of mercury from combustion of fossil fuels and processing of mineral materials by emission control technology, or by regulatory measures;
- (c) Limiting or preventing the release of mercury from processes into the wastewater treatment system (in order to limit releases to the water recipient and to permit use of sludge);
- (d) Controlling, confirming and improving the efficiency of measures for limiting or preventing mercury emissions and releases through end-of-pipe technology and to that end establishing emission standards and suitable cost-effective environmental monitoring.

### 5. Waste management

22. Measures to reduce and/or eliminate mercury in wastes through mercury waste management might include:

- (a) Limiting or preventing mercury in products and process waste from being released directly into the environment, by efficient waste collection;
- (b) Limiting or preventing mercury in products and process waste from being mixed with less hazardous waste in the general waste stream, by separate collection and treatment;

- (c) Limiting or preventing mercury releases into the environment through treatment of household waste, hazardous waste and medical waste, by emission control technology;
- (d) Limiting the mercury content in sewage sludge spread on agricultural land and limiting the use of solid incineration residues containing mercury in road-building, etc.;
- (e) Limiting or preventing remarketing of wastes containing mercury;
- (f) Retiring excess mercury through long-term waste management (terminal storage);
- (g) Preventing mercury releases into the environment through the management of obsolete and waste pesticides and chemicals containing mercury;
- (h) Promoting legal commitments among producers of mercury containing products to take responsibility for adequate waste treatment and final disposal of their products;
- (i) Limiting or preventing the incineration of mercury containing products, materials and waste.

#### B. International cooperation

23. International cooperation might be improved through:

- (a) Promoting increased participation in existing regional and international conventions and agreements that deal with mercury and mercury compounds;
- (b) Exchanging information regularly among international organizations, including the member organizations of the Inter-Organization Programme for the Sound Management of Chemicals, to ensure coordination of activities relevant to mercury and avoid duplication of efforts and waste of available resources;
- (c) Supporting long-term monitoring and modelling initiatives at national, regional and international levels to ensure availability of comparable data and precise information that can guide policies and programmes aimed at reducing levels of mercury in the environment throughout the world;
- (d) Exploring collaboration with regional and subregional centers, such as those of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, and supporting collaborative research programmes and initiatives to improve understanding of mercury sources, impacts on human health and the environment impacts on the fishing industry, fishing groups and people dependant upon fish for their livelihood and cycling in the environment;
- (e) Supporting studies and clean-up programmes through international funding or financing initiatives for developing countries and countries with economies in transition;
- (f) Filling information needs to assist developing countries and countries with economies in transition in targeting and prioritizing national or regional actions and strategies to reduce mercury use and releases (e.g. source and emissions inventory assistance), including through possible use of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade;
- (g) Promoting surveys and information exchanges to identify international uses of mercury and to enhance our understanding of flows within and among countries from production through consumption and end-of-life storage or disposal;
- (h) Establishing an international plan for the prevention of illegal import of mercury and mercury compounds as a raw material and/or as a hazardous waste.

### C. Risk communication

24. Risk communication relevant to the adverse effects of mercury and mercury compounds might be enhanced through:

(a) Raising awareness among policy and decision makers with regard to the adverse effects of mercury and mercury compounds;

(b) Promoting public information, awareness and education on the health and environmental effects of mercury and mercury compounds and the alternatives available to reduce exposure and reduce or eliminate releases and emissions of mercury especially to those vulnerable populations such as indigenous people, women and children, workers and communities living around industrial and mining activities, etc.;

(c) Promoting curricula development in schools and training programmes for workers involved in mercury processing and handling;

(d) Establishing a clearing house for information relevant to mercury, for example, information on risk management strategies, appropriate alternatives and related costs, and ensuring easy access to this information, especially for developing countries and countries with economies in transition;

(e) Establishing a network among Governments and other actors involved to exchange information on ongoing initiatives and efforts at national, regional and international levels to reduce or eliminate the adverse effects of mercury;

(f) Providing, for the general population, awareness of exposure risks to mercury through effective fish consumption advisories and other information dissemination methods. Enhancing, for vulnerable populations such as indigenous people, pregnant women and children, outreach and risk communication about mercury exposure;

(g) Promoting the awareness of the risks associated with the mobilization of mercury from geological sources and its accumulation in the biosphere;

(h) Promoting the awareness of the persistence of mercury and its ability to be transported, transformed and accumulated in food chains.

### D. Additional measures to support the reduction or elimination of uses, emissions, discharges and losses and limit the adverse impacts on human populations and the environment

25. In addition to the measures listed in the previous section, which aim directly at reducing emissions and releases of mercury, a broader range of measures and management tools exist that supplement the regulatory infrastructure and support implementation of agreed reduction strategies and policies.

#### 1. National, regional and international action

26. The development of national, regional and international action plans to address the use and release of mercury might be promoted through:

(a) Developing inventories of uses, releases and possible global adverse impacts of mercury and mercury compounds as well as of existing sites polluted by mercury and mercury compounds to serve as a baseline for considering action on mercury globally, particularly in developing countries and countries with economies in transition;

(b) Developing and implementing an action plan setting out the policies necessary within each sector to reduce uses and releases of mercury through multi-disciplinary approaches and involving major stakeholders;

- (c) Developing monitoring programmes including standardized measures linked to other international programmes through international networks, including training programmes and the exchange of expertise between on the one hand, developed and on the other, developing countries and countries with economies in transition;
- (d) Promoting studies on socio-economic effects of different measures related to varying national conditions;
- (e) Developing effective environmental policy tools based on integrated methodologies to assist in the management of mercury polluted sites resulting from anthropogenic activities;
- (f) Exploring collaboration with the Basel Convention to develop guidelines for affordable waste management options for mercury wastes and research into methods for definitive storage and encourage and promote research into the search for viable alternative technologies and substitutes;
- (g) Establishing a task force to coordinate and implement mercury action to resolve some of the uncertainties involving various issues.

## 2. Chemicals management

27. The use of life-cycle assessment and chemicals management tools and techniques for addressing uses and releases of mercury might be promoted through:

- (a) Setting environmental quality standards for maximum acceptable mercury concentrations in different media, such as air, water, soil and foodstuffs, in order to limit exposure of human populations and the environment (including occupational settings and vulnerable populations or ecosystems at special risk);
- (b) Using Pollutant Release and Transfer Registers to track the environmental performance of industrial facilities using mercury or generating mercury waste and to stimulate voluntary initiatives by companies to reduce their releases and transfers of mercury;
- (c) Using life-cycle assessment tools, facilitating the development and implementation of codes of conduct for various industrial sectors and producers, and promoting recognized environmental management systems, such as ISO 14.001, etc.;
- (d) Developing best environmental practices or guidelines for best available techniques for various industrial sectors;
- (e) Using economic incentives and/or disincentives to promote substitution of products, methods of analysis and processes that contain or use mercury or mercury compounds;
- (f) Developing a framework to manage the transboundary movement of mercury, its compounds and products containing mercury and technology in particular into developing countries and countries with economies in transition. This may be achieved by adopting the process used by the Montreal Protocol on Substances that Deplete the Ozone Layer, or through other models such as the Rotterdam Convention;
- (g) Setting standards for maximum acceptable mercury emissions into the environment.

## 3. Voluntary measures

28. Voluntary commitments and reduction programmes at national, regional and/or international levels to limit the use and release of mercury might include:

(a) Promotion of voluntary commitments among producers of mercury containing products to take responsibility for ensuring appropriate handling and waste treatment of their products (for example, through information and training of users, product take-back schemes, etc.);

(b) Promotion of voluntary commitments among users of mercury containing products (for example, hospitals) to reduce or eliminate use and limit or avoid releases of mercury into the environment through appropriate handling and waste treatment;

(c) Promotion of voluntary reduction programmes within different private sector industries or activities to reduce and/or eliminate their uses and releases of mercury, thus stimulating the sector to identify and implement appropriate and effective solutions.

#### 4. Technical and financial assistance

29. Measures to provide technical and financial assistance to enhance the capacity of Governments, especially developing countries and countries with economies in transition, to monitor and assess emissions and releases of mercury and implement appropriate control measures might include:

(a) Organizing training and capacity-building activities to support Governments in developing action plans and implementing the policies and strategies identified through the development of such plans;

(b) Establishing a mechanism for addressing the needs for capacity-building and technical and financial assistance of Governments, especially of developing countries and countries with economies in transition, taking into consideration the resources and assistance available from bilateral and multilateral assistance and partnerships through rigorous application of the principles and practice of needs assessment.

## II. ADDITIONAL ASPECTS FOR CONSIDERATION

30. When considering the possible options that might be applied to address the adverse effects of mercury, some additional aspects should be taken into consideration, such as efficacy of national and regional measures versus international measures and binding versus voluntary measures. Some considerations relevant to these aspects are given in paragraphs 31 to 45 below.

### A. National and regional measures versus international measures

31. Chapter 9 of the global mercury assessment report documents a considerable range of measures that have been implemented at the national and regional levels to deal with mercury and mercury compounds. Through such measures, a number of countries have achieved substantial reductions in emissions and releases of mercury from products and industrial processes. In addition, a number of coordinated regional approaches, both binding and non-binding, such as the Convention on Long-range Transboundary Air Pollution, the Convention for the Protection of the Marine Environment of the North-East Atlantic and the North American Regional Action Plan on Mercury, have supported national measures and contributed to additional reductions beyond national borders.

32. Despite these successful national and regional initiatives, some countries consider that they might not be sufficient to ensure adequate protection of human health and the environment from the adverse effects of mercury, and are calling for the consideration of coordinated initiatives at the international level.

33. If it is found that there are global problems related to mercury that should be addressed, it might be essential to the effectiveness of any reduction measures for the substantive commitments to be discussed and agreed at the international level. Any specific regional or national considerations may be addressed taking into account common but differentiated responsibilities within the commitments agreed to.

34. Should countries within a region consider it necessary to set more stringent requirements than those in an international instrument, provisions for such regional agreements might be incorporated into an international initiative.

#### B. Non-binding versus binding measures

35. As can be seen from the global mercury assessment report, both voluntary non-binding and binding measures have been implemented successfully to address the negative effects of chemicals. Both approaches represent positive steps towards obtaining environmental aims and should be considered complementary rather than mutually exclusive.

##### 1. Non-binding measures

36. Examples of some non-binding measures specifically relevant to mercury are described in the global mercury assessment report. Other measures relevant to chemicals management that have been successfully implemented at national, regional and international levels include:

(a) Codes of conduct, such as the UNEP Code of Ethics on the International Trade in Chemicals (1994) and the Food and Agriculture Organization of the United Nations (FAO) International Code of Conduct on the Distribution and Use of Pesticides (amended 1989);

(b) Voluntary reduction programmes with set reduction goals, for example, the United States of America Chlorine Institute's measures to reduce mercury use within United States mercury cell chlor-alkali facilities and the Great Lakes Binational Toxics Strategy;

(c) Ministerial or high-level declarations setting reduction goals, such as the North Sea Ministerial Declarations of the North Sea Conferences and the Nordic Environmental Action Programme of the Nordic Council of Ministers;

(d) Action programmes setting out detailed recommendations for responsible mercury management and control, such as the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities and the North American Regional Action Plan on Mercury.

37. There might be some advantages to such non-binding measures. Binding instruments are often negotiated over a number of years, while non-binding instruments often may be adopted within a shorter time period. Because of their more flexible character, non-binding instruments can often be more ambitious in the goals they set. A non-binding instrument can incorporate measures to promote reporting, access to information, capacity-building and technical assistance. Although implementation is voluntary, States feel obliged to respect as far as possible the political commitments they have made. Non-binding instruments do not require a subsequent ratification or acceptance procedure and might contribute to a rapid implementation of commitments. Finally, participation in implementation might often be broader than for binding instruments that require ratification.

38. As mentioned before, binding and non-binding measures are complementary rather than mutually exclusive. Non-binding commitments might also be used to ensure rapid implementation of environmental goals in expectation of the development and entry into force of binding measures. An example is the voluntary prior informed consent procedure of the UNEP London Guidelines for the Exchange of Information on Chemicals in International Trade (amended 1989) and the FAO Code of Conduct on the Distribution and Use of Pesticides (amended 1989), which was implemented on a voluntary basis from 1989 until the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade was adopted in 1998. This voluntary implementation is being continued during the interim period before the Convention enters into force, through the implementation of an interim prior informed consent procedure, based on the provisions of the Rotterdam Convention.

## 2. Binding instruments

39. A binding instrument establishes firm legal commitments for those countries that ratify it and contains mechanisms to support implementation in accordance with the instrument's requirements. A binding instrument also requires the establishment of the administrative and technical procedures and structures required at national level.

40. A binding instrument will often also have some benefits incorporated into it, such as the promotion of capacity-building and technical assistance as well as access to information and advice on substitutes and appropriate technology that might promote broad participation. Furthermore, a binding instrument can include elements, which are more or less voluntary such as recommended measures and commitments to long-term goals.

41. When considering the advantages of a binding instrument, two options might be envisaged: developing a new instrument, or using an existing international instrument to address the adverse effects of mercury and mercury compounds. Some considerations relevant to these two options are:

(a) Option 1: Developing a new, binding instrument to address mercury

42. Negotiating a separate, new international instrument on mercury might allow for the detailed regulation of all aspects Governments would find necessary to address, but would also require the establishment of the necessary infrastructure at national and international levels to implement the provisions of the instrument. Negotiating an international, legally binding instrument often requires a number of years and substantial funding before the instrument can be adopted. Of the two most recently adopted international instruments regulating chemicals, the Rotterdam Convention took 30 months to negotiate and adopt (March 1996 to September 1998), while the Stockholm Convention on Persistent Organic Pollutants took 35 months (June 1998 to May 2001). Both conventions require 50 ratifications to enter into force, and neither has yet done so.

(b) Option 2: Using an existing international binding instrument to address mercury

43. Using an existing international instrument to address the adverse effects of mercury might present two possibilities: incorporating mercury and mercury compounds, in accordance with existing provisions, into an existing instrument, or developing a protocol covering mercury and mercury compounds under an existing instrument.

44. Relevant conventions, such as the Rotterdam Convention and the Basel Convention, aim at regulating transboundary trade in unwanted chemicals and hazardous wastes. The most recent international convention adopted and aimed at reducing releases from anthropogenic sources and minimizing or ultimately eliminating the use and production of certain chemicals is the Stockholm Convention. In addition, there are a number of binding instruments limited to a specific geographic area that address mercury, such as the Convention on Long-range Transboundary Air Pollution, the Convention for the Protection of the Marine Environment of the North East Atlantic and the Convention for the Protection of the Marine Environment of the Baltic Sea. Descriptions of all the above-mentioned instruments can be found in the global mercury assessment report.

45. If considering this option, thought should be given as to whether the overall objectives of the specific existing convention and the control measures stipulated therein are appropriate to address the concrete issues identified with regard to mercury.

Part C

## PROPOSALS FOR IMMEDIATE ACTION TO BE CONSIDERED BY THE GOVERNING COUNCIL

46. The Governing Council should consider inviting multilateral financing agencies, Governments and other partners to mobilize technical and financial resources to support national and regional efforts and capacity-building in areas such as the following:

- (a) Begin the process to establish national implementation plans to examine:
  - (i) Public awareness of the adverse effects of mercury and its compounds on health and the environment through training and workshops;
  - (ii) An inventory of uses and release of mercury and mercury compounds as well as existing polluted sites to serve as baseline information;
  - (iii) Establishment, where necessary, of legislation and regulations for enforcement;
  - (iv) Regional information exchange;
- (b) Build capacity through:
  - (i) Training and workshops for a wide range of topics, including pollution prevention actions or key mercury use sectors (e.g., chlor-alkali facilities);
  - (ii) Technical assistance in the development of facilities for analysis and monitoring;
  - (iii) Provision of facilities for proper disposal of waste containing mercury including obsolete pesticides containing mercury;
- (c) Promote awareness of alternative livelihood options and promote transfer of appropriate technology for the small-scale artisanal mining sector;
- (d) Initiate one or more pilot projects in developing countries and countries with economies in transition to look at issues (a) to (c) mentioned above;
- (e) Support research in order to better understand routes and nature of exposure and mercury cycling (transport and transformations, in particular the formation of methylmercury) in various environmental conditions in particular tropical and dry regions, for which limited information is available in developing countries and countries with economies in transition, and promote research on mercury (differentiation of natural and anthropogenic mercury in the air, in water and in soil, and in Arctic regions) in developed countries;
- (f) Support research on the development of standardized analytical procedures and methods to support meaningful and cost-effective monitoring and modelling programmes (trends, health-related, hot spot monitoring and biomonitoring) as an essential component of mercury control measures;
- (g) Assist countries in building broad based public awareness through incorporation of the subject “environmental education” in school curriculum;
- (h) Establish a data bank regarding uses, sources, chemistry, import, export, health hazards, and research conducted in various areas of the world of mercury and its compounds. This data bank should be accessible to everyone;
  - (i) Undertake immediate research into best available environmentally friendly alternatives;
  - (j) Develop strategies for enhanced outreach and risk communication to reach sensitive populations (for example, pregnant women);

(k) Promote information exchange and collaboration, including scientific and technical information exchange on various topics such as long-range transport, monitoring and modelling, health and ecological risks, source charact

(l) erization, source control technology, alternatives, pollution prevention techniques, nutrition and genetic factors among Governments in partnership with other public and private organizations.

47. In so doing, established organizations and existing international frameworks and infrastructure should be relied upon to the extent possible.

Annex II

## OUTLINE OF KEY FINDINGS OF THE GLOBAL MERCURY ASSESSMENT REPORT

1. Why is there concern and can intervention result in change?
  - (a) Mercury is present in the environment:
    - Widespread exposure from anthropogenic sources;
  - (b) Effects are real:
    - (i) Human health effects;
    - (ii) Sensitive life stages;
    - (iii) High exposure subgroups;
    - (iv) Ecological and wildlife effects;
  - (c) Persistence:
    - (i) Bioaccumulation and biomagnification;
    - (ii) Global recycling;
    - (iii) Threat to food supply and socio-economic structure;
  - (d) Changes have had an impact.
2. Why is local/regional action not sufficient?
  - (a) Transport:
    - (i) Long residence time in atmosphere;
    - (ii) Long distance atmospheric transport;
    - (iii) Ocean currents and rivers enhance transport;
    - (iv) Re-emission from soil and water to atmosphere;
  - (b) Impacts:
    - (i) Global fishing;
    - (ii) Local actions when taken impact global levels;
    - (iii) Global actions impact local levels;
    - (iv) Waste, dumping and trade;
  - (c) International commerce:
    - (i) Trade in mercury and mercury-containing products, especially illegal, uncontrolled and/or unregulated trade;
    - (ii) Transboundary waste.
3. How does mercury cycle around the globe?
  - (a) Global mercury cycle:
    - (i) Description;
    - (ii) Impact;
    - (iii) Arctic deposition;
  - (b) Other transport and storage sinks:
    - International commerce.
4. How does mercury get into humans and wildlife?
  - (a) Humans:

- (i) Exposure through diet (fish, shellfish and marine mammals);
    - (ii) Direct exposure (dental amalgams, pharmaceuticals, cosmetics and vaccines);
    - (iii) Occupational exposure (including artisanal/small-scale mining);
    - (iv) Other exposures (contaminated groundwater used as drinking water; contaminated food, etc.);
  - (b) Wildlife:
    - (i) Exposure through food web (fish);
    - (ii) Other exposures.
5. What are the anthropogenic sources and how might release reductions be accomplished?
- (a) Coal-fired power plants;
  - (b) Incineration/cremation;
  - (c) Chlor-alkali plants;
  - (d) Mining (primary and other metals) and usage of elemental mercury in artisanal/small-scale mining;
  - (e) Fuels extraction/processing;
  - (f) Changes in methylation processes in the environment;
  - (g) Consumer products (batteries and electric switches, pesticides etc.);
  - (h) Other (land disposal, storage/management of reserves, etc.).
6. What would improve our understanding and communication?
- (a) This should not delay taking action now;
  - (b) International coordination and improvement of inventories;
  - (c) Monitoring, modeling and accounting;
  - (d) More health data and exposure data;
  - (e) Communication, outreach and training.
7. What actions did the Working Group identify as possibilities?
- Link to the Global Mercury Assessment Working Group's conclusions on impacts and options for addressing the impacts.

Annex III

## LIST OF DOCUMENTS BEFORE THE GLOBAL MERCURY ASSESSMENT WORKING GROUP

Document number	Title	Date
UNEP/(DTIE)/GMA/WG.1/1	Provisional agenda	14 June 2002
UNEP/(DTIE)/GMA/WG.1/1/Rev.1	Provisional agenda (revised)	9 Sept 2002
UNEP//GMA/WG.1/2	Organizational matters: terms of reference for the Working Group	4 July 2002
UNEP(DTIE)/GMA/WG.1/3	Review of the draft global mercury assessment report : issues of relevance to the review	23 July 2002
UNEP(DTIE)/GMA/WG.1/4	Review of the draft global mercury assessment report	4 July 2002
UNEP(DTIE)/GMA/WG.1/5	Consideration of any significant global adverse impacts of mercury that might be addressed through international initiatives	4 July 2002
UNEP(DTIE)/GMA/WG.1/6	Consideration of possible options for addressing any adverse effects of mercury and its compounds	4 July 2002
UNEP(DTIE)/GMA/WG.1/7	<b>Outline of the final report of the first meeting of the Working Group</b>	18 July 2002
UNEP(DTIE)/GMA/WG.1/7/Rev.1	<b>Outline of the final report of the first meeting of the Working Group (revised)</b>	4 Sept 2002
UNEP(DTIE)/GMA/WG.1/INF/1	<b>List of information submissions received as at 15 July 2002</b>	4 July 2002
UNEP(DTIE)/GMA/WG.1/INF/2	List of comments received on the first draft of the global mercury assessment report as at 15 July 2002	4 July 2002
UNEP(DTIE)/GMA/WG.1/INF/3	<b>Stockholm Convention on Persistent Organic Pollutants and its possible relevance to mercury and mercury compounds</b>	4 July 2002
UNEP(DTIE)/GMA/WG.1/INF/4	Final report of the meeting of the Intergovernmental Forum on Chemical Safety (IFCS) Ad Hoc Working Group on Persistent Organic Pollutants	18 July 2002
UNEP(DTIE)/GMA/WG.1/INF/5	<b>Compilation of comments and input received on the revised draft of the global mercury assessment report</b>	3 Sept 2002
	Global mercury assessment Revised draft	17 July 2002
	<b>Global mercury assessment (appendix): overview of existing and future national actions, including legislation, relevant to mercury</b>	15 July 2002

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