Revisions to the Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions in the Oil and Gas Industry

Extended Abstract # 47

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INTRODUCTION

For over a decade the petroleum industry has recognized the need for GHG accounting and reporting guidance that is focused specifically on its operations. The American Petroleum Institute (API) first published the Compendium of Greenhouse Gas Emissions Estimation Methodologies for the Oil and Gas Industry[1] in April 2001, with a third edition released in August 2009 (referred to as the Compendium). The original edition of the Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions, (referred to as the *Guidelines*) was issued in December 2003[2] to fulfil the need for industry guidance focused specifically on the accounting and reporting of GHG emissions at the facility through to the corporate level. Since the original version of the *Guidelines* was published, GHG emission reporting has become much more widespread. Mandatory reporting of GHG emissions has increased and for companies that are not required to report emissions, or are required to report only for some of their operations, voluntary corporate reporting has also increased.

The second edition of the *Guidelines*[3] was developed to reflect changing practices, and to continue to promote credible, consistent, and reliable GHG accounting and reporting practices. The development of these *Guidelines* proceeded in recognition of the large number of existing GHG accounting and reporting approaches. The World Resources Institute (WRI)/ World Business Council on Sustainable Development (WBCSD) GHG Protocol[4], and the International Standards Organisation ISO 14064-1[5] standard were carefully considered for the revised *Guidelines*.

The *Guidelines* have been developed as a complement to the API Compendium of Emissions Methodologies and the IPIECA Sustainability Guidance. While the Compendium focuses on GHG emissions estimation methodologies for industry sources (how to calculate emissions), the *Guidelines* primarily address GHG accounting and reporting for the GHG indicators identified in the Sustainability Guidance. Together, these three publications provide a comprehensive set of guidance for the estimation, accounting and reporting of petroleum industry GHG emissions.

BODY

In 2009, after 6 years, it was decided that the *Guidelines* needed updating. This was to: reflect scientific and technical developments; reflect the actual experiences of those Companies which implemented the original *Guidelines*; maintain consistency with other oil industry documents and other nationally or international recognized GHG standards or guidance. Material in the *Guidelines* is grouped around the following areas:

- Accounting and reporting principles
- Setting boundaries for GHG reporting
- Tracking emissions over time
- Identification of industry GHG emissions
- Evaluation of industry GHG Emissions
- Reporting
- Inventory assurance processes

The 2011 revision made improvements and changes (some significant) to topics, including:

- Improved alignment with IPIECA's Sustainability Reporting Guidance[6]
- Substantially rewritten section on boundaries, including:
    - a clearer presentation of the topic, and closer alignment with GHG Protocol 'Scopes'

    - a new discussion of financial control as a consolidation approach
    - addition of the concept of a ‘reporting unit’
    - improved consistency and clarity of the use of terms such as ‘asset’ and ‘facility’
    - additional guidance on how to treat leased assets and mobile sources
- Expanded the discussion on tracking emissions over time to include rolling base years.
- Included new discussions of de minimis and uncertainty in evaluating emissions
- Clarification on the aggregation and normalization of emissions

There follows a summary of some of the key concepts which have been added / changed.

Setting boundaries for GHG reporting

Two types of boundaries are widely recognized in the context of GHG emissions inventories: organizational boundaries and operational boundaries. Organizational boundaries refer to those assets which fall within the inventory boundary of a company and the way in which the emissions from those assets are accounted for. Operational boundaries refer to the scope of the emissions that are included in the boundary, in particular emissions that are not from a company’s assets, but which may occur as a result of the operation of its assets (‘indirect’ emissions).

Organizational boundaries

When a company wholly owns and operates an asset, the organizational boundaries (and consolidation) for reporting that asset are clear (the company should report 100% of the emissions from the asset). When a company owns only part of an asset, owns an asset that is operated by others or operates an asset that it does not own, determining what emissions from that asset fall within its reporting boundaries becomes more complex. These more complex business arrangements often apply in petroleum companies due to the nature of the industry (activities are commonly conducted by two or more parties working together in joint ventures, instead of by individual firms). Rules for accounting for GHG emissions from ventures involving more than one party are still evolving.

Accounting for GHG emissions from joint ventures may be performed in one of three ways. Reporting may be based on a company’s equity share of ownership, with the emissions from that asset reported as a corresponding fraction). Or it may be based on whether the company controls the joint venture, in which case it reports all of the joint venture’s emissions. Control may be defined in either of two ways:—operational control or financial control. Within the petroleum industry, companies that voluntarily report GHG emissions on the basis of control typically do so using operational rather than financial control.

Similarly to the equity share approach, the financial control approach results in closer alignment between GHG accounting and financial accounting. However, it should be noted that the financial control boundary does not include some arrangements that can be common in the petroleum industry and which are equity accounted or proportionally consolidated under international financial reporting standards.

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Reporting units

Key to applying organizational boundaries is the concept of the reporting unit. The identification and listing of all of the reporting units that are part of the reporting company for the purpose of GHG emissions reporting should be the starting point for setting organizational boundaries.

Reporting units should be selected to represent the smallest practical building blocks reflecting the internal management of the company and to allow data to be reported at local, country, region or global levels, as appropriate. A reporting unit can be all or part of a subsidiary company, joint

venture, investment, facility, plant, office or business location depending on what works best for the company given the way in which it is organized and managed.

In the oil and gas industry, ensuring that the company's organizational boundary is correctly described in terms of reporting units can be complex. In order to facilitate consolidation of data by organizational boundary, typically each reporting unit should:

- represent a discrete piece of business that is unlikely to be split
- manage assets operated by a single company
- manages assets which have the same reporting company ownership; and
- cover a narrow range of related business activities located within one country or region.

Operational boundaries

A key distinction in setting the operational boundaries is whether GHG emissions are categorized as direct or indirect emissions. The *Guidelines* divide operational boundaries into three scopes, as described in other voluntary methodologies:

- Scope 1: Direct emissions
- Scope 2: Indirect emissions from energy consumption
- Scope 3: Other indirect emissions

Given the complexity of oil and gas industry operations there is sometimes uncertainty over which physical sources should be considered as being managed by the reporting unit. One area which frequently causes dilemmas is mobile sources, such as vehicles or ships. Vehicles, aircraft or rail rolling stock not owned by the company but contractually dedicated for exclusive use by the company are generally included as operated assets for reporting (Scope 1, or direct emissions).

Scope 2 emissions are defined precisely the same as for other voluntary methodologies, as energy-related indirect emissions, namely those from purchased electricity, steam, heating (hot water), and cooling. Scope 3 emissions are all of the indirect emissions that result from a company's activities that are not Scope 2 emissions. Scope 3 usually includes the production of hydrogen (which is used in some refinery processes and can be purchased or produced by oil and gas companies) as it is generally considered to be a feedstock rather than an energy vector. However, some companies choose to categorise them differently as Scope 2 emissions.

Tracking performance over time

Companies that report GHG emissions generally wish to maintain data consistency over time. They may also wish to track performance over time, either for internal reporting purposes or for demonstrating to external stakeholders their progress in managing emissions. However, some companies emphasize total company emissions over time, rather than performance with respect to some fixed reference point. In such cases, adjustments are not made to reported emissions over time, but instead historical trends in emissions are reported.

For those companies wishing to track performance, they may use a 'fixed base year', or may also choose to use a 'rolling base year' to track their emissions. When using a rolling base year, the base year rolls forward at regular time intervals, usually one year, so that emissions are always compared against the previous year. This approach may be desirable when obtaining reliable emissions data for a fixed base year is difficult, such as when a company has frequent acquisitions.

When monitoring for performance improvement, the base year emissions should be adjusted when significant changes occur, for example, significant mergers, acquisitions and divestment, ownership of sources, or significant change in calculation methods.

Uncertainty

In the revision, the *Guidelines* were expanded to provide an introduction to the subject of uncertainty based on the GHG Protocol uncertainty guidance document[7], and serving as a companion to an IPIECA/API/CONCAWE document addressing uncertainty in GHG inventories in more detail[8].

Uncertainties associated with inventories of GHGs from known sources can be broadly categorized into scientific uncertainty and estimation uncertainty. Scientific uncertainty is a function of the understanding of the science of the actual emission and/or removal process. For example, many of the global warming potential (GWP) values that are used to combine emission estimates of different greenhouse gases involve significant scientific uncertainty. Analysing and quantifying such scientific uncertainty is extremely problematic and is likely to be beyond the scope of most company's inventory efforts.

Estimation uncertainty arises whenever GHG emissions are quantified, and can be further classified into two types: model uncertainty and parameter uncertainty. Model uncertainty refers to the uncertainty associated with the mathematical equations (i.e. models) used to characterize the relationships between various parameters and emission processes. Estimating model uncertainty is also likely to be beyond the scope of most companies' inventory efforts. Parameter uncertainty refers to the uncertainty associated with quantifying the parameters used as inputs (e.g. activity data, emission factors or other parameters) to estimation models. Parameter uncertainties can be evaluated through statistical analysis, measurement equipment precision determinations and expert judgment, and will be the primary focus for those companies which choose to investigate the uncertainty in their emission inventories.

To reduce uncertainty in the corporate inventory, it is important to focus on the largest emission sources. This statement applies to both the type of operations that result in emissions and the specific GHG being considered. Common technical uncertainties in the industry:

- Combustion: Fuel composition.
- Flaring and Venting: Quantity and composition.
- Fugitive emissions: composition, quantity.

De Minimis

Companies conducting emission inventories inevitably make decisions concerning sources and GHGs that they include in their inventories, or that they deem to be insignificant and therefore exclude. Voluntary corporate reporting guidance varies in its approach to the inclusion of de minimis emission sources. The GHG Protocol and Climate Registry do not recognize the practice of excluding emission sources that fall below a particular size threshold. ISO guidance on GHG reporting (ISO 14064-1) allows excluding GHG sources or sinks whose contribution to GHG emissions or removals is not material or where quantification is costly or not technically feasible.

In the *Guidelines* a specific de minimis level of emissions that can be left out of a GHG inventory is not recommended because a level that is insignificant for one facility, such as an oil refinery, may be highly significant for another, such as a terminal.

Aggregation

Relevant environmental performance data in the petroleum industry is dependent on the type of operational activities within various sub-sectors of the industry. Tracking data, including emissions, should be done by the following industry subsectors:

- exploration and production;
- refining;
- transportation and terminals;
- pipeline;

- marketing (retail);
- marine; and
- petrochemicals.

However, some companies may need to expand on the categories listed above. The aggregation of emissions by industry subsector is done to better enable comparisons to be made among participating companies and to facilitate the normalization of emissions.

Normalization

Care should be taken in interpreting and reporting normalized emissions. Output measures represent gross indicators of production and do not take into account the varying nature of specific operations. Emissions from oil production, for example, will vary greatly depending on the need for enhanced oil recovery techniques such as steam injection and whether the associated gas produced with the oil is flared or captured for sales.

If emissions are normalized, it is essential that the organizational boundaries for the emissions and the output measure are the same. Thus, if emissions are calculated based on equity share, the basis for the normalization of these emissions must be measured using the same equity share boundary.

Materiality

Information is considered to be material if, by its inclusion or exclusion, it can be seen to influence any decisions or actions taken by users of it. A material discrepancy is an error (for example, from an oversight, omission or miscalculation) that results in a reported quantity or statement being significantly different from the true value or meaning.

Verifiers need to assess the risk of material discrepancy of each component of the GHG information collection and reporting process. This assessment is used to plan and direct the verification process.

SUMMARY

The new edition of the *Guidelines* holds significantly revised chapters on setting boundaries (including discussion of financial control and clearer reference to Scope 1, 2, and 3 emissions) and the evaluation of industry GHG emissions, including uncertainty. There are also revisions to discussions around reporting emissions over time, de minimis, and normalization. The WRI/WBCSD GHG Protocol and ISO 14064-1 were carefully considered. The revised *Guidelines* also aim to achieve consistency with the approaches described in the IPIECA Oil and Gas Industry Guidance on Voluntary Sustainability Reporting, revised in 2010.

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KEY WORDS

Petroleum industry; voluntary reporting; GHG emissions; guidelines;