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**Open-ended Working Group of the Parties to
the Montreal Protocol on Substances that
Deplete the Ozone Layer
Thirty-second meeting
Bangkok, 23–27 July 2012
Items 3–11 of the provisional agenda***

Issues for discussion by and information for the attention of the Open-ended Working Group of the Parties to the Montreal Protocol at its thirty-second meeting

Note by the Secretariat

Introduction

1. The present note sets out, in section I, a summary of the substantive issues on the agenda for discussion by the Open-ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer at its thirty-second meeting.
2. The present note also sets out, in section II, information on matters that the Secretariat would like to bring to the parties' attention, including matters related to continuing collaboration with other multilateral environmental agreements and institutions, information on activities related to the celebration of the twenty-fifth anniversary of the Montreal Protocol, information on preparations for the Twenty-Fourth Meeting of the Parties and information on the ratification of the amendments to the Montreal Protocol.

I. Summary of issues for discussion by the Open-ended Working Group at its thirty-second meeting

Agenda item 3: 2012 progress report of the Technology and Economic Assessment Panel

3. This year, the Technology and Economic Assessment Panel progress report spans three volumes. Issues covered in the report that are relevant to matters on the provisional agenda of the current meeting are discussed in the present note.

Agenda item 4: Issues related to exemptions from Article 2 of the Montreal Protocol

(a) Nominations for essential-use exemptions for 2013 and 2014

4. In accordance with decision IV/25, China and the Russian Federation submitted requests for essential-use exemptions for chlorofluorocarbons (CFCs) for metered-dose inhalers applicable to

* UNEP/OzL.Pro.WG.1/32/1.

2013. In addition, the Russian Federation requested an exemption for the use of 95 metric tonnes of CFC-113 for 2013 for certain aerospace applications.

5. The Technology and Economic Assessment Panel's Medical Technical Options Committee met in Dhaka from 14 to 16 March 2012 to review the exemption requests for metered-dose inhalers and to prepare its recommendations on those requests. The Panel's Chemicals Technical Options Committee met in Hong Kong from 29 February to 2 March 2011 and considered, among other things, the exemption requested by the Russian Federation for aerospace uses.

6. In its progress report, the Panel noted that requests for exemptions for metered-dose inhalers from parties operating under paragraph 1 of Article 5 had decreased from eight in 2009 to one for 2013. The Panel's detailed review of the metered-dose-inhaler nominations can be found in section 1.2 (pages 1–14) of volume I of the 2012 progress report, while its detailed review of the Russian Federation's aerospace nomination can be found in section 3.7 (pages 36–37) of volume 1 of that report. Table 1 below summarizes the parties' requests for essential-use exemptions and the Panel's initial recommendations.

Table 1

Essential-use nominations submitted in 2012 for 2013 and recommendations of the Technology and Economic Assessment Panel (in metric tonnes)

<i>Party</i>	<i>Approved for 2012</i>	<i>Nominated for 2013</i>	<i>Recommendation of the Technology and Economic Assessment Panel</i>
Parties not operating under paragraph 1 of Article 5 of the Montreal Protocol			
Russian Federation (metered-dose inhalers)	212	250	Recommends 212 t for 2013. The Panel considers that the volume of CFCs for the manufacture of salbutamol-based inhalers could safely be maintained at 212 t. It recommends that any growth in demand should be met through the increased use of imported, affordable CFC-free inhalers and suggests that the Russian Federation may wish to consider adjusting its domestic arrangements (market and pricing) to facilitate that.
Russian Federation (aerospace)	100	95	Recommends 95 t on the grounds that progress continues to be made in reducing the use of CFC-113 and that an end date (2016) has been proposed. The Russian Federation is currently studying the potential use of a non-controlled CFC as an alternative to CFC 113 as explained in paragraph 7 below.
Subtotal: Parties not operating under paragraph 1 of Article 5	312	345	307

<i>Party</i>	<i>Approved for 2012</i>	<i>Nominated for 2013</i>	<i>Recommendation of the Technology and Economic Assessment Panel</i>
Parties operating under paragraph 1 of Article 5 of the Montreal Protocol			
China (metered-dose inhalers)	532.04	446.52	Recommends 386.82 t The Panel is unable to recommend 50 t of CFCs for salbutamol, 9 t for traditional Chinese medicines and 0.7 t for a company not undertaking active research and development for a clenbuterol/beclomethosone/ipratropium combination). China's total phase-out of CFC-based inhalers is projected to be complete by 2016.
Subtotal: parties operating under paragraph 1 of Article 5	532.04	446.52	386.82
Total	844.04	791.52	693.82

7. In the essential use nomination for the aerospace industry, the Russian Federation reported that alternative solvents, including a new chemical, RC-316c, were being tested. According to the preliminary assessment of the Technology and Economic Assessment Panel, RC-316c is technically a chlorofluorocarbon (1,2-dichloro-1,2,3,3,4,4-hexafluorocyclobutane) that is not currently controlled by the Montreal Protocol. The ozone-depletion potential and global-warming potential of RC-316c is not known.

8. The Parties have adopted several decisions dealing with substances that might have ozone-depleting potential and are not subject to the Protocol, including decisions IX/24, X/8, XI/19 and XIII/5. Paragraph 2 of decision XIII/5 asks the Secretariat to request any Party that has an enterprise producing a new substance to request that enterprise to undertake a preliminary assessment of the ozone-depletion potential of the substance using procedures to be developed by the Scientific Assessment Panel, to submit, if available, toxicological data on the substance, and to report on the outcome of its assessment to the Secretariat. Paragraph 4 of the same decision requests the Secretariat to notify the Panel of the outcome of any such preliminary assessment to enable the Panel to review it. Consultations on RC316c and the criteria for the preliminary assessment are currently taking place between the Technology and Economic Assessment Panel, the Scientific Assessment Panel and the Secretariat, and further consultations with the Parties and companies producing the substance are envisaged. The results will be reported to the Parties in due course.

Item 4 (b) Nominations for critical-use exemptions for 2013 and 2014

9. The Methyl Bromide Technical Options Committee's Structures and Commodities Subcommittee met from 28 February to 1 March 2012 in Berlin, Germany, while its Subcommittee on Soils and its Subcommittee on Quarantine and Pre-shipment met from 27 February to 2 March in Beijing. Among the items on their agendas were the evaluation of nominations for methyl bromide critical-use exemptions and the proposal of interim recommendations on the quantity of methyl bromide eligible for such exemptions. In 2012 Australia, Canada and the United States of America submitted eight nominations for critical uses of methyl bromide for pre-plant soil use and post-harvest use in 2014. The total nominated amount for all countries was 483,589 metric tonnes, which represented a 35 per cent reduction from the amount nominated in 2011 for 2013.

10. The Committee adopted interim recommendations in respect of all of nominations submitted. A summary of the requests and the nominations is included in table 2 below, while the complete analysis of the Panel on each nomination is included in tables 9-9 and 9-11 volume 1 of the Panel's 2012 progress report. Each of the subcommittees of the technical options committee achieved consensus on its recommendations. When the recommendations were considered by the full Methyl Bromide Technical Options Committee, only one of the attending members of the Committee disagreed with the consensus position of the Committee. Subsequent to the meeting a further member

and one non-attending member also supported the minority views. Both the minority and majority views, together with the Panel's comments on the minority views, may be found in chapter 9.5.2 of the Panel's 2012 progress report.

Table 2

Summary of the Methyl Bromide Technical Options Committee's interim recommendations (in square brackets) for 2014 critical use exemptions for methyl bromide in response to nominations submitted in 2012 (in metric tonnes)

<i>Nominating party and sector</i>	<i>Nomination</i>	<i>Interim recommendation</i>
1. Australia		
Strawberry runners	29.760	[26.784]
Packaged rice	1.187	[1.187]
2. Canada		
Strawberry runners	5.261	[5.050]
Mills	5.044	[5.044]
3. United States of America		
Strawberry fruit	415.067	[363.186]
Commodities	.740	[.487]
Mills/Food processing structures	22.80	[22.80]
Cured pork	3.730	[unable to assess]
Total	483.589	[424.372]

11. During its meeting, the Committee also considered decision XXIII/14 of the Twenty-Third Meeting of the Parties, which requested the Panel "to consider whether the guidelines and criteria for the preparation of critical-use nominations ... need any modification to take into account the situation of parties operating under paragraph 1 of Article 5..." and to report on the issue to the Open-ended Working Group at its thirty-third meeting. In section 9.2.7 of its 2012 progress report the Panel suggested that the best way to effect any such modification would be to revise the Handbook on Critical Use Nominations for Methyl Bromide. The Panel observed that if parties operating under paragraph 1 of Article 5 of the Protocol followed the pattern of some parties not so operating then some nominations for critical-use exemptions could come in as early as January 2013. Accordingly, the Panel suggested that it update the Handbook in time for consideration by the Twenty-Fourth Meeting of the Parties in November 2012.

Item 4 (c): Quarantine and pre-shipment issues

12. By decision XXIII/5 the Twenty-Third Meeting of the Parties requested the Technology and Economic Assessment panel to prepare two concise reports for consideration by the Open-ended Working Group. In the first report the Panel was requested to provide a summary of data submitted under article 7 of the Protocol on a regional basis, to analyse trends in that data and to provide guidance on procedures and methods for data collection on methyl bromide use for quarantine and pre-shipment for parties that had not yet established such procedures and methods or wished to improve existing ones. In the second report the Panel was asked to analyse information submitted by Parties on a voluntary basis by 31 March 2013 on the amount of methyl bromide used to comply with phytosanitary requirements of destination countries and on phytosanitary requirements for imported commodities that must be met through the use of methyl bromide.

13. As little new information of the sort required for the second report had been submitted, the Panel focused on the first report, which may be found in section 10.3 of volume 1 of the 2012 progress report. With regard to quarantine and pre-shipment data, the panel noted that global production of methyl bromide for quarantine and pre-shipment in 2010 was reported as 11,477 metric tonnes. While this is about 32 per cent higher than for 2009, it is fairly consistent with average annual production rate of 10,797 tonnes for the period 1999–2010. Regarding trends in production of methyl bromide for quarantine and pre-shipment uses, the panel noted that compared to 2009, production in 2010 increased significantly in the United States of America, showed some increase in Israel, and decreased in Japan. In general, Japan continued to show a consistent reduction trend since 2003, while the United States and Israel showed relatively large fluctuations over several years. As regards trend in

production of methyl bromide for quarantine and pre-shipment in parties operating under paragraph 1 of article 5 of the Protocol, the Panel noted that two such parties, India and China, had reported such production since 1999. India last reported quarantine and pre-shipment production in 2002 and was presumed to have ceased production. Several companies in India, however, indicate on their websites that they manufacture methyl bromide for quarantine and pre-shipment, non-quarantine and pre-shipment uses and feedstock uses. China's yearly production of methyl bromide for quarantine and pre-shipment has ranged from 700 tonnes in 1999 to 1,853 tonnes in 2010 and shows a generally increasing trend since 2004.

14. In terms of consumption of methyl bromide for quarantine and pre-shipment uses, the Panel reported that overall consumption over the last 12 years had increased in parties operating under paragraph 1 of article 5 and decreased in parties not so operating. Although a recent increase had been noted in parties not operating under paragraph 1 of article 5 in 2010, consumption by the two groups of parties had been roughly equal, with parties operating under paragraph 1 of article 5 consuming 5,558 tonnes and parties not so operating consuming 5,355 tonnes. Overall, global consumption has been relatively stable and has averaged 11,268 tonnes over the past 12 years.

15. The Panel's report included a number of additional points in terms of regional trends in consumption of methyl bromide for quarantine and pre-shipment. The overall increase in 2010 in parties not operating under paragraph 1 of article 5 was attributable to increases in the Western Europe and others group of States. Consumption in that group, which is concentrated in Australia, Israel, Japan, New Zealand and the United States, now equals the consumption of Asia. In the European Union, which reported substantial consumption in the past, all uses of methyl bromide, including for quarantine and pre-shipment, have been banned since 2010. Eleven parties operating under paragraph 1 of article 5 reported consumption of more than 100 tonnes in 2010. Eight of those reported consumption of more than 500 tonnes, two consumed between 500 and 800 tonnes (Republic of Korea and Viet Nam) and one consumed more than 1,000 tonnes (China). The number of parties reporting consumption of more than 100 tonnes of methyl bromide for quarantine and pre-shipment was nearly evenly divided between parties operating under paragraph 1 of article 5 and parties not so operating.

16. An analysis of the overall data reported for 2010 to the Ozone Secretariat shows that 86 parties (72 operating under paragraph 1 of article 5 and 14 not so operating) have reported using methyl bromide for quarantine and pre-shipment at least once between 1999 and 2010; that 47 (or about 55 per cent) of the parties either did not report in 2010 or reported consumption of less than 10 tonnes in 2010; and that 15 (or about 17 per cent) of the parties that reported methyl bromide quarantine and pre-shipment consumption in 2010 consumed 100 tonnes or more.

17. In addition to reporting on data trends, the Panel report responded to the Parties' request for a report that provided "guidance on procedures and methods for data collection on methyl bromide use for quarantine and pre-shipment for parties that have not yet established such procedures and methods or wish to improve existing ones." In that regard, the Panel report focuses on providing examples of methods used by several countries for the collection of data on the use of methyl bromide for quarantine and pre-shipment. The report also looked at the form for data collection developed by the Panel in 1999 and other data collection forms used by parties, as well as guidelines and key information elements that could be considered in collecting and exchanging information on the reduction of methyl bromide used for phytosanitary purposes.

18. The Panel found that the most common method of data collection was through the use of a form, supported by policies or measures that required users of methyl bromide to complete the forms and to submit them to government agencies for analysis and reporting. The Panel also found that the forms used by parties had common elements that the Parties might wish to use in order to harmonize as much as possible the collection of data. To assist the parties in doing so, the Methyl Bromide Technical Options Committee has provided information on what it considers to be essential elements of or criteria for forms for collecting data on methyl bromide use on articles and soil, suggesting that Parties could add other elements that they consider relevant for their national circumstances. The Committee suggested that information on the date and location of use and the authorizing authority was essential in forms on both post-harvest and soil uses of methyl bromide. In the case of forms for the use of methyl bromide on articles, the Committee stated that essential information included that on target pests, the reason for fumigation (import requirement, export requirement or other), the origin of the product (domestic or the country where the product was imported from), the destination of the product (for export or for the domestic market), the import, export or domestic market, whether the item fumigated was a commodity (using the list of commodities prepared under the International Plant Protection Convention for guidance) or a pest-infested structure, and the dosage and quantity of methyl bromide used. As regards essential information for a form on soils the committee suggested that the following points would be important: information on the crop or soil, the area treated (in

hectares), the quantity of methyl bromide used (in kg), the target pests, including genus, species and common name, the reason for treatment (e.g., certification requirement, pest control, an eradication programme) and the formulation of methyl bromide used (e.g., pure methyl bromide or a methyl bromide mixture with chloropicrin). The information that the Panel considers to be essential for these forms is listed in section 10.4.4 of volume 1 of the Panel's 2012 progress report.

19. One final item requested in decision XXIII/5 was a report from the Secretariat on consultations with the secretariat of the International Plant Protection Convention on ways of ensuring and improving the exchange of information on methyl bromide uses and alternative treatments between the Convention and Montreal Protocol bodies and on the systems available to facilitate access to such information by national authorities and private organizations.

20. The Ozone Secretariat can report that since the Twenty-Third Meeting of the Parties it has consulted with the secretariat of the Convention with a view to delineating areas in which they might be able to work together to facilitate better access to information on alternatives to methyl bromide for quarantine and pre-shipment purposes. Toward that end the two secretariats collaborated on a draft memorandum of understanding, which was presented to the Bureau of the Commission on Phytosanitary Measures and then to the Commission itself at its seventh session, which was held in Rome from 19 to 23 March 2012. Also presented was a report of the Ozone Secretariat that provided information on how the Montreal Protocol has been addressing the use of methyl bromide for quarantine purposes and suggesting ways that the two multilateral agreements might work together further, through their Secretariats, to ensure that their parties and stakeholders are able to share the fullest possible information on alternatives to methyl bromide. The report and the memorandum of understanding are set out in document UNEP/OzL.Pro.WG.1/32/INF/3. After further review by the appropriate authorities, it is expected that the memorandum of understanding will be signed by the two secretariats. The Ozone secretariat will inform the parties of any updates on the status of the agreement and will in the meantime continue its close collaboration with the Convention on related matters.

Item 4 (d): Global laboratory and analytical-use exemption

21. In 1995, the Seventh Meeting of the Parties established a global exemption to enable the continued use of ozone-depleting substances for laboratory and analytical uses under specified conditions until such time as ozone-friendly alternatives could be adopted. Over the years, the parties have worked with relevant groups to find and commercialize alternatives, and as alternatives have been developed, the parties have eliminated the exemption for a number of specific uses (the testing of oil, grease and total petroleum hydrocarbons in water; the testing of tar in road-paving materials; forensic finger-printing; use in refrigeration and air-conditioning equipment used in laboratories, including centrifuges; the cleaning, reworking, repair or rebuilding of electronic components or assemblies; the preservation of publications and archives; the sterilization of materials in laboratories; the testing of organic matter in coal; and most uses of methyl bromide). In its 2010 progress report, the Panel suggested that alternatives were then available for almost all of the remaining uses. It therefore recommended that the exemption should be discontinued for 15 specific uses and retained only for the use of carbon tetrachloride for biomedical purposes, as a solvent for reactions involving N-bromosuccinimide and as a chain transfer agent in free radical polymerization reactions. Elimination of the exemption for the 15 specified uses would mean that any production or import of virgin ozone-depleting substances for such uses would have to be approved by the parties through specific essential-use exemptions.

22. Since the panel's 2010 progress report, the global analytical and laboratory use exemption has been on the agenda of each meeting of the parties to the Protocol, and the parties have focused mainly on whether and how to continue the exemption for parties operating under paragraph 1 of article 5 for those uses that had been eliminated from the coverage of the exemption.

23. In an effort to clarify related matters, the Twenty-Third Meeting of the Parties decided in decision XXIII/6 to allow parties operating under paragraph 1 of Article 5 until 31 December 2014 to deviate from the existing ban on the use of carbon tetrachloride for the testing of oil, grease and total petroleum hydrocarbons in water in individual cases where such parties considered doing so to be justified. The Parties also clarified that any deviation beyond that date for the testing of oil, grease or total petroleum or any other use already excluded from the global exemption should, after 2014, take place only in accordance with an essential-use exemption.

24. As it relates to further work to be done, the decision requested parties operating under paragraph 1 of Article 5 that used carbon tetrachloride for this purpose to report annually to the Secretariat, together with their Article 7 data reports, on the quantities of carbon tetrachloride used, on the procedures followed for using the substance, on any alternative methods or procedures being investigated to replace carbon tetrachloride for this purpose and on the timeframe during which the

Party expected to make use of the global exemption. Paragraph 7 of the decision requested the Panel to provide those parties reporting continuing use of the exemption with information and advice on means and methods of achieving a transition to the use of non-ozone-depleting substances and to report annually on any information provided and progress made in assisting parties in that transition. In addition, the Panel was requested to work with interested parties, with support from the Secretariat, to prepare information on laboratory and analytical uses for the purpose of assisting parties to achieve a transition to alternative methods and procedures, and parties were invited to consider contributing resources and information for that purpose.

25. In response to decision XXIII/6, the Panel prepared a report which can be found in section 7.7 of the Panel's 2012 progress report. The report included, among other things, a review of alternative solvents (S-316, IrSol-316 and perchloroethylene) and other methods (mass spectrometry and various "integral" techniques) that could be used for ozone-friendly oil, grease and total petroleum analysis. Additional techniques recommended by ASTM International (formerly known as the American Society for Testing and Materials) were also listed. Regarding support for a broader phase-out, the Panel noted that its members provided relevant advice in its annual progress reports and through attendance at regional meetings of ozone officers and other stakeholders, such as those that took place in Turkey, Nepal and Paraguay. The Panel suggested, however, that it could deliver advice and assist parties and laboratories in their transition in a more cost-effective manner by working directly with them through e-mail dialogues between laboratory staff and member of the Chemicals Technical Options Committee.

26. As regards the Secretariat's work on this issue, consistent with paragraph 6 of decision XXIII/6, the Secretariat prepared a reporting format to assist parties operating under paragraph 1 of Article 5 in reporting information on their use of carbon tetrachloride for the testing of oil, grease and hydrocarbons in water. The format included an optional part where a party could provide information on its laboratory and analytical uses with a view to advancing the implementation of paragraph 8 of the decision, which calls for a transition to ozone-friendly alternatives to laboratory and analytical uses. The format was sent to all parties in March 2012 for comment and use. As at mid-May, one party had submitted relevant and detailed information on laboratory uses of ozone-depleting substances and five parties had reported that they did not have any such uses. Any further information that the Secretariat receives from the parties will be forwarded to the Panel to enable it prepare the reports requested in the decision.

27. Decision XXIII/6 also requested the Panel to continue its work in reviewing international standards that mandated the use of ozone-depleting substances and to work with the organizations that promulgated such standards to include non-ozone-depleting substances and procedures as applicable. Regarding this request the Panel noted in its report that some effort had begun, coordinated by the Panel and its Chemicals Technical Options Committee, to look into existing European standards. The Panel also noted the continuing work of ASTM International to replace a number of methods using ozone-depleting substances with methods that did not require the use of ozone-depleting substances.

Item 4 (e): Process-agents

1. Background

28. In some chemical processes, ozone-depleting substances are used as process agents, or catalysts, to enable the manufacture of final products. Decision IV/12 of the Parties initially clarified that insignificant quantities of ozone-depleting substances used as process agents were excluded from the definition of a controlled substance. Several years after the adoption of decision IV/12, however, the Parties adopted decision X/14, which controls the use of ozone-depleting substances as process agents and emissions of such substances. In that decision the parties agreed to limit process agent uses to specified applications, which were listed in the decision (in table A). In addition, the Parties adopted a table B, which noted the maximum amount of the substances expended in the approved processes that must be replenished yearly (referred to in the table as "make-up" or "consumption") and the maximum level of allowable emissions from the exempted processes in the countries listed in the table. In the decision the parties also requested the Technology and Economic Assessment Panel to review tables A and B and make recommendations to amend them as necessary.

29. In accordance with decision X/14 and subsequent decisions¹ the Panel has on several occasions reviewed the tables in decision X/14 and recommended the addition to table A of process agent uses that meet at least two of the following criteria: first, chemical inertness during the process; second, physical properties; third, action as a chain-transfer reagent in free radical reactions; fourth, control of product physical properties such as molecular weight or viscosity; fifth, ability to increase yield; sixth,

¹ Decisions XV/6, XVII/7, XIX/15, XXI/3, XXII/8 and XXIII/7.

non-flammability/non-explosiveness; and, seventh, minimization of by-product formation. In addition, the Panel has on many occasions noted that certain listed process agent applications were no longer in use, and on the basis of a Panel recommendation, the Parties have agreed to delete those applications from the process agent tables. In the process of doing so the number of approved process agent uses has been reduced from a high of 40 to 14 currently.

30. The latest such decision was decision XXIII/7. In that decision the parties requested the Panel to provide the Open-ended Working Group at its thirty-second meeting with a summary report updating the Panel's findings on the remaining process agent uses listed in table A of decision X/14. Also, taking into account relevant information from previous investigations, the Panel was asked to estimate emissions from process agent uses and their impact on ozone and climate. In addition, in paragraph 8 of the decision the parties decided that the use of carbon tetrachloride for the production of vinyl chloride monomer would be considered to be a feedstock use for 2012 on an exceptional basis and in paragraph 9 the parties requested the Panel to review that use in India and elsewhere, as applicable. Finally, in paragraph 3 of decision XXIII/7 the Secretariat was requested to provide a draft format to facilitate the parties' submission of process agent information. A summary of the response to those requests is set out in sections 2 and 3 immediately below.

2. Response of the Technology and Economic Assessment Panel to decision XXIII/7

31. The Panel's response to decision XXIII/7 is set out in section 3.3.2 of the Panel's 2012 progress report. There, the Panel notes that nine of the remaining fourteen process agent uses in table A of decision X/14 employ carbon tetrachloride. It also notes that several of the current process agent uses involve legacy processes built around large, high-investment facilities in a manner that would make it difficult or impossible to convert the facilities in a cost effective and timely manner. As regards individual process agent uses, the panel reports that it was not able, in the time available, to review all of the uses listed in table A. It did, however, review five, and indicated that it would review the remainder in future progress reports.

(a) Use of carbon tetrachloride to remove nitrogen trichloride (NCl₃) in chlor-alkali production (use 1 in table A of decision X/14)

32. The Panel notes that carbon tetrachloride is used by a number of parties to remove nitrogen trichloride (NCl₃) in chlor-alkali production in a large-scale process consisting of the electrolysis of sodium chloride (common salt) in solution (brine) by passing an electric current through the solution. During this process caustic soda (elemental chlorine and sodium hydroxide) is produced. This substance is dangerously explosive and is therefore removed from the chlorine by extraction into a solvent and treatment with a reagent to destroy the NCl₃. The Panel notes that if purer salt were used less NCl₃, or perhaps none at all, would be produced and the use of carbon tetrachloride as a solvent would be unnecessary. To support the idea the Panel cites a project approved by the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol for a Colombian company, Quimpac S.A. (formerly known as Prodesal S.A.), through which the firm was able to replace carbon tetrachloride with chloroform, a non-ozone-depleting substance.

(b) Use of carbon tetrachloride to recover chloride from tail gas emitted in the production of chlorine (use 2 in table A of decision X/14)

33. The Panel notes that owing to its non-reactivity with chlorine, carbon tetrachloride is commonly used to recover chloride from the tail gas produced in the industrial process for the production of elemental chlorine. According to the Panel, this use of carbon tetrachloride meets criteria (i), (v) and (vi) of the process-agent criteria listed in paragraph 29 above. The Panel draws attention, however, to the use of chloroform to remove nitrogen trichloride (NCl₃) in chlor-alkali production, suggesting that it could also be useful in sequestering chlorine from tail gas.

(c) Use of CFC 11 as a solvent in the production of synthetic fibre (use 6 in table A of decision X/14)

34. The Panel notes that the use of CFC 11 as a solvent in the production of synthetic fibre is considered to be a process agent use because it satisfies process-agent criteria (i), (ii) and (vi). Regarding alternatives, the Panel cites a 1997 process agent task force report, which had noted that over one hundred possible alternatives had been tested and that satisfactory results had only been obtained with CFC-11. The Panel had been given to understand in 1997 that the search for alternatives would continue but since that time has received no new information.

(d) Use of carbon tetrachloride as a solvent in the production of cyclodime (use 9 in table A of decision X/14)

35. The Panel reports that carbon tetrachloride is used as a solvent in the production of cyclodime. The process includes a nitroization step which must occur under special conditions to ensure that side-reactions are suppressed and that the product of the reaction is not deposited in the reactor. Residues from the process are destroyed but most carbon tetrachloride is recycled; reported emissions from this process in 2010 were 0.103 metric tonnes and make-up was 723.126 metric tonnes. Carbon tetrachloride in this process meets process-agent criteria (i), (v) and (vii). Some patents claim that chloroform can be used as a solvent in this reaction as an alternative to carbon tetrachloride. The French company Arkema and its corporate predecessors, however, have reported finding this alternative to be unsatisfactory.

(e) CFC 113 in the production of high modulus polyethylene (use 14 in table A of decision X/14)

36. CFC-113 is used as a process agent in the production of high modulus polyethylene fibre. This use was the subject of a careful Panel review in 2005. In its response to decision XXIII/7 the Panel notes that while one manufacturer has reported that a non-ozone-depleting alternative to CFC-113 performed satisfactorily, the proponent reported that it had tested hundreds of non-ozone-depleting alternatives to CFC-113 and that “none had been able to achieve required technical performance criteria on flammability, boiling point, toxicity, compatibility with materials of construction, economy, and recoverability, while retaining product properties and performance”. CFC-113 in this process is noted by the Panel to satisfy process-agent criteria (i), (ii) and (vi).

(f) Information on estimated emissions from the remaining process agent uses in table A of decision X/14 and their impact on ozone and climate, based on data reported by the Parties under Article 7

37. In terms of estimated emissions and impact on ozone and climate, the Panel notes in its response to decision XXIII/7 that, while data provided by Parties are incomplete, the sum of all emissions of ozone-depleting substances reported from their use as process agents is 284 metric tonnes. Since most of these substances consist of carbon tetrachloride, which has an ozone-depletion potential of 1.1, the estimated ozone-depletion impact is 312 ODP-tonnes per year. In terms of its climate impact, using a 100-year global-warming potential of 1,400 for carbon tetrachloride, the annual 100-year contribution equals 397,600 tonnes of carbon dioxide equivalent. The Panel notes that these figures are subject to considerable uncertainty.

(g) Use of carbon tetrachloride in vinyl chloride monomer production

38. As noted above, in paragraph 8 of decision XXIII/7 the parties decided that the use of carbon tetrachloride for the production of vinyl chloride monomer would be considered to be a feedstock use for 2012 on an exceptional basis. In addition, in paragraph 9 of the decision, the Parties requested the Technology and Economic Assessment Panel to review the use of carbon tetrachloride for the production of vinyl chloride monomer in India and elsewhere, as applicable. In response to the decision the Panel’s Chemicals Technical Options Committee studied the role of carbon tetrachloride in the production of vinyl chloride monomer through pyrolysis of ethylene dichloride. The Committee concluded that, because all or most of the carbon tetrachloride was destroyed or irreversibly transformed, the use of carbon tetrachloride in vinyl chloride monomer production would be better described as a feedstock use rather than a process-agent use. Given that variations of the process were possible, however, the Committee was of the view that information from other parties using the ethylene dichloride process would need to be evaluated to determine whether its conclusion applied to all facilities in which vinyl chloride monomer was prepared from ethylene dichloride.

3. Response of the Secretariat in facilitating the reporting on process agent uses by the parties

39. As noted above, paragraph 3 of decision XXIII/7 requested parties that had process agent uses in their territories to provide the information required by decision X/14 using a format available from the Ozone Secretariat. Accordingly, the Secretariat prepared and made available to the Parties the requested information format. At the time of the 31 March deadline that was established by decision XXIII/7, two parties had submitted information on their process agent uses. Meanwhile, 139 parties have reported to date that they do not have process agent uses of ozone-depleting substances.

Agenda item 5: Treatment of ozone-depleting substances used to service ships (decision XXIII/11)

40. In its decision XXIII/11, the Twenty-Third Meeting of the Parties requested the Secretariat to prepare a document collecting current information about the sale of ozone-depleting substances for onboard servicing and other uses on board ships, including ships from other flag States. The document was to include any guidance and information previously provided to parties regarding sales to ships; information on how parties calculated consumption with regard to such sales; and information on how international bodies such as the International Maritime Organization (IMO) and the World Customs Organization (WCO) treated ozone-depleting substance trade and use in respect of ships, along with a general overview of the framework applied by those bodies to manage relevant activities. The outcome of this effort can be found in document UNEP/OzL.Pro.WG.1/32/6. The major findings are summarized in paragraphs 41–49 below.

41. The issue of reporting on the supply of ozone-depleting substances for the purpose of refilling the refrigeration and fire-extinguishing systems of ships in ports was addressed by the Third and Fifth Meetings of the Parties in 1991 and 1993, respectively. Specifically, by decisions III/9 and V/5 the Parties adopted formats for reporting data under Article 7 of the Montreal Protocol. According to the introduction to those formats “the quantities of controlled substances used for refilling the refrigeration and fire-extinguishing systems of ships in ports should be regarded as forming part of consumption of the country with jurisdiction over the port and should therefore not be included in its exports figures”.² In addition, the data reporting formats prepared by the Secretariat for the use of the Parties between 1991 and 1997 included instructions for reporting on imports and exports related to the refilling of ships’ equipment and the treatment of ozone-depleting substances in free trade zones. No guidance has ever been provided, however, on how to treat ozone-depleting substances that are supplied to a ship in quantities that are sufficient to meet its servicing requirements (or exceed the total capacity of the equipment in which they could be installed) but are not in fact used for servicing (either by the company providing the substances or by the ship’s crew) during the vessel’s stay in port.

42. In 1997, the Parties adopted decision IX/28, through which they considered ways to simplify the data reporting forms. This effort resulted in the exclusion of the instructions advising parties to treat the use of ozone-depleting substances for refilling equipment on board flag ships in their ports as part of their domestic consumption. As a consequence, the current data reporting formats include instructions only on trans-shipment as opposed to imports and re-exports.

43. A total of 21 parties, including the European Union on behalf of its 27 member States, submitted information to the Secretariat in response to a directive from the Open-ended Working Group at its thirty-first meeting and decision XXIII/11. While four of those parties did not provide in their submissions explicit information on how they treated such sales relative to consumption, the remaining 17 parties (including the European Union and its member States) reported that they were treating the supply of ozone-depleting substances to ships in their territories for servicing purposes as part of their domestic consumption. A few of those parties stated that such treatment related to onboard uses in general rather than servicing uses only.

44. Of the 17 parties mentioned above, however, three (including one party reporting on behalf of its 27 member States) reported that they differentiated between ozone-depleting substances provided for servicing a ship’s equipment and ozone-depleting substances simply supplied to a ship (in quantities that either met or exceeded its servicing requirements) but not necessarily used to refill the ship’s equipment while the ship was in port. Two of those parties stated that they treated such supply as an export to the flag State, while the third specified that it did so only if the supplied substances exceeded the total capacity of the equipment to be serviced. A few parties indicated that they had no official statistics on the sales or uses of ozone-depleting substances on foreign flag ships because such substances were not taken into consideration by their licensing and quota systems.

45. With regard to the submission of additional data called for by decision XXIII/11, one party reported data on ozone-depleting substances on its ships amounting to 242 tonnes of HCFCs. Data on ozone-depleting substance exports to foreign flagged ships were reported by just two parties. One of those parties reported such data for the period 2008–2010, while another (reporting on behalf of its 27 member States) submitted such data for the period 2009–2010. The amount reported by the former party for 2008 was 14.4 metric tonnes (mostly HCFCs), while the combined HCFC consumption reported by both parties totalled 608 and 483 metric tonnes in 2009 and 2010 respectively.

2 UNEP/OzLPro.5/12, annex I, para.8.

46. In addition to the information from parties mentioned above, a search of the Secretariat's database has shown that to date three parties have specified in some of their annual data reports ozone-depleting substance exports to ships of other flag States. The substances are primarily hydrochlorofluorocarbons (HCFCs) and range in amount from approximately 37 metric tonnes in 2005 to approximately 67 metric tonnes in 2010. It is important to note, however, that as there is no separate line in the reporting formats for reporting exports to ships, there may be some parties that include such figures in their overall export data reports without specifying the purpose of such exports.

47. With regard to the issues noted by the parties that provided information in response to decision XXIII/11, a few parties stated that the lack of recording of ozone-depleting substances supplied to flag ships could provide a loophole for illegal trading as such amounts, not subject to import/export authorization, might be passed on to other flag ships operating on the high seas or in other ports. In addition, a number of parties expressed concern that the supply of ozone-depleting substances to ships flying their flags in foreign ports might be treated by the port States as exports to the flag States rather than as domestic consumption of the port States. They noted, in particular, that such an approach could potentially lead them into non-compliance, as their baselines for the phase-out of HCFCs did not take into account amounts used on board their flag ships engaging in international traffic and existing domestic controls did not extend to licensing or setting quotas for the normal servicing requirements of such ships. A few small island States also expressed the concern that such an approach would compromise the ability and capacity of their businesses and industries to make the most of HCFCs at a time when developing countries were engaged in the mandatory transition process necessary to freeze and eventually phase out HCFC consumption as required by the Montreal Protocol.

48. As requested, the Secretariat consulted with IMO and WCO regarding their treatment of ozone-depleting substances and ships. IMO rules require ships of 400 gross tons and above to list systems and equipment containing ozone-depleting substances, that are not permanently sealed, in the supplement to the international air pollution prevention certificate issued by the ship's flag State; such ships must also maintain an ozone-depleting substance record book and register in it the amounts of ozone-depleting substances that are used for supply, recharging, repair, discharge and disposal operations. While ships are required to carry and fill out such records, IMO has no mandate to review them; enforcement of the requirement is rather undertaken by port State control officers in ports of contracting parties to Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL). No international compliance obligation exists in this regard.

49. WCO rules do not specifically address the trade of ozone-depleting substances for use on board ships or such use itself. The quantities of ozone-depleting substances supplied to a vessel during its stay in a customs territory are exempted from duties and taxes but according to a recommended practice should be recorded on any relevant declaration required by Customs authorities. This practice, however, has to date been accepted by just 16 WCO member States. Recording of such Customs data remains the prerogative of the country concerned. WCO has no mandate to review such information, and no international compliance obligation exists in this regard. On the other hand, WCO revised in 2012 its International Convention on the Harmonized System and relevant tools, which include nomenclature of ozone-depleting substances. These tools facilitate the collection and comparison of such data.

Agenda item 6: Report by the Technology and Economic Assessment Panel on additional information on alternatives to ozone-depleting substances (decision XXIII/9)

50. In its decision XXIII/9 the Twenty-Third Meeting of the Parties requested the Technology and Economic Assessment Panel to prepare and present to the Open-ended Working Group at its thirty-second meeting a report containing information on, among other things, the cost of technically proven, economically viable and environmentally benign alternatives to HCFCs; technically proven, economically viable, environmentally benign alternatives to HCFCs suitable for use in high ambient temperatures, including information on how such temperatures might affect efficiency or other factors; quantities and types of alternatives already phased in and projected to be phased in as replacements for HCFCs, disaggregated by application and type of country; and an assessment of the technical, economic and environmental feasibility of options, prepared in consultation with scientific experts. In response to decision XXIII/9 the Panel established a task force to study the issues raised by the decision. The task force prepared a report on the issues, which is set out in volume 2 of the Panel's 2012 progress report. The report includes sections on refrigeration, foams, solvents and halons. A summary of this highly technical report is included below.

51. In initiating its review, the task force had to create a common understanding of the terms of the decision. First, the task force suggested that because scientific knowledge, including knowledge about

alternatives to ozone-depleting substances, was not static, it was not possible to define the term “environmentally benign in the context of technical feasibility and commercial availability without a wide range of interpretations”. The task force accordingly concluded that “each of the sectors should deal with the subparagraphs of decision XXIII/9 in a consistent manner, without putting ‘environmentally benign’ as the overruling criterion for the clauses that included that term”. In addition, the task force also decided that the assessment of costs of technically proven and economically viable alternatives should be done against a baseline of HCFCs or HCFC-based equipment and that the application of technically proven (and probably economically viable) high-GWP alternatives should be assessed for comparative reasons.

(a) Refrigeration and air-conditioning

52. In assessing the technical, economic and environmental feasibility of options in the refrigeration and air-conditioning sector the task force considered the energy efficiency of equipment, the toxicity and flammability of alternative refrigerants, greenhouse gas emissions and direct and societal costs (for some options). Considering current technology, the Panel suggested that the vapour compression cycle would be hegemonic for decades to come, with the main options being the replacement of HCFCs with alternative refrigerants. The refrigerant options for HCFC replacement were categorized according to their global-warming potential (low-GWP and medium/high-GWP). The low-GWP refrigerants deemed broadly suitable for replacement of HCFC-22 were HFC-152a, HFC-161, HC-290, HC-1270, R-717, R-744, HFC-1234yf and HFC-1234ze. The medium/high-GWP alternatives included HFC-134a, R-410A, R-404A and HFC-32, although a variety of other mixtures of HFCs also fell into this category. The refrigerant options were classified in seven groups (four low-GWP groups and three medium/high-GWP groups) according to their degree of toxicity, flammability and compatibility with materials.

53. Other than vapour-compression refrigeration, technologies that could be used for HCFC phase-out were absorption cycles, desiccant cooling systems, Stirling systems and thermoelectric and a number of other thermodynamic cycles. The task force report notes, however, that most of these technologies are not even close to commercial viability for air-cooled air conditioning applications. While these alternative technologies are technologically feasible they have thus far not been proven to be economically viable. The report therefore notes that they are unlikely to penetrate other than in niche applications (such as absorption cycles) during the next decade. Alternative technologies will therefore have a minimal impact on HCFC-22 phase-out.

54. The report describes current and relatively long-term refrigerant options for new equipment for each HCFC refrigeration and air conditioning application. Throughout, consideration is given only to new systems and not to conversion or retrofitting of existing systems. Some of the alternative refrigerants are broadly available, but several options (such as HFC-161, HFC-1234yf and other unsaturated HFCs and blends) are not fully mature at present and their application cannot be achieved immediately. The application of some currently available refrigerants in certain types of systems is still being developed. As the report notes, a comprehensive description of refrigerant technology options can be found in the 2010 assessment report of the Refrigeration Technical Options Committee.

55. In terms of cost, the task force report notes that the costs associated with adopting alternative refrigerants were assessed against the baseline cost of using HCFC-22. It notes further that costs may be broken down into the following specific categories: direct refrigeration and air-conditioning product costs (fixed by system manufacturers and suppliers, with the most significant being research and development, refrigerant cost/price during the manufacture of system components and materials, installation costs and production line conversion) and societal costs (peripheral to the product itself, and comprising primarily the cost of technician training, technician tooling, service and maintenance (which mainly involves refrigerant cost/price) and disposal). Several of these individual costs are normally grouped into the conventional accounting concepts of “incremental capital costs” (including research and development and production line conversion) and “incremental operating costs” (including refrigerants, components and installation costs). The task force also suggested that it was essential to recognize the difference between actual cost implications arising from the characteristics of refrigerants and the market introduction costs associated with the introduction of any new technology.

56. Considering the variety of refrigerants and applications, the report notes that individual costs vary widely. Where possible, therefore, the report offers a range of values for these costs. It was not possible to quantify aggregated costs for a refrigerant-application matrix, but the report includes a summary of the incremental costs for a number of low-GWP alternatives obtained from a recent European Union study.

57. With regard to high ambient temperatures, the report notes that the difficulty of achieving high energy efficiency in high temperatures limits the choice of refrigerants. HCFC-22 has been the refrigerant of choice for both stationary air-conditioning and commercial refrigeration. As regards stationary air-conditioning in high ambient temperatures, the primary global replacement, especially for the dominant air-cooled equipment designs, is R-410A. When condensing temperatures approach critical levels cooling capacity and energy efficiency decline sharply. Small packaged equipment for comfort air-conditioning is mass produced and in common use around the world. Refrigerant choice for this equipment needs to take into account a number of criteria, including cooling capacity in high outdoor temperatures, energy efficiency, required input power, refrigerant global-warming potential, safety, availability of the refrigerant for servicing, and cost. The choice of a unique refrigerant is part of the standardization process and it is assumed that the use of such a refrigerant will lower costs. Currently, several options are open. The Refrigeration, Air-Conditioning and Heat Pumps Technical Options Committee 2010 assessment report mentions that HFC-134a, R-407C, R-410A, HFC-32, HFC-152a, HFC-161, HFC-1234yf, HFC-1234yf based blends and HC-290 (propane) are possible replacement options for HCFC-22. The list will be shortened in the coming years depending on the emphasis put on the criteria considered.

58. In commercial refrigeration functioning under high ambient temperature conditions the choice of a refrigerant depends on its cooling capacity and evaporation temperature. HFC-134a, with a relatively low volumetric capacity, has been and is still the preferred refrigerant choice for small equipment (stand-alone equipment and some condensing units), whereas HCFC-22 or R-404A, with larger refrigeration capacities, are used in large commercial systems and in small systems for low evaporation temperatures. Hot climates imply high condensing temperatures and pressures and lead to the choice of "medium pressure" refrigerants such as HFC-134a or HFC-1234yf for low-capacity single stage systems. With the exception of HC-290 (and its limitation for large systems owing to safety concerns), there is a lack of low GWP refrigerants with a large refrigeration capacity to replace R-404A or HCFC-22 in single stage refrigeration systems. Cascading systems with carbon dioxide used at the low temperature level and refrigerants such as HFC-1234yf or HC-290 at the high temperature level turn out to be energy-efficient designs in hot climates.

(b) Foams

59. The following points summarize the conclusions of the Committee following its assessment of the technical, economic and environmental feasibility of the options for blowing agents in foams:

(a) The main market segments currently using HCFCs are rigid polyurethane (PU), including polyisocyanurate (PIR), insulating foams and extruded polystyrene (XPS) foam;

(b) Hydrocarbons (HCs), mainly pentanes, are the preferred choice for HCFC replacement in rigid PU foams in medium and large enterprises. For some applications, such as appliances, they are currently blended with saturated HFCs to enhance the foam's thermal performance;

(c) Saturated HFCs, HFC-245fa, HFC-365mfc/HFC-227ea and HFC-134a are used in significant amounts in developed countries, particularly in North America, for rigid PU foam. However, this well proven technology has two drawbacks: high incremental operating cost, because of the blowing agent cost, and high global-warming potential;

(d) There are current and emerging low-GWP options to replace HCFCs in the various foam market segments;

(e) The capital conversion costs for the safe use of HCs in small and medium-size enterprises is prohibitive, making such conversions not cost effective. This constitutes a barrier to the conversion from HCFCs in the required timeframe;

(f) Small quantities of oxygenated hydrocarbons (HCOs), specifically methyl formate and carbon dioxide (water), both low-GWP options, are being used in integral skin foam and some rigid PU foam applications, despite having poorer operational cost and thermal performance than HCFC-141b;

(g) Recent evaluations of unsaturated HFCs and HCFCs, commercially known as hydrofluoroolefins (HFOs), used in a line of commercial household refrigerators and freezers, showed an improved thermal performance compared to saturated HFCs. These substances, which exhibit global-warming potential values lower than 10, will be commercially available in 2013.

(c) Fire protection

60. HCFCs and their blends constitute one of several options introduced into the market as alternatives to halon 1301 and halon 1211 for total flooding and local/streaming applications,

respectively. It has been estimated that clean agent alternatives, i.e., those agents that leave no residue, comprise approximately 51 per cent of the former halon market. Of these, HCFCs are used in approximately 1 per cent of the applications; it is thus clear that the use of HCFCs in fire protection is very small compared to other alternatives. This is primarily attributable to tradition, market forces and cost compared with carbon dioxide and not-in-kind alternatives.

61. As with halons, the use of HCFCs in fire protection is driven by the fire protection applications, which can be summarized as total flood applications and local/streaming applications.

62. In the case of total flood applications, only HCFC Blend A is still produced; its use is primarily for recharging existing systems, and even this is diminishing because of changes in national regulations in the countries where it is accepted. Clean agent alternatives to HCFC Blend A include inert gases (nitrogen, argon or blends of the two, sometimes incorporating carbon dioxide as a third component), HFCs, and a fluoroketone (FK). The inert gas systems have no environmental impact as a replacement for HCFC Blend A and FK 5-1-12 has almost negligible environmental impact. The system costs of these alternatives, however, are significantly higher than the two closest HFC alternatives, and the footprint of the cylinders necessary for the inert gases is three times that of its competitors because of the amount of agent required for extinguishment.

63. In the case of local/streaming applications, only HCFC Blend B is marketed in both parties operating under paragraph 1 of article 5 and parties not so operating, with a market ratio of 1 to 4 respectively. Limited quantities of HCFC-123 and HCFC Blend E are still marketed in portable extinguishers in some article 5 parties such as India and Indonesia. HCFC-123 is the primary component of the HCFC clean agents commercialized for use in streaming applications. When comparing the costs of portable extinguishers, one must take into account their fire ratings – a measure of extinguisher performance – and the fact that the clean agent options, HCFC-123-based and HFC-236fa, are significantly more expensive than traditional options such as multi-purpose dry powder, water and carbon dioxide. Thus they are only used where users consider cleanliness to be a necessity. The ozone-depletion potential of HFC-236fa is zero and that of HCFC-123 0.02. HFC-236fa, however, has a 100-year integrated global warming potential of 9,810, which is much more than the value of 77 for HCFC-123, although the HCFC Blend B formulation also contains a small percentage of CF₄, a high-GWP gas. Nevertheless, according to one source (Wuebbles 2009), notwithstanding its CF₄ content one could emit over 40 times the amount of HCFC Blend B before one would have the same impact on climate as one would have using HFC-236fa. Finally, it should be noted that an unsaturated hydrobromofluorocarbon (HBFC), 3,3,3-trifluoro-2-bromo-prop-1-ene (2-BTP), has completed fire testing and many of the toxicity tests required for commercialization. Should it receive final approvals, it would be an effective substitute for HCFC Blend B, although it might be more expensive.

64. Development and testing of alternatives to ozone-depleting substances in fire protection continues and chapter 2.0 of the 2010 report of the Halons Technical Options Committee describes the attributes of those alternatives in detail. With the exception of aircraft cargo bays, fire extinguishing agent alternatives to ozone-depleting substances, in the form of non-ozone depleting gases, gas-powder blends, powders and other not-in-kind technologies (i.e., non-gaseous agents) are now available for virtually every fire and explosion protection application once served by ozone-depleting substances. The retrofit of existing systems that use ozone-depleting substances, however, may not always be technically or economically feasible.

(d) Solvents

65. Among the ozone-depleting substances controlled by the Montreal Protocol are CFC-113 and 1,1,1-trichloroethane, solvents that have been used primarily for precision cleaning and metal cleaning. By 1999, over 90 per cent of such ozone-depleting substance solvents had been eliminated through conservation and substitution with not-in-kind technologies. The remaining less than 10 per cent of the solvent uses are shared by several organic solvent alternatives, which include chlorinated solvents, a brominated solvent and fluorinated solvents. Fluorinated solvents are essentially used as alternatives to CFC-113, and HCFCs are included in this category as well as HFCs and hydrofluoroethers.

66. The elimination of HCFCs for solvent applications still leaves many options available, and such options have found various levels of acceptance. No single option, however, seems well suited to replace HCFCs completely. Recently it has been announced that unsaturated fluorochemical HFOs, with zero ozone-depletion potential, and hydrochlorofluoroolefins (HCFOs), with negligible ozone-depletion potential, are being developed. They have ultra-low global-warming potential (<10) and are expected to replace high-GWP HFC and low- or moderate-GWP hydrofluoroether solvents. They also could be candidates to replace HCFCs in certain solvent applications.

Agenda item 7: Performance and verification criteria related to the destruction of ozone-depleting substances (decision XXIII/12, paragraphs 2 and 3)

67. In response to decision XXII/10 the Technology and Economic Assessment Panel presented to the Open-ended Working Group at its thirty-first meeting a detailed report that, among other things, evaluated options on destruction and removal efficiency criteria for the destruction of methyl bromide and other substances and proposed a voluntary procedure that Parties might use to verify levels of destruction.

68. Following discussion of the report, the Twenty-Third Meeting of the Parties, in decision XXIII/12, requested the Panel to continue to investigate the issues covered by its report and to submit a final report to the Open-ended Working Group at its thirty-second meeting. It also requested the Panel to continue to assess plasma destruction technology for methyl bromide in the light of any additional information that might become available and to report to the parties when appropriate.

69. The Panel has responded to the requests of decision XXIII/12 in section 3.11 of volume 1 of its 2012 progress report. Regarding the request for the Panel to continue to investigate the performance criteria, destruction efficiency and destruction and removal efficiency for ozone-depleting substance destruction, the Panel noted that it had done no new detailed work. It noted, however, that the Executive Committee of the Multilateral Fund at its April 2012 meeting had considered a proposal from the United Nations Development Programme to conduct a project in Colombia in which CFC-11, CFC-12 and foam containing CFC-11 would be incinerated. The Panel suggested that the data collected from that project would allow comparison of destruction efficiency and destruction and removal efficiency and could be evaluated to that end by the Panel once the results of the trials became available. As regards verification criteria, the Panel noted that while no further work had yet been undertaken, there continue to be developments in the field regarding best practices in ozone-depleting substance recovery and destruction verification. Accordingly, the Panel proposed to revisit the subject in its 2013 progress report to provide an appropriate update at that point on the value that might be added by the introduction of the verification criteria proposed in 2011. Regarding destruction of methyl bromide by plasma destruction technology, the Panel noted that the proponent of the technology had provided no update of the data it had submitted in 2011. The destruction and removal efficiency reported then had been affected by the way methyl bromide, being less volatile than CFCs, had been introduced into the plasma arc. It has been ascertained that at this stage the proponent does not wish to modify the existing system so as to overcome this difficulty. The Panel suggests that further evaluation of plasma technology will not be possible until this is done.

Agenda item 8: Evaluation of the financial mechanism of the Montreal Protocol (decision XXII/2)

70. By its decision XXII/2 the Twenty-Second Meeting of the Parties adopted terms of reference for an evaluation of the financial mechanism of the Montreal Protocol and established a steering panel that would, among other things, supervise the evaluation and select an evaluator to carry it out. The steering panel selected the firm of ICF International as the evaluator. ICF International began its work in March 2011 and has now completed the evaluation.

71. An executive summary of the evaluation is set out in document UNEP/OzL.Pro.WG.1/32/4 and the full evaluation is available on the Internet in the information document section of the Secretariat's conference portal as UNEP/OzL.Pro.WG.1/32/INF/5. The evaluation includes findings on the points referred to in the terms of reference adopted in decision XXII/2, an analysis of the strengths, weaknesses, opportunities and threats associated with the financial mechanism and a series of recommendations. The recommendations, as summarized in the executive summary, are included, unedited, as follows:

- (a) Results achieved:
 - (i) Encourage parties operating under article 5 to submit remaining stage I HPMPs as soon as possible and begin implementing strategies in approved stage I HPMPs without delay;
 - (ii) Encourage the Executive Committee to approve project preparation funding for stage II HPMPs as early as possible;
 - (iii) Ramp up efforts to phase out methyl bromide in order to meet the 2015 milestone;

- (b) Organizational effectiveness and decision-making processes:
 - (i) Review and streamline reporting requirements given the new complexity of HPMPs and other multi-year agreements;
 - (ii) Improve the accessibility and consistency of guidance on HPMP preparation;
 - (iii) Evaluate the quality of HPMP preparation;
- (c) Information dissemination and capacity-building activities:
 - (i) Consider future availability of institutional-strengthening funding, especially for low-volume-consuming countries;
- (d) Effectiveness of technology transfer:
 - (i) Consider systematically tracking technology transfer;
- (e) Cooperation with other organizations:
 - (i) Consider the Multilateral Fund as a model for other multilateral environmental agreements, as appropriate;
 - (ii) Pursue climate, persistent organic pollutant and ozone synergies and linkages to further the ozone agenda.

Agenda item 9: Nomination and operational processes of the Technology and Economic Assessment Panel and its subsidiary bodies and any other administrative issues (decision XXIII/10)

72. The Twenty-Third Meeting of the Parties adopted decision XXIII/10, which covered a number of items designed to enhance the operation of the Technology and Economic Assessment Panel. The Panel's response to the various components of that decision can be found in volume 3 of its 2012 progress report, and the terms of reference for the Panel, updated to take into account decision XXIII/10, can be found in annex D to volume 3.

73. In particular, decision XXIII/10 requested the Panel to submit a number of items for the consideration of the Open-ended Working Group at its thirty-second meeting, including draft guidelines on recusal, draft guidelines on the appointment of co-chairs of the Panel, a draft nomination form for standardizing nominations of members of the Panel and its subsidiary bodies, and a proposed revision of the number of members of each of the Panel's subsidiary bodies to ensure that its membership is consistent with its workload. A brief summary of the Panel's response on these matters is presented below.

(a) Draft recusal guidelines

74. In paragraph 17 of decision XXIII/10 the Parties requested the Panel to revise its draft guidelines on recusal, taking into account similar guidelines in other multilateral forums, and to provide them to the Open-ended Working Group at its thirty-second meeting for consideration by the Parties.

75. In revising the draft guidelines, the Panel considered a number of important substantive and governance issues. It also considered recent work of the Intergovernmental Panel on Climate Change and other documents. The resulting draft guidelines can be found in annex E to volume 3 of the Panel's 2012 progress report, and they will be reproduced in an addendum to the present note. While the draft recusal guidelines are currently presented in the form of an annex to a decision of the Parties, the Panel envisaged it as a substitute for most of the Code of Conduct that is set out in part 5 of the Panel's current terms of reference. The Panel noted that the draft contained footnotes designed to raise policy issues for the parties to consider. It also noted that the draft included a currently blank annex where, the Panel proposed, an illustrative list of interests would be set out once the structure and substance of the guidelines were settled.

(b) Draft guidelines on appointment of co-chairs of the panel

76. Paragraph 18 of decision XXIII/10 requests the Panel "to prepare guidelines, for the appointment of the co-chairs of the Panel for review of the Open-ended Working Group at its thirty-second meeting. The Panel's work on this issue included proposals that it believed might require amendments of its terms of reference, along with more general guidelines.

77. Regarding proposals that might require amendment of the Panel's terms of reference, the Panel noted that the existing terms of reference were not clear on precisely how the Panel's co-chairs were to

be appointed. That said, in preparing its proposal the Panel worked on the basis that candidates for the position of co-chair could be recommended by the Panel itself but would be nominated by parties and appointed by a decision of the Meeting of the Parties. The Panel suggested that if this was the common understanding, the Parties might wish to amend the terms of reference to reflect that fact.

78. The Panel also noted its assumption that the requirement in decision XXIII/10 that all nominations for appointments to the Panel be agreed to by the national focal points of the relevant parties would also apply to the appointment of co-chairs. Accordingly, the Panel suggested that the parties might wish to consider the advantages of having the terms of reference expressly specify that the nomination of co-chairs was subject to national focal point agreement. Finally, the Panel asked that parties consult the Panel as fully as practicable before nominating Panel co-chair candidates.

79. As regards general proposals, the panel noted that the terms of reference contained general provisions relating to, among other things, the promotion of geographical and expertise balance. With that in mind it suggested that such provisions should be taken into account in the appointment of Panel co-chairs. More fundamentally, the Panel expressed the view that the co-chairs should be familiar with the business of the Panel and have the expertise required to participate fully in its affairs, and that ideally they would be appointed from among the existing members of the Panel. The Panel also noted that a mix of specific skills related to leadership, interpersonal interactions and management and organizational skills were essential. In that regard, the Panel noted that if and when consulted by the Parties on a potential nominee, the Panel would seek to reach a consensus view on whether the candidate had the necessary qualifications.

(c) Draft update of the terms of reference

80. Paragraph 20 of decision XXIII/10 requested the Panel to update its terms of reference in accordance with decision XXIII/10 and submit it to the Open-ended Working Group at its thirty-second meeting. The first draft of updated terms of reference is set out in annex D to volume 3 of the Panel's 2012 progress report, and it will be reproduced in an addendum to the present note. In volume 3 of its 2012 progress report, the Panel mentions that the recusal guidelines (see paras. 74 and 75 above) could be incorporated into the terms of reference when agreed. The Panel also points out that the draft terms of reference include the bare minimum of amendments necessary to fulfil the specific mandate given to the Panel and that further updating can be done in the light of Parties' discussions and comments at the meeting of the Open-ended Working Group.

(d) Draft nomination form

81. In section 4 of its report the Panel noted a number of items that should be included in a standardized nomination package, including a cover letter explaining the nominee's experience, qualifications and competence; information on the nominee's formal education and other qualifications; information on the nominee's employment and other relevant work experience as an expert; the nominee's past performance in conducting similar or related work; information on the countries and regions where the nominee has resided or had relevant experience; the nominee's proficiency in languages, taking into account the fact that the Panel and its technical options committees work and write only in English in accordance with paragraph 3.1 of the Panel's terms of reference; and relevant professional references. The Panel also identified additional information or qualifications that would aid the selection process, including but not limited to relevant publications, professional memberships and awards; sources of funding or support (noting that candidates from parties operating under paragraph 1 of article 5 receive funding for travel and other meeting expenses from the Ozone Secretariat, but that members from parties not so operating must identify and organize their own funding for travel and other meeting expenses and compensation); and disclosure of interests that might not already be included in other supporting information and which could have a bearing on matters likely to be considered by the relevant technical options committee; confirmation of review and agreement to abide by the Panel's terms of reference, its code of conduct contained in the Panel's terms of reference, relevant decisions of the parties and the Panel's operational procedures.

82. As requested by the Parties, and in taking into consideration the above noted factors, the Panel has drafted a standardized nomination form that can be found in annex C of volume 3 of its 2012 progress report. That form will be reproduced in an addendum to the present note.

(d) Proposed revision of the number of members of subsidiary bodies

83. Paragraph 19 of decision XXIII/10 requests the Panel "to consider the number of members of each of its subsidiary bodies to ensure that their membership is consistent with each of the subsidiary bodies' workload." The decision also requests the Panel to submit a proposed revision of such numbers to the Open-ended Working Group at its thirty-second meeting. In response to this request each of the Panel's technical options committees undertook a review of its numbers. The results of that

review are described in volume 3 of the Panel's 2012 progress report and are briefly summarized below. Additional relevant information can be found in table 3-1 in that volume, which summarizes the regional distribution of the members of the Panel and its technical options committees, table 3-2 which summarizes openings on the Panel and its technical options committees, and in annex B, which presents the matrix of expertise presented for each of the committees.

i. Chemicals Technical Options Committee

84. The Chemicals Technical Options Committee has seven members from parties operating under article 5, including countries with economies in transition, and seven from non-article 5 parties; four members are women and 10 are men. Members are from North and South America, East and South Asia, the Middle East, Western and Eastern Europe, Africa and Australia. The members have qualifications and experience in chemistry and chemical engineering and are employed by one or more of the following sectors: industry, academia, research, and consultancy. In accordance with decision XXIII/10, at the Committee's most recent meeting members were asked to indicate whether they wished to be re-nominated as members of the Committee. Non-attending members were posed the same question by e-mail. Most members indicated that they wished to continue. The Committee needs new members from article 5 parties.

ii. Foams Technical Options Committee

85. The Foams Technical Options Committee currently has 18 members, including 13 from parties not operating under paragraph 1 of article 5 and five from parties so operating, including two from China. The representation of parties operating under paragraph 1 of article 5 reflects to some extent the geographic focus of continuing ozone-depleting substance use in foams, although there is a need for better representation of South Asia and the Middle East. Individuals have been identified in both regions and have confirmed their interest in participation. In addition, a new member in Latin America has been identified. Concerns over the level of extruded polystyrene foams representation on the Committee continues and there is a need for such a member from Europe and, ideally, from Japan. It would be particularly valuable if at least one member with such expertise was from a relatively small independent enterprise. In addition, the Committee would welcome any governmental or regulatory expert in foams.

86. The Committee plans to put forward its entire membership for re-appointment in 2012, although it is anticipated that not all members will be able to commit for a full four-year period, in some cases because of funding constraints. The co-chairs will therefore assess the level of additional staggering that may be necessary to ensure continuity within the Committee leading into the 2014 Assessment.

iii. Halons Technical Options Committee

87. The Halons Technical Options Committee currently has 20 members: 11 from parties not operating under paragraph 1 of article 5, seven from parties operating under paragraph 1 of article 5 and two from countries with economies in transition. The Committee is organizing to reappoint existing non-retiring members and is trying to fill vacancies by adding members with expertise in areas such as aviation airframe fire protection (from article 5 parties); commercial airline fire protection (from non-article 5 parties); military fire protection (from Europe); regional information (from Northern Africa); new chemicals production (from China and India); inventory expertise/knowledge (from Asia); regulatory and policy expertise regarding halons and alternatives (from both article 5 and non-article 5 parties); oil and gas fire protection in cold climates; and military and civil aviation.

iv. Methyl Bromide Technical Options Committee

88. The Methyl Bromide Technical Options Committee presently has 35 members, including 22 from parties not operating under paragraph 1 of article 5 and 13 from parties so operating (including one from a former country with an economy in transition). Membership of parties operating under paragraph 1 of article 5 needs to be strengthened, and downsizing the committee to 20–25 members while improving balance and geographic distribution is envisaged.

89. While the number of critical-use nominations from parties not operating under paragraph 1 of article 5 has diminished greatly (from over 115 in 2004 to eight in 2012), it is unknown how many, if any, will be submitted by parties operating under that paragraph in 2013 and thereafter. Owing to this it is difficult to predict the Committee's future workload at this time. In spite of this, it is important that some existing and any additional members have significant expertise pertinent to any remaining critical-use nominations by parties not operating under paragraph 1 of article 5 and any issues pertaining to parties operating under that paragraph; it is also important that those members be aware

of the phase-out efforts already conducted in parties operating under paragraph 1 of article 5 that submit critical-use nominations. In addition, the Committee co-chairs consider that it is still necessary to have members with expertise in soils, quarantine and pre-shipment and structures and commodities from both parties operating under paragraph 1 of article 5 and parties not so operating.

90. As tasks and workload become clearer, the Panel and the Committee will continue to refine this reorganization process to respond to this requirement from the parties to the greatest extent possible. This could include consolidating the Committee once again, so that it consists of only two subcommittees that meet together, although a lack of funding for members from parties not operating under paragraph 1 of article 5 would have a bearing on such an option.

v. Medical Technical Options Committee

91. The Medical Technical Options Committee does not consider the reorganization of its membership to be necessary at this time and is beginning the process of reappointment for its current members. Those members provide coverage across all needed expertise areas, thereby achieving adequate technical balance, and provide adequate balance geographically and in the number of members from parties operating under paragraph 1 of article 5 (11) and from parties not so operating (18). The Committee aims to maintain its current membership to provide consistency and experience for its technical assessments during the final stages of ozone-depleting substance phase-out.

92. Meetings of the Committee's metered-dose inhaler sub-group have historically proven to be valuable in reaching consensus on difficult issues and in the exchange of complex technical details. In that regard, the Committee suggests that one or two more meetings of the sub-group are needed to consider essential-use nominations for 2013 and 2014. It should be noted, however, that the China CFC-based metered-dose inhalers transition allows for essential-use nominations up until the end of 2015. The Committee suggests that it may be feasible for it to work only through correspondence after 2014 or when essential use nomination assessments and detailed metered-dose inhalers reports are no longer required.

93. The Committee's sterilants sub-group has operated through correspondence for many years. The technical issues in this sector are slow moving.

94. Considering that the Committee's next assessment report, due at the end of 2014, is planned to be brief compared with previous reports, the Committee suggests that there may be limited value in further detailed assessments after 2014.

vi. Refrigeration Technical Options Committee

95. The Refrigeration Technical Options Committee consists of experts from 10 subsectors, each with specific expertise. In 2011, there were 27 members, of which seven were from article 5 parties. Finding experts from such parties is a goal that has proved to be challenging. Each Committee subsector has a chapter lead author for preparing the Committee's reports (CLA). Other members (non-CLAs) can participate in the drafting and internal reviewing of two or three chapters. The entire Committee, of course, is involved in the semi-final and final reviews.

96. The Committee notes that most new technology developments still come from a limited number of mostly non-article 5 parties. The Committee strives for geographical balance within the limitation of available expertise. Where it finds expertise gaps it seeks to identify appropriate experts principally through Committee members but also from outside sources. Interested experts willing to serve request the relevant party to nominate them.

97. The Committee continues to reconsider membership after each assessment. Proposals for reorganization of the Committee's membership have recently been completed, resulting in an adjustment in the light of the work needed to complete the 2014 assessment report. This reorganization is under discussion at the Committee level, and these discussions are expected to be completed shortly. No further reorganization is considered necessary at this time, apart from the usual replacements in the case of retirement, resignation of members and other similar circumstances. The Committee will submit the existing, continuing members for renomination in 2012. New members selected will be nominated in 2012.

Agenda item 10: Proposed adjustments to the Montreal Protocol**Agenda item 11: Proposed Amendments to the Montreal Protocol****(a) Proposed amendment by Canada, Mexico and the United States of America****(b) Proposed amendment by the Federated States of Micronesia**

98. On 9 May 2012 the Ozone Secretariat received a proposal to amend the Protocol from the Governments of Canada, Mexico and the United States of America. On 11 May 2012 it received a proposal to amend the Protocol from the Government of the Federated States of Micronesia. The proposals, which were submitted pursuant to article 9 of the Vienna Convention for the Protection of the Ozone Layer and paragraph 10 of article 2 of the Protocol, may be found in documents UNEP/OzL.Pro.WG.1/32/5 and UNEP/OzL.Pro.WG.1/32/6, respectively.

99. The proposal of Canada, Mexico and the United States is similar to the proposal submitted by those parties to the Twenty-Second and Twenty-Third Meeting of the Parties in that it aims to list 21 specific HFCs, including two hydrofluoroolefins (HFOs), in a new annex F to the Protocol. Recognizing that alternatives are not currently available for all HFC applications, the proposal calls for a gradual phase-down rather than a complete phase-out of the listed chemicals. The required reductions would be taken from a baseline, which for parties operating under paragraph 1 of article 5 of the Protocol would be based on 2005–2008 production and consumption of HCFCs; for parties not operating under paragraph 1 of article 5, the baseline would be based on production and consumption of HFCs plus 85 per cent of HCFC production and consumption averaged over 2005–2008. Parties not operating under article 5 would be required to meet an initial phase-down of production and consumption of 10 per cent of the baseline amount starting in 2016, followed by a set of further reductions leading, in 2033 and beyond, to the elimination of 85 per cent of baseline production and consumption. Parties operating under paragraph 1 of article 5 would have to freeze their production and consumption at baseline levels starting in 2018, and gradually phase down levels to no more than 15 per cent of baseline in 2043 and beyond.

100. In generally applicable terms, the proposal calls for the measurement of production and consumption of HFCs in terms of global-warming potential instead of ozone-depletion potential; the licensing of HFC imports and exports; controls on imports and exports of HFCs to non-parties to the amendment; controls on by-product emissions of HFC-23 and reporting on the production and consumption of HFCs and the emission of HFC-23 produced as a by-product of the production of HCFC 22.

101. The proposal states that it would not affect the provisions of the United Nations Framework Convention on Climate Change and its Kyoto Protocol governing HFCs. The Montreal Protocol obligations would therefore be seen as additional obligations and parties could follow them as a way of meeting some of their HFC obligations under the Framework Convention. In all, its proponents say, the proposal would enable a reduction in emissions of an estimated 96,300 million tonnes of carbon dioxide equivalent up to and including 2050.

102. The proposal submitted by the Federated States of Micronesia is similar to the proposal submitted by that party in 2010 and 2011, in that it would add a new article 2J to the Protocol that would require the control of the production and consumption of HFCs, including two HFOs. Under this proposal, parties not operating under paragraph 1 of article 5 of the Protocol would, in the 12-month period beginning on 1 January 2015, be required to reduce their production and consumption of those substances by 15 per cent of their baseline, which is defined as the average of the 2004–2006 levels of production and consumption of HCFCs and HFCs. The proposed phase-down schedule would then reduce HFC production and consumption an additional 15 per cent every 3 years until it reached 15 per cent of the baseline in 2030 and ultimately 10 per cent of the baseline in 2032.

103. For parties operating under paragraph 1 of article 5, the Federated States of Micronesia proposal calls for a six-year grace period from the deadlines that would apply to parties not so operating. In addition, the baselines for parties operating under paragraph 1 of article 5 would be different, in that they would be based solely on 2007–2009 HCFC production and consumption. This would be done to enable baselines to be established using existing data and account for the recent growth in sectors that will rely on HFCs in the near future. The proposal would require the Multilateral Fund to make available to parties operating under paragraph 1 of article 5 funds to defray the agreed incremental costs of activities necessary to enable compliance with the control measures established under the amendment, including the costs associated with destruction of HFC-23 where funding has not already been provided by the Clean Development Mechanism.

104. Finally, the proposal makes clear that its adoption would require no changes or amendments to the Kyoto Protocol of the United Nations Framework Convention on Climate Change. Accordingly, it notes that with adoption of this proposed amendment, emissions of HFCs would remain in the Kyoto Protocol “basket” of gases and neither parties’ commitments under the Kyoto Protocol nor their opportunities to meet those commitments would be altered.

II. Matters that the Secretariat would like to bring to the parties’ attention

A. Secretariat missions

105. In accordance with the parties’ directives on participation in or monitoring of activities in other forums, the Secretariat has participated in and contributed to several meetings since the Twenty-Third Meeting of the Parties in Bali. Specifically, the Secretariat has attended the Technology and Economic Assessment Panel meetings in Bonn, the Interagency Coordination meeting of the Multilateral Fund in Montreal and regional network meetings in Dominica, Bhutan, Kyrgyzstan, Comoros, Jordan Vanuatu, and Zambia.

B. Secretariat interactions with other international bodies

106. In addition to the meetings reported above, the Secretariat has been actively engaged with other international bodies. As noted in the context of agenda item 4 (c), the Secretariat has been in consultation with the International Plant Protection Convention secretariat on efforts to broaden the availability of information related to alternatives to methyl bromide for quarantine and pre-shipment uses. In addition, the Secretariat attended the December 2011 meeting of the Framework Convention on Climate Change in Durban, South Africa, and met with the Secretariat of the Convention both there and at the special session of the UNEP Governing Council/Global Ministerial Environment Forum to discuss potential future collaboration. The Executive Secretary has also attended meetings of the UNEP senior management team, which includes the heads of the secretariats of other UNEP-administered multilateral environmental agreements. As noted in the discussion of agenda item 5, above, the Secretariat consulted with IMO and WCO regarding their treatment of ozone-depleting substances and ships. Finally, the Secretariat attended the first summit of the International Chiefs of Environmental Compliance and Enforcement, which took place in Lyons, France, from 27 to 29 March 2012, and participated in the third meeting of the steering committee for the Multilateral Environmental Agreement Information and Knowledge Management Initiative, which was organized by UNEP in Geneva, Switzerland, from 22 to 24 May 2012.

C. Potential trade sanctions in respect of HCFCs against non-parties and efforts to promote ratification of pending amendments to the Montreal Protocol

107. In accordance with Article 4, paragraphs 1 quin and 2 quin, of the Montreal Protocol, the import and export of HCFCs to non-parties to the Beijing Amendment to the Montreal Protocol was scheduled to be banned with effect from 1 January 2004. In 2003 and 2009, however, the parties adopted decisions delaying that ban in respect of parties operating under paragraph 1 of article 5. Specifically, the Twentieth Meeting of the Parties adopted decision XX/9, by which it agreed that the imposition of the HCFC trade ban would not take effect in respect of parties operating under paragraph 1 of article 5 of the Protocol until 1 January 2013.

108. To date there are twenty parties to the Protocol (including two parties not operating under paragraph 1 of article 5) that have not yet completed the ratification of all amendments to the Protocol, including the Beijing amendment. Those parties are Azerbaijan (non-Article 5 party), Bahrain, Bolivia (Plurinational State of), Botswana, Chad, Côte d’Ivoire, Djibouti, Ecuador, Haiti, Islamic Republic of Iran, Kazakhstan (non-Article 5 party), Kenya, Libya, Mauritania, Morocco, Nicaragua, Papua New Guinea, Peru, Saudi Arabia, and South Sudan.

109. The Secretariat has been following various approaches to engage the concerned parties through correspondence, conference calls and high-level consultative meetings to explore procedures for expediting the ratification processes in individual countries. The Secretariat has also sent a communication to all HCFC-producing countries requesting their assistance in advising non-parties to which HCFC shipments may be sent to ratify the Beijing Amendment as quickly as possible in order to avert potential trade sanctions.

110. Many of the non-parties to the amendments have expressed an intent to complete the ratification of all pending amendments to the Protocol very soon. The Secretariat is requesting all parties to support this effort by advising their HCFC trading partners to ratify all amendments to the

Protocol as soon as possible and in any case before the end of 2012. Achieving universal ratification of all amendments to the Montreal Protocol, which the Secretariat is pursuing, will facilitate uniform implementation, monitoring and compliance by all parties to the Montreal Protocol.

D. Ozone champions

111. Over the 25 years of its history, the Montreal Protocol has celebrated the achievements of many ozone champions. In recent days the Secretariat has been considering ways that the Protocol might continue to benefit from the efforts of people who have demonstrated a strong commitment to ozone layer protection, particularly as it relates to mobilizing popular support among the general public for such things as the HCFC phase-out. Towards that end the Ozone Secretariat is working in coordination with the OzonAction Programme on an initiative within the Compliance Assistance Programme framework to identify ozone champions who could act as ambassadors to support and further strengthen party compliance with the Protocol, particularly in the case of parties operating under paragraph 1 of Article 5. To pioneer this effort, Her Majesty, Gyaltsuen Jetsun Pema Wangchuk of Bhutan, has graciously expressed her willingness to be such an ozone ambassador. This important gesture was recognized with honour and appreciation at the twenty-fifth anniversary celebration of Bhutan held in Thimpu on 16 May 2012 by the South Asia and Southeast Asia and Pacific ozone officer networks. The criteria for selecting champions and terms of reference for their work need to be further developed, and the Secretariat would welcome any feedback that the parties may wish to provide on the matter.

E. National celebrations of the twenty-fifth anniversary of the Montreal Protocol

112. The UNEP ozone team is enthusiastic about the twenty-fifth anniversary of the Montreal Protocol and the enduring mission of protecting the ozone layer for generations to come. As noted in past correspondence and at recent ozone network meetings, the Ozone Secretariat is working with OzonAction and others to prepare tools to help parties celebrate this historic milestone in the best way possible. Towards that end, in the weeks and months ahead, the Secretariat will provide parties with a number of items, including an updated press kit, a plaque commemorating Parties' contributions to the Montreal Protocol, a public service announcement that parties can use in their media, a special twenty-fifth anniversary edition of the OzonAction newsletter, a twenty-fifth anniversary poster, twenty-fifth anniversary balloons with the anniversary logo, draft presentations on ozone and the Montreal Protocol, updated vital graphics on key ozone topics and information on the projects approved by the Multilateral Fund in each party.

113. In addition, given the generosity of the parties the Ozone Secretariat will be able to provide a limited number of parties operating under paragraph 1 of article 5 with a modest amount of monetary support (up to \$2,000) to help with celebration plans. As noted in our correspondence, requests for such support should be received by the Ozone Secretariat at ozoneinfo@unep.org no later than 15 June 2012, and the criteria for applications can be found at http://ozone.unep.org/25th_Anniversary/Support_for_national_celebrations_of_the_25th_Anniversary_of_the_MP.pdf. In addition to these activities, the ozone team is working on the initiation of a Facebook page, on which parties can upload pictures and share memories, and on the launching of a youth video contest.

114. While the Secretariat and the implementing agencies have many initiatives planned, they look forward to hearing from parties on their plans to celebrate this milestone. The Secretariat will post any information that it receives on such plans on its twenty-fifth anniversary web page.

G. Side events associated with the thirty-second meeting of the Open-ended Working Group

115. At the time of the preparation of the present note, the Secretariat is able to report that the following events are planned to be held on the days before and during the thirty-second meeting of the Open-ended Working Group:

(a) On 21 and 22 July, the UNEP OzonAction programme, the United Nations Development Programme, the United States Government, the Alliance for Responsible Atmospheric Policy, the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants and the European Commission will bring together experts to discuss various alternatives and approaches aimed at ensuring that the phase-out of CFCs and HCFCs is done in a manner that limits the climate contribution of high-GWP materials while preserving or enhancing energy efficiency, cost-effectiveness, safety, and performance. Presentations will be designed for a wide audience including Montreal Protocol party representatives, national ozone officers and representatives of

industry, environmental organizations and academia. Registration is free. The convenors have established a website at www.BangkokTechConference.org;

(b) During the course of the Open-ended Working Group's thirty-second meeting, the European Partnership for Energy and the Environment, representing the heat pump, air-conditioning and refrigeration industry in Europe, will hold a workshop to discuss fluorinated gases and their role in climate change. The event will include a presentation comparing the international and European regulatory frameworks for fluorinated gases;

(c) On 24 July the ozone and fluorinated gases team of the European Commission Directorate General for Climate Action will hold a lunch-time side event;

(d) On 25 July the Ozone Secretariat, in coordination with the co-chairs of the Scientific Assessment Panel, will convene an event to pay tribute to the late Dr. Sherwood Roland and discuss his contributions to ozone science and his impact on ozone protection.

116. Any information received by the Secretariat regarding new events or changes in already-scheduled events will be posted on the Secretariat's conference portal.
