

Upstream Oil & Gas Sector Greenhouse Gas Reporting Protocol Development

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ABSTRACT

The exploration, production, and gathering activities associated with the upstream Oil and Gas (O&G) sector are the subject of significant interest and concern regarding air quality, climate change and other environmental impacts. Emission totals of Greenhouse Gasses (GHG) from these O&G operations are significant, thus accurate measurement and reporting of the emission totals is crucial for understanding and evaluating the impacts and designing potential control options for mitigating the impacts from these air emissions. The Western Regional Air Partnership (WRAP), in conjunction with project sponsors including The Climate Registry, the New Mexico Environmental Department and the California Air Resources Board, has been working on development of a GHG accounting protocols for this upstream O&G sector so that O&G operators can report and verify GHG emissions. The protocols are tailored to reporting under both voluntary and mandatory reporting regimes. Links are provided to allow interested parties to review the background, details and supporting documentation of the project.

INTRODUCTION

The exploration, production, and gathering activities associated with the upstream oil and gas sector are the subject of significant interest and concern regarding air quality, climate change and other environmental impacts. Because of the unique operational requirements of this sector, protocols for GHG accounting that might apply to other activities do not always fit well with oil and gas activities. Under the auspices of the [Western Governors' Association](#) through the [Western Regional Air Partnership](#), upstream oil and gas exploration and production and natural gas gathering and processing GHG accounting protocols are under development. Those protocols, through early 2010, are summarized.

BODY

GHG accounting protocols are framework documents that are intended to promote a consistent, comparable, transparent, and accurate inventory methodology for GHG emissions. They describe how to do reporting, both voluntary and mandatory, as well as how verification should occur. They contain essential definitions, as well as scope and boundary requirement for GHG accounting. They also document calculation methodologies and emission factors employed, as appropriate. Several emissions source types for this sector have been addressed in the development of the accounting protocols by the

WRAP on behalf of sponsoring organizations ([The Climate Registry](#)) and governments ([New Mexico Environment Department](#) and [California Air Resources Board](#)).

The WRAP GHG accounting protocol development effort includes all of North America, and involves all oil and gas activities upstream of oil refineries and gas sale pipeline transfer points. With respect to oil and gas exploration and production, activities include conventional oil and gas production, as well as unconventional production from tight sands (gas), gas from shales, methane gas, and gas from oil sands; and oil production from offshore facilities, enhanced oil recovery activities, and oil sands production. The protocols under development by WRAP cover all emission sources in oil and gas exploration and production (E&P), including gas gathering, collection and processing; and crude oil transportation including; for Oil, the emissions from pipelines, trains, trucks and marine vessels up to the delivery point at oil refineries. For Gas, the protocols cover all emissions sources through to the gas sale pipeline transfer points, the “tailgate” of natural Gas Processing Plants. The protocols are addressed to all companies involved in E&P activities, including oil and gas leaseholders and support service contractors such as drilling, completion and workover contractors.

The Climate Registry’s reporting protocol was reviewed and approved by the Registry’s board in early 2010. Technical reports and materials through December 2009 are available on the archive WRAP project website at: <http://www.wrapair.org/climatechange/GHGprotocol/docs.html>. The current step in the oil and gas GHG accounting protocol project is to support the development of a mandatory reporting protocol through continued review, comment, and the analysis by the Technical Working Group, but now under the auspices of the [Western Climate Initiative](#).

Oil & Gas Sector GHG Reporting Protocol Development Activities

The oil and gas sector is vital to the economic well-being of many states in the West, and its activities in recent years in exploring for and producing from existing and new sources of oil and natural gas are also the subject of significant interest and concern regarding air quality, climate change and other environmental impacts. Because of the unique operational requirements of this sector, protocols for GHG accounting that might apply to many industrial sectors do not always fit well with the upstream oil and gas sector. As a result, a number of organizations have come together under the auspices of the Western Governors’ Association through the WRAP to develop an oil and gas exploration and production and natural gas gathering and processing GHG accounting protocol. The development of that protocol and the importance of good protocol development to GHG accounting and regulation, are examined briefly below.

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Gas processing plants	Fugitive emissions
Compressor stations	Completion venting
Wellhead compressor engines	Well Blowdowns
CBM pump engines	Dehydration units
Miscellaneous/exempt engines	Amine units
Drilling/workover rigs	Hydrocarbon liquid loading
Salt/water disposal engines	Land farms
Artificial lift engines (pumpjacks)	Water treatment/injection
Vapor recovery units(VRUs)	Flaring
Oil/gas well heaters	Pneumatic devices
Hydrocarbon liquid storage tanks	Produced water tanks
Well completions	Crude oil transportation

The WRAP GHG accounting protocol development effort includes all of North America, and involves all oil and gas activities upstream of oil refineries and gas sale pipeline transfer points. With respect to oil and gas exploration and production, activities include conventional oil and gas production, as well as unconventional production from tight sands (gas), gas from shales, methane gas, and gas from oil sands; and oil production from offshore facilities, enhanced oil recovery activities, and oil sands production. The protocols under development by WRAP cover all emission sources in oil and gas E&P, including gas gathering, collection and processing; and crude oil transportation including; for Oil, the emissions from pipelines, trains, trucks and marine vessels up to the delivery point at oil refineries. For Gas, the protocols cover all emissions sources through to the gas sale pipeline transfer points, the “tailgate” of natural Gas Processing Plants. The protocols are addressed to all companies involved in E&P activities, including oil and gas leaseholders and support service contractors such as drilling, completion, and workover contractors.

Some of the major issues to be addressed in protocol development by the WRAP and participating organizations include the definition of a facility, the reporting of direct emissions from stationary combustion (even in the absence of fuel consumption data); and whether reporting from drilling, completion, and workover activities is to be reported by the oil and gas leaseholders who contract for such services with third parties. With respect to facility definition, such as numerous wellhead facilities which are common to onshore oil and gas production, the reporting of facilities specific GHG emissions employing direct measurement of those emissions is wholly impractical and infeasible for this industry sector. Accordingly, the WRAP project sponsors and technical working group have proposed a solution of aggregating dispersed emission sources for reporting on a production field level, while still separately reporting discrete facilities such as natural gas processing plants on a facility specific basis.

Results and Discussion

With respect to reporting of direct emissions for stationary combustion sources, the numerous small combustion devices that are common to many oil and gas activities in this sector typically lack fuel consumption metering. Accordingly, the absence of fuel consumption data requires the consideration of alternative methodologies such as those available under The Climate Registry's voluntary reporting protocol, and rely on load factors and time of use for estimating stationary combustion source emissions of GHGs. With respect to the reporting of drilling, completion, and workover activities, because these activities are generally outsourced to third party contractors there is potentially less confidence in accuracy to be obtained in the estimation of such emissions by dispersed and fragmented firms engaged in these activities. Also, if an oil and gas leasehold operator cannot obtain activity data from its contractors, the question of what default methodologies should be used must be addressed. TCR's reporting protocol was reviewed and approved by TCR's board in January 2010. Technical reports and other materials through December 2009 are available on the archive WRAP project website at: <http://www.wrapair.org/climatechange/GHGprotocol/docs.html>.

The current step in the oil and gas GHG accounting protocol project is to support the development of a mandatory reporting protocol through continued review, comment, and analysis by the Technical Working Group, but now under the auspices of the Western Climate Initiative. Key activities for the mandatory protocols include defining what emitting sources exist within the sector and the relative importance of those emission sources, as well as the range of calculation approaches available to account for their GHG emissions.

With the recent finalization of EPA's mandatory GHG reporting rule, even though it did not include oil and natural gas systems (subpart W of the rules), the need to harmonize the development of a WCI mandatory reporting protocol with future EPA requirements, as well as related data analyses and evaluation of methodologies is clear. On March 22, 2010, the signature by Administrator Jackson of a proposed rulemaking for the Mandatory Reporting of Greenhouse Gases (GHG): Carbon Dioxide Injection and Geologic Sequestration, defines the need to understand and harmonize with proposed EPA requirements. The public comment period is 60 days and more information is at: <http://www.epa.gov/climatechange/emissions/subpart/rr.html>.

CONCLUSIONS

The exploration, production, and gathering activities associated with the upstream oil and gas sector are of particular interest regarding the reporting and regulation of GHG emissions. Because of the unique operational requirements of this sector, specific protocols for GHG accounting, both voluntary and regulatory, are being developed

ACKNOWLEDGMENTS

This protocol development effort was been sponsored by the New Mexico Environment Department, the California Air Resources Board, and the Province of Alberta through The Climate Registry, and managed by a Protocol Steering Committee. Follow-up work is supported by the Western Climate Initiative. Financial support was also provided by British Petroleum, Chevron, and the American Petroleum Institute.

Review and structuring of the protocols was executed through a Technical Workgroup. TWG members

provided review, analysis, and invaluable feedback on the data used and analyses completed in this effort. The effort also received excellent staff support from Lee Gribovicz of the WRAP staff.

REFERENCES

All materials from the 2008-09 portion of the project are available at:

Steering Committee: <http://wrapair.org/ClimateChange/GHGProtocol/sc-members.html>

Technical Workgroup: <http://wrapair.org/ClimateChange/GHGProtocol/twg-members.html>

Meetings and Calls: <http://wrapair.org/ClimateChange/GHGProtocol/meetings.html> (includes interactive agendas and notes from calls and meetings)

Documents and Reports: <http://wrapair.org/ClimateChange/GHGProtocol/docs.html>

KEYWORDS

Oil & Gas, exploration, production, gathering, processing, Greenhouse Gas emission, reporting protocol