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UNITED STATES OF AMERICA

REPORT OF THE INDIVIDUAL REVIEW OF THE GREENHOUSE GAS INVENTORY SUBMITTED IN THE YEAR 2004[1]

I. OVERVIEW

A. Introduction

1. This report covers the centralized review of the 2004 greenhouse gas (GHG) inventory submission of the United States of America (US), coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, in accordance with decision 19/CP.8 of the Conference of the Parties. The review took place from 11 to 16 October 2004 in Bonn, Germany, and was conducted by the following team of nominated experts from the roster of experts: Generalists – Ms. Ruta Bubniene (Lithuania) and Mr. Jan Pretel (Czech Republic), Energy – Mr. Christo Christov (Bulgaria), Mr. Amit Garg (India) and Ms. Kristin Rypdal (Norway), Industrial Processes – Mr. Justin Goodwin (United Kingdom) and Ms. Natalya Parasyuk (Ukraine), Agriculture – Mr. Michael McGettigan (Ireland) and Mr. Vitor Gois (Portugal), Land-Use Change and Forestry (LUCF) – Mr. Tomas Hernandez-Tejeda (Mexico) and Mr. Walter Oyhantcabal (Uruguay), Waste – Mr. Sabin Guendehou (Benin) and Ms. Maria Paz Cigaran (Peru). Mr. Michael McGettigan and Ms. Maria Paz Cigaran were the lead reviewers. The review was coordinated by Ms. Rocio Lichte (UNFCCC secretariat).

2. In accordance with the "UNFCCC guidelines for the technical review of greenhouse gas inventories from Annex I Parties", a draft version of this report was communicated to the Government of the US, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Inventory submission and other sources of information

3. In its 2004 submission, the US has submitted a complete set of common reporting format (CRF) tables for the years 1990–2002 and a national inventory report (NIR) supported by a set of annexes that provide comprehensive information on methodologies, activity data (AD), emission factors (EFs), recalculations, uncertainties, verification and quality assurance/quality control (QA/QC) procedures, key sources and GHG trends.

C. Emission profiles and trends

4. In the year 2002, the most important GHG in the US was carbon dioxide (CO_2), contributing 83.4 per cent to total[2] national GHG emissions. Methane (CH_4) accounted for 8.6 per cent and nitrous oxide (N_2O) for 6.0 per cent of emissions. The fluorinated gases (F-gases) contributed almost 2 per cent (perfluorocarbons (PFCs) 0.1 per cent, hydrofluorocarbons (HFCs) 1.6 per cent, and sulphur hexafluoride (SF_6) 0.3 per cent) to the total GHG emissions in the country. The Energy sector accounted for 85.3 per cent of total GHG emissions, Agriculture for 6.7 per cent and Industrial Processes and Waste for 4.5 per cent and

[1] In the symbol for this document, 2004 refers to the year in which the inventory was submitted, and not to the year of publication.

[2] In this report, the term total emissions refers to the aggregated national GHG emissions expressed in terms of CO_2 equivalent excluding LUCF, unless otherwise specified.

3.4 per cent, respectively. Fossil fuel combustion accounted for 97.4 per cent of total US CO_2 emissions (excluding LUCF) in 2002.

5. In 2002, total national GHG emissions were 6,934.6 Tg CO_2 equivalent. Total emissions increased by 0.7 per cent between 2001 and 2002 and emissions from fossil fuel combustion increased by 52.2 Tg CO_2 equivalent (0.9 per cent), which is in line with the historical trends where emissions from fossil fuel combustion have been the dominant factor affecting US emissions.

D. Key sources

6. The US has reported a tier 1 key source analysis using both level and trend assessment and has applied a qualitative approach in determining the key sources. The Party presents a thorough description of the methodologies used for the key source analysis. The level assessment has been performed for all years. The key source analyses performed by the Party and the secretariat[3] produced similar results. The Party has identified 20 key sources based on level assessment and 20 key sources based on trend assessment. Two additional key sources (international bunkers and non-energy uses of fossil fuels) were identified on the basis of the qualitative assessment. The secretariat has identified 18 key sources based on level assessment and 23 based on trend assessment. The Party reports on the efforts to implement a robust plan to support data-gathering for both a tier 1 and a tier 2 level analysis and to incorporate the tier 2 approach in future inventories.

E. Main findings

7. The quality of the US inventory submission is high and it complies closely with the UNFCCC reporting guidelines. All required inventory data and methodological information are provided in the CRF and in the NIR. No major inconsistencies were identified between the CRF and the NIR. The NIR and annexes provide detailed descriptions of the methodologies used for inventory preparation. The expert review team (ERT) recognized significant improvement in the inventory as a result of recalculations, the further development of QA/QC procedures and, in particular, the application of quantitative uncertainty estimates.

F. Cross-cutting topics

Completeness

8. A full CRF time series is available for the years 1990–2002. The geographic coverage is complete and all major sources/sinks are covered, as are the relevant GHGs (CO_2, CH_4, N_2O, HFCs, PFCs and SF_6) and the indirect GHGs nitrogen oxide (NO_X), carbon monoxide (CO) and non-methane volatile organic compounds (NMVOCs), and sulphur oxide (SO_X). CRF table 9 and the NIR provide an overview of source/sink categories which are reported as "not estimated" ("NE"), recognizing that further investigation is needed. In several cases the use of notation keys is not fully consistent with the UNFCCC reporting guidelines (e.g., in the Energy sector "NE" seems to be reported instead of "not occurring" ("NO")). Not all sources for which "included elsewhere" ("IE") is used are explained in table 9. Sources that are not estimated are assumed to be only minor sources which do not make a significant contribution to the emissions total.

Transparency

9. The ERT recognized that the methods and rationale for selecting information sources and EFs are adequately described and documented in the NIR and the relevant CRF tables; this ensures an adequate level of transparency and consistency between the NIR and the CRF. Only in some subcategories did the ERT find minor inconsistencies between table Summary 3 of the CRF and the NIR (e.g., CO_2 emissions from 2.B, N_2O emissions from 3 Solvent and Other Product Use, etc.). A very comprehensive NIR and extensive use of the CRF documentation boxes ensure that the general transparency of the US inventory is very high.

[3] The secretariat had identified, for each individual Party, those source categories which are key sources in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance. Key sources according to the tier 1 trend assessment were also identified for those Parties providing a full CRF for the year 1990. Where the Party has performed a key source analysis, the key sources presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key source assessment conducted by the secretariat.

Nevertheless, there are some aspects of the reporting which should be improved, for example, reporting linkages between the Energy and Industrial Processes sectors (coal and gas, energy and non-energy fuel use), more clarification on the EFs for diesel and cement and ammonia production, and the provision of more detailed descriptions of the national models used in the Waste and LUCF sectors, which could allow for the inventory to be replicated more easily.

Recalculations and time-series consistency

10. The ERT noted that recalculations of the emissions estimates of the period 1990–2001 have been provided to take into account changes in methods, EFs and AD. The rationales for recalculations are comprehensively described in CRF table 8(b) and in the NIR. The recalculations have increased the estimates of total emissions by 2.1 per cent for 1990 and by 1.6 per cent for 2001 but have only a relatively small effect on the emissions trend. A plan for further improvements to the inventory is provided in the NIR.

Uncertainties

11. The US has provided a qualitative uncertainty assessment in CRF table 7. In addition, it has provided quantitative uncertainty estimates and information according to the *Intergovernmental Panel on Climate Change (IPCC) Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) using tier 1 and 2 methods in the NIR for the first time. No quantitative estimate is provided for municipal solid waste combustion N_2O, natural gas flaring CO_2, silicon carbide production CH_4, bunker fuels or biomass. No figures for quantitative uncertainty estimates for the total inventory or for individual gases are available in the NIR.

Verification and quality assurance/quality control approaches

12. The US has developed a QA/QC plan in accordance with the IPCC good practice guidance, designed to check, document and improve the quality of its inventory over time. Key attributes of the QA/QC plan include specific detailed procedures or protocols that serve to standardize the process of documenting and archiving information, and inventory expert and public review processes. Secondary data quality checks and source-specific quality checks are considered in parallel with the uncertainty assessment. The plan promotes and involves coordination and interaction within and between the US Environmental Protection Agency (EPA), federal agencies and departments, state government programmes, and research institutions and consulting firms involved in supplying data or preparing estimates for the inventory. Moreover, based on the national QA/QC plan for the inventory, source-specific QA/QC plans have been developed for a limited number of sources, in particular in the Energy and Industrial processes sectors.

Follow-up to previous reviews

13. Compared with previous review findings, the completeness of the inventory has been improved, in particular by very transparent recalculations of all time series. For the first time the US has provided information on the inventory QA/QC plan and quantitative uncertainty estimates based on tiers 1 or 2.

G. Areas for further improvement

Identified by the Party

14. The improvements are aimed at some emission sources reported as "NE", improving the accuracy of EFs (e.g., those for CH_4 and N_2O emissions from stationary and mobile combustion), and collecting more detailed AD (e.g., for SF_6 from electrical transmission and distribution). Further, since the reliability of quantitative uncertainties in the overall GHG inventory depends on the accuracy of the uncertainties in the input data, the US plan underscores the importance of developing credible quantitative uncertainty estimates for the AD and EFs that underlie the emission estimates.

Identified by the ERT

15. The ERT recognized that the US inventory is sufficiently complete, and the NIR provides very comprehensive and transparent descriptions of methodologies used and the overall structure of the national inventory system. The ERT recommends the Party to focus on those emission sources reported in this

submission as "NE" and to prioritize the quantitative uncertainty estimates based on the IPCC good practice guidance tier 2 method, if the necessary data are available. Recommendations related to specific source/sink categories are presented in the relevant sector sections of this report.

II. ENERGY

A. Sector overview

16. In the year 2002, the Energy sector accounted for 85.3 per cent of total GHG emissions in the US. Fuel combustion contributed 82 per cent of total GHG emissions and 97.4 per cent of CO_2 emissions. An increase in Energy sector emissions by 15 per cent (from 5,144 Tg in 1990 to 5,915 Tg in 2002) is mainly caused by increases in emissions from stationary combustion and transport – of 14.7 per cent and 20.3 per cent, respectively. Transport contributed 26.3 per cent to total national emissions. Following a decrease in emissions of 1.4 per cent between 2000 and 2001, emissions from the Energy sector increased by 0.7 per cent between 2001 and 2002, mainly due to a 1.8 per cent increase in transport emissions.

17. In general, the NIR is complete and transparent for the Energy sector, with a detailed discussion of AD, methodologies and EFs. Supporting documentation and references are provided. Calculations for the key energy sources are reported in the NIR and are consistent with the IPCC good practice guidance. However, imperial units are commonly used instead of SI units (International System of units) in the NIR. Tables with conversion factors are given in the annexes, but nevertheless comparison of the data in the NIR with those in the CRF, the references and the data reported by other countries can be difficult. The ERT encourages the Party to use SI units in the NIR to the extent possible.

18. All significant IPCC sources are addressed for the Energy sector and all years and gases are covered. The Party has mentioned that the statistics for the allocation of fuel consumption to individual end-use sectors are not sufficiently certain and a subsectoral breakdown is therefore not reported. The ERT again recommends that the US make the necessary effort to report emissions at a more disaggregated level following the *Revised 1966 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC Guidelines).

19. Recalculations in the Energy sector are well documented in the NIR. They have been performed as a result of new EFs and changes in the methodologies. As a result of the recalculations, the estimates of emissions for the most recent years have decreased by about 1 per cent compared to the 2003 submission, while the estimates for emissions in the year 1990 have decreased by only 0.1 per cent.

20. There are significant changes in the methodology for uncertainty assessment in the Energy sector compared to the previous submission. The uncertainty analysis is performed by primary fuel type for every end-use sector following the tier 2 IPCC recommended method.

B. Reference and sectoral approaches

Comparison of the reference approach with the sectoral approach and international statistics

21. CO_2 emissions from fuel combustion have been calculated using the reference approach and the sectoral approach. Comparing the estimates under the two approaches, there is a difference of 0.8 per cent in the CO_2 emission estimates for the year 2002. Explanations are provided in the documentation box of table 1.A(c) of the CRF. In addition, the NIR provides explanations for the fluctuations in the differences between the two approaches over the years.

22. Under "Other" in the reference approach, a negative value is reported to account for waste combustion, geothermal energy consumption, and adjustments to exclude fuels consumed as feedstocks that are accounted for in the Industrial Processes sector (petroleum coke for aluminum, ferroalloys and titanium dioxide production; coking coal for iron and steel production; and natural gas for ammonia production). The value also includes CO_2 exported to Canada, produced as a by-product of coal gasification. The Party is encouraged to verify that these emissions are included in the Canadian emissions inventory. The ERT noted that the US adopts the value of 0.67 for the fraction of carbon stored in respect of natural gas feedstocks. This value is inconsistent with the CO_2 EF used for ammonia production, which consumes the bulk of this feedstock (see paragraph 44), and this is not in accordance with the IPCC Guidelines. In responding to the

draft of this report, the US explained that before calculations are made regarding natural gas consumption and the application of a fraction of carbon stored for feedstocks, a correction removes the consumption of any natural gas for the ammonia production process. The US further indicated its intention to clarify these corrections in future inventory submissions.

International bunker fuels

23. There are discrepancies between the international bunker fuel data reported in the CRF and those of the International Energy Agency (IEA). The ERT would recommend that the Party explain these differences and possibly harmonize the data. The estimates of marine bunker fuel CO_2 emissions decreased substantially since 1990. The ERT would welcome an explanation of the reason for this decrease.

Country-specific issues

24. The use of notation keys does not always appear to be according to the UNFCCC reporting guidelines. Furthermore, "IE" is frequently used without corresponding explanation in CRF table 9. The Party is encouraged to improve the use and explanation of the notation keys.

25. Several of the comments on the Energy sector made by the previous review team have not been addressed by the Party and are consequently repeated in this review report.

C. Key sources

26. Activity data and emissions for 1.A.1b Petroleum Refining and 1.A.1c Manufacture of Solid Fuels and Other Energy Industries, along with all subcategories 1.A.2a through 1.A.2e, are reported under 1.A.2f Manufacturing Industries and Construction – Other. The Party has indicated that this reporting structure reflects the manner in which fuel consumption data are collected. However, the ERT would encourage the Party to collect separate data or develop methods that would enable reporting of emissions from these subcategories following the IPCC structure. This was already noted in the 2003 review report.

27. Furthermore, under Other Fuels of the 1.A.1 subcategories, it is indicated that emissions are included elsewhere ("IE" is reported). However, for 1.A.2f, the Other Fuels are reported as "not applicable" ("NA"). The documentation box indicates that for the 1.A.1a Public electricity and heat production subcategory the "Other fuels" include geothermal consumption and emissions. The ERT would welcome an explanation or description of how and where emissions from specifically the "Other fuels" of all of the 1.A.1 subcategories are reported. In response to the draft of this report the US indicated that it is not aware of fuel combustion from 1.A.1b Petroleum Refining or 1.A.1c Manufacture of Solid Fuels and Other Energy Industries that is not from Liquid, Solid, Gaseous or Biomass Fuels, and indicated its intention to eventually change the use of notation keys (from IE to NA).

1.A.2a Iron and steel – CO_2

28. The Party has reported all coal used for coke production as non-energy use under 2.C.1 Iron and Steel Production. Emissions from imported coke consumed in blast furnaces are also reported under 2.C.1. The resulting implied emission factors (IEF) for coal corresponds to combustion of coal and that for coke corresponds to combustion of coke. The CO_2 process emissions from metal production are accounted for by reporting negative values as separate additional entries in respect of pig iron, steel and aluminium. The coke oven gas and the blast furnace gas produced in the coking batteries and in the blast furnaces are not accounted in the energy sector. Consequently, the CO_2 emissions from combustion of these gases are accounted in the Industrial processes category and the CH_4 and N_2O emissions from combustion of these gases are not accounted at all. The ERT recommends separating the CO_2 emissions produced during the coke production and combustion of coke oven and blast furnace gases for energy purposes from process-based emissions, as well as to account for CH_4 and N_2O emissions from combustion of coke oven gas and the blast furnace gas according to the IPCC Guidelines and good practice guidance.

1.A.2f Other – liquid fuels

29. Combined AD are reported for liquid fuels used for energy and non-energy purposes. The ERT recommends the Party to report only combusted fuel data in this category following the IPCC good practice guidance. The US indicated that for the 2005 submission emissions from non-energy uses of fossil fuel sources and those from fossil fuel combustion sources would be calculated separately.

1.A.3b Road transport

30. The CO_2 EF for diesel fuel is well documented in the annex to the NIR, according to which the same EF is applied each year as the value is not expected to vary from year to year. However, the IEF as calculated in the CRF fluctuates between years. According to the US response, emissions from road transport are allocated from aggregated energy statistics rather than from a bottom-up collection of AD. The ERT recommends the Party to explain the cause of these fluctuations in the NIR.

31. The N_2O IEF for diesel fluctuates from year to year. The EF is well documented in the NIR. It is originally given in g/km. The Party has explained that the calculations are based on vehicle kilometers travelled, so that a constant EF can give a fluctuating IEF based on fuel use. In responding to the draft of this report the US further explained that the fluctuations in the IEF are due the fact that diesel consumption (in TJ) reported in the CRF is based on an allocation from total diesel consumption in the US (instead of bottom-up estimates), whereas emission estimates for N_2O are calculated based on vehicle miles traveled (VMT) annually in the US, which are two totally different data sets, collected by two separate US government agencies. The ERT would welcome a further explanation in the NIR and possible harmonization between data sources because fuel consumption in g/km and technologies are normally expected to change gradually and not to fluctuate.

1.A.3d Navigation

32. There is a large difference between the CRF data and the IEA data for residual oil and gas/diesel oil for domestic navigation. Although the CRF data appear more plausible than the data reported to IEA, the ERT would encourage the Party to clarify the basis for the CRF reporting. In particular it is important to explain the differences between the sum of fuel used by domestic navigation and international maritime bunkers and the corresponding IEA figures for total fuel used for shipping (domestic and bunkers) which cannot be explained by differences in allocation methods. Furthermore, the trend in emissions from domestic navigation fluctuates considerably. The ERT would recommend the Party to undertake further QA/QC of the data in order to increase time-series consistency or to explain what drives the fluctuations. In responding to the draft of this report the US indicated that it has begun to examine these matters more closely.

1.A.5 Other – other fuels

33. The methodology for estimating CO_2 emissions from waste combustion for energy purpose has been revised in the 2004 submission. The emissions due to synthetic rubber and carbon black in tyres are now estimated as being the same through out the period 1996–2002, at 0.9 Tg CO_2 and 1.2 Tg CO_2, respectively, compared to the approximate doubling in both over the period 1995–2001 reported in 2003 submission. The emissions from other components of waste are also near-constant. In responding to the draft of this report the US explained that the revisions in the estimates from municipal solid waste combustion resulted in an average annual decrease in CO_2 emissions from the source of 4.4 Tg CO_2 equivalent (21.8 per cent) for the period 1990 to 2001, mainly due to the availability of additional updated and more precise data for the 2004 submission, which led to a revision in some of the underlying assumptions. The ERT recommends the Party to explain these changes in more detail in the NIR. The US indicated its intention to improve the transparency of its calculations from this source in future submissions.

34. According to the details provided in the NIR, the amount of waste combusted decreased by more than 13 per cent over the period 1990–2002, while CO_2 emissions increased by 72.5 per cent over the same period. The reasons for this are not clearly explained and could not be assessed since the Party has not provided direct information on the composition of solid wastes combusted or their average carbon contents. The Party is encouraged to provide this information in the NIR to enhance the transparency of its reporting.

In responding to the draft of this report the US explained that, while the amount of total waste combusted has decreased, the amounts of certain types of waste combusted over the time period has varied. The US also indicated its intention to improve transparency of AD on the amounts of particular types of waste combusted in future submissions.

1.B.2 Fugitive emissions from oil and gas

35. The fugitive CH_4 estimates reported appear to be complete and well documented. However, CH_4 emissions from venting have been reported as "IE" (according to the NIR they are included in the petroleum system (category 1.B.2a – Oil)). Emissions of N_2O from flaring and fugitive CO_2 emissions have not been estimated. According to the Party emissions from the flaring of landfill gas have not been estimated. Although it does not give net CO_2, flaring will give emissions of CH_4 and N_2O. The ERT would recommend further disaggregation of the emissions reported according to the structure in the CRF and the inclusion of estimates for activities currently reported as "NE".

D. Non-key sources

1.A.3e Gaseous fuels – CH_4 and N_2O

36. Emissions from gaseous fuels (other transport) are reported for CO_2, but CH_4 and N_2O are reported as "NE". The ERT would encourage the Party to include these emissions in its next submission.

1.A.4c Agriculture/forestry/fisheries

37. The notation key "IE" is used for all emissions, but no indication is given of where these emissions were included. The ERT encourages the Party to document where the corresponding AD and emissions are reported and to make the necessary effort to report emissions from this subcategory following the IPCC structure.

1.B.1a Coal mining and handling

38. The Party has reported "NE" for CO_2 emissions from this category because of lack of data. The ERT recommends the Party to include these in its next submission.

III. INDUSTRIAL PROCESSES AND SOLVENT USE

A. Sector overview

39. In the year 2002, the Industrial Processes sector generated emissions of 310.7 Tg CO_2 equivalent, or 4.5 per cent of total GHG emissions in the US. CO_2 emissions from all industrial processes were 147.3 Tg in 2002. This was only 2.5 per cent of total national CO_2 emissions. In 2002, combined emissions of HFCs, PFCs and SF_6 from the sector totalled 138.2 Tg CO_2 equivalent. Overall, emissions from industrial processes increased by 4.5 per cent from 1990 to 2002 despite decreases in emissions from several industrial processes, such as iron and steel production, electrical transmission and distribution, HCFC-22 production, and aluminum production. The increase in emissions was driven by a rise in emissions originating from cement manufacture and, primarily, emissions from the use of substitutes for ozone depleting substances.

40. The transparency of the Party's reporting in this sector could be improved by providing more detailed information on actual EFs used per type of technology for some processes, the share of different technologies in total production, and specific information on what proportion of total AD is based on capacity rather than actual production. In addition, transparency could be improved by adding summary documentation on QA/QC procedures implemented by industries, in particular for emissions or EFs reported directly by industrial companies. In some cases the NIR includes descriptions of key methodologies in the sections on uncertainty and not under the sections on methodologies. For example, in the NIR, section 4.3 Ammonia Manufacture and Urea Application (IPCC Source Category 2.B.1) paragraphs 2 and 3 under the uncertainty section (page 119) discuss and provide information on assumptions for the methodology, but are included under the uncertainty heading. The ERT recommends that the US include methodology descriptions under the respective methodology chapters in line with the requirements of annex I (structure of the national inventory report) of the UNFCCC reporting guidelines.

41. The secretariat's analysis shows nine key sources, including ammonia production and other consumptions of halocarbons and SF_6, which have not been identified by the Party according to the US key source list in the NIR. In addition, ammonia production was reported as a key source in the 2003 submission. The Party's 2004 NIR shows ammonia production to be below the threshold for both level and trend key source assessment.

42. As the US notes in CRF table 9, a number of sources are not estimated ("NE") in the US emissions inventory. These include CO_2 from calcium carbide production, silicon carbide production, food and drink production, and solvents and other product use; CH_4 from ferroalloys production; N_2O from solvents and other product use; and PFCs from metal production. The Party will investigate the possibility of including emissions from a number of these sources for future inventories. The ERT noted that emissions estimates for CH_4 from iron and steel production and CO_2 from phosphoric acid production have been included in the 2004 submission for the first time.

B. Key sources

2.A.1 Cement production – CO_2

43. In response to the preliminary analysis in the 2004 synthesis and assessment (S&A) report (part II), the US explained that the AD for cement production in 2002 contained a transcription error and should be 82,959 kt instead of 81,294 kt. However, this is still 8.1 per cent lower than the value published by the United Nations Industrial Commodity Production Statistics Database. As a result of this error the 2002 value of the CO_2 IEF (0.53 t/t) is higher than the IPCC default value for clinker (0.51 t/t). Using the revised AD, the resulting IEF would be 0.52 t/t.

2.B.1 Ammonia production and urea fertilizer application – CO_2

44. The US uses a tier 1 method to calculate emissions from ammonia (NH_3) because of difficulties with separating feedstock use from the energy consumption statistics as documented in the NIR. The basic EF applied is 1.2 t CO_2/t NH_3 produced, based on a 1995 EFMA (European Fertilizer Manufacturers Association) report, which is significantly lower than the IPCC default value of 1.5 t CO_2/t NH_3. The NIR (footnote 2, page 119) provides the rationale for using the value of 1.2 t CO_2/t NH_3. In addition, the US adds CO_2 emissions estimated from net imported urea to the emissions from domestic ammonia production. The contribution from urea accounts for 16 per cent of the total emissions reported for ammonia production in 2002, and the IEF is accordingly 1.42 t CO_2/t NH_3. This approach explains the variation in IEFs over the time series, ranging between 1.23 and 1.46 t CO_2/t NH_3. The ERT encourages the US to further investigate methods of estimating emissions from ammonia production on the basis of gas feedstock and to reassess whether the allocation of emissions related to net urea imports is in accordance with the IPCC Guidelines.

2.C.3 Aluminum production – PFCs

45. As stated in the NIR, PFC emissions from aluminum production have been estimated using a per unit of production EF that is expressed as a function of operating parameters. However, the most accurate method is either to monitor smelter emissions continuously (tier 3a), or to develop a smelter-specific relationship between measured emissions and operating parameters and then apply this relationship using production data for individual years (tier 3b). A measurement study is currently taking place at three US aluminum smelters to develop facility-specific emission coefficients. The use of these coefficients instead of IPCC defaults will enable the calculation of more accurate estimates of PFC emissions from these facilities. The ERT looks forward to reviewing the updated methodology when the measurements have been completed.

2.B.3 Adipic acid production – N_2O

46. Estimates of emissions from this source are based on a mix of plant-specific data and IPCC good practice guidance default factors for plants where direct measurement data are not used. Improvements are focused on obtaining direct measurement data from the remaining two plants. If they become available, cross-verification with top–down approaches will provide a useful tier 2 level QA check. Also, additional information on the actual performance of the latest catalytic and thermal abatement equipment at plants with continuous emissions monitoring may support the re-evaluation of the current default abatement values.

2.C.1 Iron and steel industry – CO_2

47. As indicated in the 2003 review, emissions are calculated on the basis of a direct mass balance of carbon-containing raw materials and products, and include emissions from coke production since this is considered by the Party to be an industrial (non-energy) use of coal. This approach allocates all CO_2 emissions to the process emissions and does not separate the energy use component and report it under the Energy sector. As some of the coking coal is converted into coke oven gas and this is presumed to be used for energy/heat generation a component is used for energy use. In addition to iron and steel process emissions, all emissions associated with the use and production of coke are allocated to the coke production category. The ERT encourages the US to separate the emissions produced from energy use from the iron and steel processes sector and allocate the component of the coke carbon to the processes where it is released (e.g., coke production, sinter, blast oxygen furnace (BOF) and electric arc furnaces (EAF)) to improve the transparency of the estimates.

2.E.1 Production of HCFC-22 – HFC-23

48. Emissions are estimated using plant measurement data and adhering to the tier 2 methodology in the IPCC good practice guidance. The methodology is generally well documented. However, there is no indication of the monitoring standards used by the plants to monitor emissions or verification by the US that recognized standard methods have been used. The ERT invites the US inventory agencies to reference any internationally recognized standard, such as USEPA methods or ISO methods used for plant emission measurements. For additional clarity the ERT invites a more detailed description in the NIR of why, despite a 5 per cent decrease in production between 2001 and 2002, emissions between these years only decreased by 0.15 per cent (which implies a small increase in emissions per unit of production).

2.F.7 Emissions from electrical equipment – SF_6

49. The US indicates that the methodology and AD used for estimating emissions from 1990 to 1998 have been updated since the previous submission. As in previous inventories, SF_6 emissions from US utilities are assumed to have followed the trend of global SF_6 emissions from utilities during this period. However, the method for estimating global emissions now accounts for SF_6 that is recaptured and/or released from retiring equipment, rather than assuming that global emissions are equal to global sales of SF_6 to electric utilities (see the 2002 NIR, page 154). The ERT welcomes this refinement to the methodology and the added response that global statistics of consumption are used because national data are confidential and therefore unavailable.

2.F Consumption of halocarbons and SF_6 – PFCs and HFCs

50. The Vintage Model used by the US is described in detail in the NIR (annex 3.8). Detailed methodologies and equations are provided. However, no summary information on EFs and related factors used is provided. If it could be provided, this would greatly enhance the transparency of the methods used. As in the 2003 review, the ERT encourages the Party to provide greater transparency in the factors used and their trends over time. This refers to reporting non-confidential national average values of manufacturing losses, and leakage and maintenance losses per gas and application, whenever possible and similar to the information contained in Godwin et al. (2003).

IV. AGRICULTURE

A. Sector overview

51. In the year 2002 emissions from the Agriculture sector in the US amounted to 467 Tg CO_2 in 2002, which represented 6.7 per cent of the total GHG emissions. Within the sector, category 4.D accounted for 61.5 per cent of emissions and category 4.A for 24.5 per cent. Emissions in category 4.A decreased by 2.9 per cent from 1990 to 2002 and those from category 4.D increased by 9 per cent, largely accounting for the overall increase of 7 per cent for the sector. The US identifies four key sources in agriculture in its list of key sources for the 2002 inventory (4.A – CH_4, 4.B – CH_4, 4.D.1 – N_2O and 4.D.3 – N_2O), which account for 86 per cent of emissions from the sector.

52. The largest contributions to emissions from agriculture are from nitrogen-fixing crops and indirect emissions due to leaching, at 24 and 23 per cent, respectively. A similar amount of emissions, 21 per cent of the category 4.D total, is generated by chemical fertilizer inputs. The indirect N_2O emissions arising from chemical fertilizers and the application of animal manures on soils (deposition and leaching) are equal to the direct emissions of N_2O emanating from the same nitrogen (N) inputs.

53. There is complete and transparent reporting for the Agriculture sector in the CRF for 2002. The NIR and annexes provide a comprehensive description of methodologies, data sources and assumptions underlying the emissions estimates reported in the CRF. Emissions in agriculture are estimated at the state level, which ensures that regional differences due to differing agricultural management practices, climatic variation and other factors are taken into account as completely as possible. Uncertainty analysis has been done using both tier 1 and tier 2 methods, and tier 2 QA/QC has been performed.

B. Key sources

4.A Enteric fermentation – CH_4

54. A very detailed tier 2 method is used for estimating enteric fermentation in cattle and the tier 1 method is used for other livestock, which is in agreement with good practice for significant sources. The cattle population is characterized in 10 classes of animal, whose populations are tracked on a monthly basis, and digestible energy and methane conversion rates are developed from dietary data representative of different regions of the US. Emissions are estimated by applying a daily rate of CH_4 emission for each animal class and in seven regions derived using the IPCC good practice guidance equations. All the key input data (populations, diets, digestible energy) supporting this approach are provided in the NIR. The IPCC default EFs are used for sheep, goats, horses and swine.

55. The US characterization of cattle populations is not entirely in line with the IPCC good practice guidance in that the dairy cattle population includes dairy heifers and the non-dairy cattle category does not include dairy heifers and calves. This means that the IEFs are difficult to compare with the default IPCC values and the IEFs reported by other Parties.

56. The IEF for dairy cattle varies from 97.2 to 99.1 kg CH_4/head/yr, which is lower than the IPCC default (118 kg/head/yr for North America). This reflects the inclusion of dairy heifers in this animal category. If the IEF is corrected to represent only dairy cows (on the basis of data from the NIR) then the IEF varies between 114 and 116 kg/head/yr, which approximates the IPCC default for North America. Conversely, the IEF for non-dairy cattle in 2002 varies from 63.7 to 59.9 kg/head/yr, which is higher than the IPCC default for North America (47 kg/head/yr). If the population would include calves and dairy heifers (on the basis of data from the NIR) then the IEF would vary between 46.5 and 45.1 kg/head/yr. Although the chosen characterization of populations serves to quantify total emissions reliably, the IEF for both dairy and non-cattle categories are not directly comparable to the IPCC default values or the IEFs reported by other Parties.

4.B Manure management – CH_4

57. The US does not report the share of each animal waste management system (AWMS) and the methane conversion factor (MCF) for each animal type in CRF table 4.B(a) to support the tier 2 EF determination, and instead reports "IE". For liquid/slurry, deep-pit and anaerobic lagoon systems, a model is used that incorporates temperature information at state level. For all other systems, the US uses the IPCC good practice guidance default values of MCF for temperate regions, without considering climatic variation by region. Although the available information would apparently allow such a breakdown, this would have a minor effect on emissions, according to US comments on the draft of this report. As the US emissions estimates at state level are weighted average values of AWMS distributions, the MCF could be reported in a similar way at country level in table 4.B(a), using the detailed information from NIR Annex 3.10. Although country-level MCF are explained in the NIR, this information could improve transparency and allow comparison with the IPCC defaults (IPCC Guidelines, tables in annex B) and with other Parties' reports, and facilitate consistency checking with table 4.B(b). In the NIR, the US identifies this modification as an item for future improvement and states that the current approach may lead to some overestimation of CH_4 emissions.

4.D.1 Agricultural soils – direct N_2O

58. The aggregated values of F_{SN} and F_{AW} (unvolatilized N input from commercial fertilizers and manure applied to soils) reported in table 4.D are consistent with the information on fertilizer use in the NIR and on N excretion by AWMS given in table 4.B(b), the description of methodology and the specified values of $Frac_{GRAZ}$, $Frac_{FUEL}$, $Frac_{GASF}$ and $Frac_{GASM}$. The IPCC default values of $Frac_{GASF}$ and $Frac_{GASM}$ are used. However, the ERT encourages the US to consider the development of country-specific values for these parameters. For instance, the US may be able to derive appropriate values for $Frac_{GASF}$ and $Frac_{GASM}$ based on agricultural NH_3-N volatilization, as quantified in the US Ammonia Emissions Inventory. The annual consumption of synthetic fertilizers indicated by table 4.D across the time series is generally consistent with that given by the Food and Agriculture Organization of the United Nations (FAO).

59. The nitrogen input arising from N-fixing crops is the largest single source of N_2O emissions in the US. This is due to large contributions from soybeans and from N-fixing forages such as alfalfa and clovers, the inclusion of which is recommended by the IPCC good practice guidance. The production statistics for clovers are not taken from official US Department of Agriculture (USDA) publications (although those for other crops and forages are). The estimation of N_2O emissions from N-fixing crops and crop residues is in accordance with the tier 1b methodology using values of nitrogen fractions, residue/crop ratio and dry matter fractions taken largely from national sources. The results are correctly reported in table 4.D and time-series information is provided on the N inputs to soils.

60. The ERT recommends that AD be reported in the NIR with sufficient decimal digits to allow comparison and verification of the emissions estimates reported in the CRF tables.

4.D.1 Agricultural soils – indirect N_2O

61. The aggregated nitrogen inputs from atmospheric deposition and N leaching reported in table 4.D are consistent with the information on fertilizer use and N excretion by AWMS given in table 4.B(b), the description of methodology, and the values of $Frac_{GASF}$, $Frac_{GASM}$ and $Frac_{LEACH}$. The accounting of N inputs for indirect N_2O emissions is consistent with that in the estimation of direct emissions of N_2O from agricultural soils. The IPCC default value of 0.3 is used for $Frac_{LEACH}$. The ERT is of the view that low average rainfall and low overall direct N inputs (less than 50 kg/ha) in parts of the US do not support this level of N loss through leaching and, this being the case, this component of indirect emissions may be overestimated. In its response to the draft of this report, the US stated that a soil process model is being used to estimate $Frac_{LEACH}$ as part of improvements being made for the 2005 submission.

V. LAND-USE CHANGE AND FORESTRY

A. Sector overview

62. In the year 2002 the LUCF sector represented a net sink of 690.7 Tg CO_2 in the US, offsetting 11.9 per cent of total CO_2 emissions. From 1990 to 2002 net removals declined by 27.9 per cent. Emissions and removals of CO_2 are reported in table 5 for 5.A.2 Temperate Forests and for harvested wood and urban trees in subcategory 5.A.5 Other, and for all activities in category 5.D. CO_2 emissions and removals relating to temperate forests in 5.B and 5.C are included in 5.A and "NE" appears for other activities. Non-CO_2 emissions are noted as "NO" for temperate forests and "NE" for other subcategories.

63. The NIR provides a very detailed description of methodologies and data acquisition for LUCF estimates. The change to state-level analysis has improved the estimates of non-soil forest carbon stocks and fluxes in other pools previously made at regional level, and better information is used for some activities in categories 5.D and 5.E. The recalculated estimates are fully reported for all years and they indicate a downward revision in reported net CO_2 removals, ranging from 11 per cent in 1990 to 18 per cent in 2002. There is a significant improvement in the assessment of uncertainties compared to previous submissions.

64. A carbon stock-change methodology, which does not separate CO_2 emissions and removals, is used for all LUCF activities except urban trees in subcategory 5.A.5 - Other. The values reported for sub-categories 5.A.2, 5.D.1 and 5.D.4 under "CO_2 removals" in fact represent "Net CO_2 removals" and the notation key "IE" is used here to indicate that the corresponding emissions are accounted for in the reported removals estimates. This use of IE is different to that of the reporting guidelines, wherein it is intended to

indicate the reporting of emissions/removals in a different source/sink category. The US also uses IE in this manner to show that emissions under 5.B.2 and both the emissions and removals under 5.C.2 are accounted for under 5.A.2. Notwithstanding the explanations provided in the Table 5.A documentation box, the US is encouraged to provide a clearer explanation regarding the use of notation keys with regard to category 5.A and to also use table 9 for indicating where emissions and removals reported as "IE" have been allocated in the inventory.

B. Sink and source categories

5.A Changes in forest and other woody biomass stocks

65. The US reports naturally regenerated temperate forests as "NA" in CRF table 5.A. Previous reviews encouraged the Party to collect data and report changes in carbon stocks for tropical and boreal forest areas, and the ERT reiterates this recommendation.

66. The production approach adopted does not provide an accurate estimate of domestic stocks of harvested wood products. Exports of harvested wood products are not included in the estimations of CO_2 emissions and removals. As such, the US considers that its approach underestimates potential carbon storage of harvested wood (imports exceed exports), but indicated its intention to continue to evaluate the best approach for estimating carbon storage of harvested wood, according to the information provided by the US in response to the draft of this report.

67. Urban trees represent a significant part of total tree canopy cover in the US (3 per cent) and the reported emissions and removals associated with them remain constant for the period 1990–2002. As the total area of urban forests does not seem to have changed significantly during the period, the reason for constant net removals of CO_2 seems to be the assumption that there is always a constant positive annual growth rate in those urban trees. In response to the 2003 review, the US stated that the fixed estimate is considered to be representative of the period 1990–2001. As the annual growth rate of trees is dynamic, depending on age structure and other factors, the basis for this assumption should be re-examined and evidence should be provided of its validity. In its response to the draft of this report, the US stated that there is insufficient information to adjust the removals estimate based on tree mortality and growth in urban areas over the full time period.

5.B Forest and grassland conversion and 5.C Abandonment of managed lands

68. The Party mentions that data are not yet available for reporting individual fluxes from forest conversion and from abandonment of managed lands, and therefore no estimates have been provided for 5.B and 5.C (under both 5.B and 5.C "IE" is reported for temperate forests and "NE" for tropical and boreal forests and grasslands/tundra) and the corresponding background tables not been completed. An alternative format will be completed when data are available. Table 5.B of the CRF indicates non-CO_2 emissions resulting from burning as "NO". It is recommended that the Party estimate these on-site emissions associated with forest fires.

5.D CO_2 emissions and removal from soils

69. The figures for net CO_2 removals from soils decreased by 69 per cent over the period 1990–2002 mainly as a result of a sudden reduction in the figures for removals, from 231,716 Gg in 1996 to 74,337 Gg in 1997. In the response to the draft of this report, the US explained that the rapid drop is due to the current method, which reflects the assumption that changes in soil carbon occur instantaneously as a function of changes in net forest area and changes among forest types and the use of survey data from only three nominal years. Because the rate of increase in forest area slowed after 1997, the estimates reflect a direct decrease in the rate of soil carbon sequestration by forest soils. Management factors have been rescaled and the latest soil information has been incorporated, which is an improvement compared to the previous inventory.

5.E Other – landfilled yard trimmings

70. The US is unique among Annex I Parties in reporting net removals of CO_2 for the country-specific activity "landfilled yard trimmings" under category 5.E Other (table 5). The IPCC states in the Special Report on Land Use, Land-use Change, and Forestry (2000) that land use is "the total of arrangements,

activities, and inputs that people undertake in a certain land cover type". The IPCC Guidelines stipulate the inclusion of CO_2 removals through land use and forestry, but do not recognize landfills as a land use. The IPCC Guidelines also recognize the increment of woody biomass (see chapter 5.2.2), but it seems quite difficult to consider landfilled yard trimming as biomass. Under the current rules for reporting LUCF, therefore, it seems advisable to reconsider the inclusion of "landfills" as a sink, even though part of the carbon stored there is maintained sequestered for long periods (see the section on the Waste sector below). The notation keys used in CRF table 5 should be used transparently and consistently in the Party's next submission (CO_2 emissions are reported as "IE" but not registered in table 9).

VI. WASTE

A. Sector overview

71. In the year 2002 the Waste sector generated 3.4 per cent of total national GHG emissions. This contribution is mainly due to CH_4 emissions from landfills, which contributed 81.4 per cent to total emissions from the Waste sector.

72. The US has provided all background data tables for all categories under Waste for the period 1990–2002. As for the sources and gases, only N_2O emissions from industrial waste-water handling are not reported.

73. The values of many parameters used in this sector are based on expert judgement. The US is encouraged to document clearly in the NIR the rationale and assumptions underlying the values chosen.

B. Key sources

6.A Solid waste disposal on land – CH_4

74. The methodology used by the US is based on country-specific models. Although the models are clearly explained in the NIR, including documentation on the methodologies, AD and parameters used, it was not possible for the ERT to replicate the calculation of emissions. The ERT recommends the US to provide the formulae in its future NIRs to make it possible to replicate the calculation.

75. CH_4 emissions decreased by 8.1 per cent from 1990 to 2002 due to an increase in volumes recovered (for energy purposes) and in flaring. CH_4 recovery and flaring have increased by over 450 per cent since 1990, while quantities of municipal solid waste (MSW) have increased by 120 per cent. In the 2004 submission the number of CH_4 recovery facilities is reported constant (992) throughout the whole time series (while in the previous submission it was increasing throughout the years), as are the percentages of wastes incinerated (7 per cent), wastes recycled (7 per cent) and waste composition. In response to the recommendation by the ERT to the US to provide an explanation for the constant values reported and to improve data on waste composition, the Party recognized that it was an error and promised to correct the latter for future inventories.

76. Recalculations have been performed for the whole time series due to the updating of CH_4 flaring and recovery for energy purposes. This has resulted in an important downward revision of the estimates of emissions, of 5 per cent for 2001. References are provided in the NIR.

77. The US assumes that emissions from industrial landfills equal 7 per cent of CH_4 emissions from municipal landfills. In response to the review report, the Party will provide the rationale for this assumption in the next submission.

78. The US applies a country-specific methodology for estimating CO_2 removals from landfilled yard trimmings (see paragraph 70 above), and reports and accounts for these removals in the LUCF sector (more than 10,000 Gg CO_2 removals). In responding to the draft of this report the US stated that the sequestration reported from "landfilled yard trimming" result from management activities on Settlement land (IPCC category according to the IPCC Good Practice Guidance for Land Use, Land-use Change and Forestry (LULUCF) (hereinafter referred to as LULUCF good practice guidance). The ERT notes that the LULUCF good practice guidance does not address the issue of carbon storage in landfills and that it is not an explicit category or subcategory under Settlements. Therefore, the ERT recommends again that the inclusion of

these estimates be further analysed and, if it is found to be justified, recommends the US to account for landfilled yard trimmings only in the Waste sector (under solid waste disposal systems (SWDS)), ensuring that the estimates are fully and directly connected with the model on landfill emissions and that under- or overestimation of emissions is avoided. In this case, the ERT strongly encourages the US to provide the uncertainty estimates underlying this methodology.

C. Non-key sources

Waste-water handling – CH_4

79. From 1990 to 2002, CH_4 emissions from domestic waste-water treatment increased by 15.6 per cent, reflecting the increase in the population, while emissions from industrial waste water increased by 22.1 per cent due to an increase in industrial production. The US has used the IPCC default methodology. The fraction of BOD_5 (biochemical oxygen demand for 5 days) that degrades anaerobically for domestic waste water is assumed to be 16.25 per cent, based on expert judgement, but the rationale for this was not provided and in its response to the review report the US indicated that it will include more description in future inventories. The Party has updated its data on production estimate for some industries, leading to recalculations for the full time series for industrial wastewater. Industry-specific parameters are used. However, some assumptions need to be explained, mainly with regard to the fraction of chemical oxygen demand (COD) or biochemical oxygen demand (BOD) that degrades in anaerobic conditions (NIR page 235). Therefore, in responding to the review report, the US provided some references and indicated that more descriptions will be included in future inventories. The US mentions in its NIR that industrial waste-water emissions from petroleum systems are reported in the Energy chapter of the NIR, but the ERT found no mention of this source in the chapter. The Party justifies this in its response by the fact that emissions from this source are considered minor.

Human sewage – N_2O

80. The IPCC default methodology has been used with some modifications. These modifications seem scientifically acceptable. In this connection the US has used some correction factors (NIR pages 237–238) which are based on expert judgement. However, the ERT recommends the US to provide more explanation of the use of these factors in the NIR.

Waste incineration

81. The US has used a country-specific method and EFs to estimate CO_2 and N_2O emissions. Emissions are reported under the Energy sector (see the Energy chapter, page 90 of the NIR) since incineration is used for energy purposes. However, in the NIR (annex, page 238) it is noted that emissions from incineration of hazardous wastes without energy recovery are reported under the Energy sector instead of the Waste sector. In responding to the draft of this report the US explained that there is no readily available data to determine which portion of the non-energy uses of fossil fuel products were combusted to eliminate hazardous wastes without energy recovery and that, because the majority of the combustion is done for energy recovery, the energy sector is used as the default location for these emissions. The ERT nevertheless recommends that, for reasons of consistency with the IPCC good practice guidance, the US estimate these emissions based on a documented assumption, and report them under the Waste sector. Any reallocations should be explained in the NIR. The US should also make the inventory more complete by including in future emissions from incineration without energy recovery of industrial non-hazardous wastes.

82. To improve the transparency of the inventory the amounts of different waste streams incinerated, differentiated between biogenic and non-biogenic wastes, should be reported under the Waste sector, even though their emissions are reported under the Energy sector and referenced in table 6.C as “IE”.

ANNEX 1: MATERIALS USED DURING THE REVIEW

A. Support materials used during the review

2003 and 2004 Inventory submissions of the United States of America. 2004 submission including a set of CRF tables for 1990–2002 and an NIR.

UNFCCC secretariat (2004). "Report of the individual review of the greenhouse gas inventory of the United States submitted in the year 2003 (Centralized review)." FCCC/WEB/IRI(3)/2003/USA (available on the secretariat web site <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/usrep03.pdf>).

UNFCCC secretariat. "2004 Status report for the United States of America" (available on the secretariat web site <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/usa04.pdf>).

UNFCCC secretariat. "Synthesis and assessment report of the greenhouse gas inventories submitted in 2004. Part I." FCCC/WEB/SAI/2004 (available on the secretariat web site <http://unfccc.int/resource/webdocs/sai/2004.pdf>) and Part II – the section on *the United States of America*) (unpublished).

UNFCCC secretariat. Review findings for the United States of America (unpublished).

The United States of America's comments on the draft "Synthesis and assessment report of the greenhouse gas inventories submitted in 2004" (unpublished).

UNFCCC secretariat. "Handbook for review of national GHG inventories". Draft 2004 (unpublished).

UNFCCC secretariat. "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories", "Part II: UNFCCC reporting guidelines on national communications" and "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention." FCCC/CP/1999/7 (available on the secretariat web site <http://unfccc.int/resource/docs/cop5/07.pdf>).

UNFCCC secretariat. "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" and "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention." FCCC/CP/2002/8 (available on the secretariat web site <http://unfccc.int/resource/docs/cop8/08.pdf>).

UNFCCC secretariat. Database search tool – *Locator* (unpublished).

IPCC. *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, 2000* (available on the following web site: <http://www.ipcc-nggip.iges.or.jp/public/gp/gpgaum.htm>).

IPCC/OECD/IEA. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, volumes1–3, 1997* (available on the following web site: <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>).

B. Additional materials

No additional information or materials were requested by the ERT during this review.

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