ANNEX 5 Assessment of the Sources and Sinks of Greenhouse Gas Emissions Not Included

Although this report is intended to be a comprehensive assessment of anthropogenic[116] sources and sinks of greenhouse gas emissions for the United States, certain sources have been identified but not included in the estimates presented for various reasons. Before discussing these sources, however, it is important to note that processes or activities that are not *anthropogenic in origin* or do not result in a *net source or sink* of greenhouse gas emissions are intentionally excluded from a national inventory of anthropogenic greenhouse gas emissions, in line with guidance from the IPCC in their guidelines for national inventories.

Given a source category that is both anthropogenic and results in net greenhouse gas emissions, reasons for not including a source related to an anthropogenic activity include one or more of the following:

- Though an estimating method has been developed, data were not adequately available to calculate emissions.
- Emissions were implicitly accounted for within another source category (e.g., CO_2 from Fossil Fuel Combustion).

It is also important to note that the United States believes that the sources discussed below are very low in comparison with the overall estimate of total U.S. greenhouse gas emissions, and not including them introduces a very minor bias. In general, the emission sources described in this annex are for source categories with methodologies introduced in the *2006 IPCC Guidelines* for which data collection has not been sufficient to pursue an initial estimation of greenhouse gases. Reporting of inventories to the UNFCCC under Decision 24/CP.19 requests "Where methodological or data gaps in inventories exist, information on these gaps should be presented in a transparent manner." Furthermore, these revised reporting guidelines allow a country to indicate that a disproportionate amount of effort would be required to collect data for a gas from a specific category that would be insignificant in terms of the overall level and trend in national emissions.[117] Specifically, where the notation key "NE" is used in the Common Reporting Format tables that accompany this Inventory report submission to the UNFCCC, countries are required to describe why such emissions or removals have not been estimated (UNFCCC 2013).

With this guidance, the United States will consider the next steps in providing transparent information on these categories in future inventories.

Source Categories Not Estimated

The following section is arranged by sector and source where additional explanations are available to describe the reason the source was not estimated.

Energy

IPCC Category 1.A.5.a: CO_2 from Non-Hazardous Industrial Waste Incineration and Medical Waste Incineration

Waste incineration of the municipal waste stream and hazardous waste incineration of fossil fuel-derived materials are reported two sections of the Energy chapter of the Inventory: in the section on CO_2 emissions from waste incineration, and in the calculation of emissions and storage from non-energy uses of fossil fuels.

Two additional categories of waste incineration that are not included in our calculus are industrial non-hazardous waste and medical waste incineration. Data are not readily available for these sources.

An analysis was conducted based on a study of hospital/ medical/ infectious waste incinerator (HMIWI) facilities in the United States showing that medical waste incineration emissions could be considered insignificant. Based on that

[116] The term "anthropogenic," in this context, refers to greenhouse gas emissions and removals that are a direct result of human activities or are the result of natural processes that have been affected by human activities (*2006 IPCC Guidelines for National Greenhouse Gas Inventories*).

[117] Paragraph 37(b) of Decision 24/CP.19 "Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention." See < http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=2>.

study's information of waste throughput and an analyses of fossil-based composition of the waste, it was determined that annual greenhouse gas emissions for medical waste incineration would be below 500 kt CO_2 Eq./year and considered insignificant for the purposes of inventory reporting under the UNFCCC.[118]

IPCC Category 1.B.1.a.iii: CO_2 from Abandoned Underground Coal Mines

Emissions from this source are not estimated due to difficulties in obtaining data. Inclusion of emissions from this source will be investigated for future Inventories.

IPCC Category 1.C CO_2 Transport and Storage

Carbon dioxide is produced, captured, transported, and used for Enhanced Oil Recovery (EOR) as well as commercial and non-EOR industrial applications. This CO_2 is produced from both naturally-occurring CO_2 reservoirs and from industrial sources such as natural gas processing plants and ammonia plants. In the Inventory, emissions from naturally-produced CO_2 are estimated based on the specific application. In the Inventory, CO_2 that is used in non-EOR industrial and commercial applications (e.g., food processing, chemical production) is assumed to be emitted to the atmosphere during its industrial use. These emissions are discussed in the Carbon Dioxide Consumption section. The naturally-occurring CO_2 used in EOR operations is assumed to be fully sequestered. Additionally, all anthropogenic CO_2 emitted from natural gas processing and ammonia plants is assumed to be emitted to the atmosphere, regardless of whether the CO_2 is captured or not. These emissions are currently included in the Natural Gas Systems and the Ammonia Production sections of the Inventory report, respectively.

In the United States, facilities that produce CO_2 for various end-use applications (including capture facilities such as acid gas removal plants and ammonia plants), importers of CO_2, exporters of CO_2, facilities that conduct geologic sequestration of CO_2, and facilities that inject CO_2 underground (including facilities conducting EOR), are required to report greenhouse gas data annually to EPA through its GHGRP. EPA will continue to evaluate the availability of additional GHGRP data and other opportunities for improving the emission estimates.

Industrial Processes and Product Use

IPCC Category 2.B.4: N_2O from Caprolactam Production

Caprolactam is a widely used chemical intermediate, primarily to produce nylon-6. All processes for producing caprolactam involve the catalytic oxidation of ammonia, with N_2O being produced as a byproduct. More research is required to determine this source's significance because there is currently insufficient information available on caprolactam production to estimate emissions in the United States.

IPCC Category 2.B.5.b: CO_2 and CH_4 from Calcium Carbide Production

CO_2 is formed by the oxidation of petroleum coke in the production of calcium carbide. These CO_2 emissions are implicitly accounted for in the storage factor calculation for the non-energy use of petroleum coke in the Energy chapter. CH_4 may also be emitted from the production of calcium carbide because the petroleum coke used in the process contains volatile organic compounds, which form CH_4 during thermal decomposition. EPA will continue research to determine if calcium carbide production and consumption data are available for the United States. If these data are available, calcium carbide emission estimates will be included in this source category.

IPCC Category 2.E.3: SF_6 Emissions from Photovoltaics

Along with more emissions information for semiconductor manufacturing, EPA's GHGRP requires the reporting of emissions from other types of electronics manufacturing, including micro-electro-mechanical systems, flat panel displays, and photovoltaic cells. There currently are no flat panel display and photovoltaic cell manufacturing facilities that are reporting to EPA's GHGRP, and five reporting MEMs manufacturers. The MEMs manufacturers also report emissions from semiconductor manufacturing and do not distinguish between these two types of manufacturing in their report; thus, emissions from MEMs manufacturers are included in emissions from semiconductor manufacturing. Emissions from manufacturing of flat panel displays and photovoltaic cells may be included in future Inventory reports; however, estimation methodologies would need to be developed.

IPCC Category 2.E.4: SF_6 from Heat Transfer Fluid

Fluorinated heat transfer fluids (HTFs), of which some are liquid perfluorinated compounds, are used for temperature control, device testing, cleaning substrate surfaces and other parts, and soldering in certain types of

[118] Paragraph 37(b) of Decision 24/CP.19 "Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention." See < http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=2>.

semiconductor manufacturing production processes. Evaporation of these fluids is a source of fluorinated emissions (EPA 2006). Further research is needed to develop new emission factors for F-GHGs from HTFs.

Agriculture

IPCC Category 3.A.4: CH_4 from Camels and Llamas Enteric Fermentation

Enteric fermentation emissions from camels and llamas are not estimated because there is no significant population of camels and llamas in the United States. Additional analyses will be conducted to quantitatively justify emissions reporting as "not estimated" and considered insignificant.[119]

IPCC Category 3.A.4: CH_4 and N_2O from Camels and Llamas Manure Management

Manure management emissions from camels and llamas are not estimated because there is no significant population of camels and llamas in the United States. Additional analyses will be conducted to quantitatively justify emissions reporting as "not estimated" and considered insignificant.[120]

IPCC Category 3.F.1.2: CH_4 and N_2O from Field Burning of Agricultural Residues—Barley, Oats, Rye, Potatoes

There was is no significant burning of barley, oats, rye, and potatoes in the United States, and therefore emissions from field burning of agricultural residues from these crops are not currently estimated. Additional analyses will be conducted to quantitatively justify emissions reporting as "not estimated" and considered insignificant.

IPCC Category 3.F.1.2 N_2O from Prescribed Burning of Savannas—Grassland

This Inventory does not currently include the non-CO_2 greenhouse gas emissions that occur with biomass burning. Grassland burning is not as common in the United States as in other regions of the world, but fires do occur through both natural ignition sources and prescribed burning.

[119] Paragraph 37(b) of Decision 24/CP.19 "Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention." See < http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=2>.
[120] Paragraph 37(b) of Decision 24/CP.19 "Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention." See < http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=2>.