



Oil & Gas Exploration & Production and Natural Gas Gathering & Processing Greenhouse Gas Accounting Protocol - Project Plan

January 23, 2008 draft

The Western Regional Air Partnership (WRAP) proposes the following project plan for the California Climate Action Registry (CCAR), the California Air Resources Board (CARB), and the New Mexico Environment Department (NMED). The project work by staff from the WRAP, through the Western Governors' Association (WGA) for CCAR, CARB, and NMED will develop a protocol for reporting greenhouse gas (GHG) emissions from the field operations of the Oil & Gas sector, specifically, exploration and production activities, and natural gas gathering and processing activities.

The stakeholders likely to be involved in this project are heterogeneous in terms of their company structures, the number and type of subcontractor firms, and their geographic coverage. The number of existing leases, the leases issued in the past several years, and those expected to be issued over the next few years, require that a standardized protocol be developed that comprehensively accounts for GHG in the Oil & Gas exploration and production sectors. This project plan summarizes the timeline, budget, staff, and deliverables. Appendix A is a working draft of the activities and sources of GHG emissions to be considered in this project.

Timeline

The project will begin in February 2008, pending funding availability, and be completed in approximately 10 months.

Proposed schedule:

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|---------------|--|
| February 08 | - Finalize project plan, RFP for draft technical paper and meeting support |
| March | - Release RFP/issue contract for protocol writing support, form workgroup |
| May | - Release draft technical paper as basis of "what should be in the protocol" |
| June – August | - Workgroup meetings by phone, drafts of protocol |
| August | - Workgroup comment period |
| September | - Release final draft protocol |
| October | - Public comment period |
| November | - Final protocol for action by NMED, CARB, and CCAR |

Budget

A total of \$160,000 has been identified as being needed to appropriately support this project, and is the working amount for planning the project. Chevron is providing seed money of \$10,000 to WGA to initiate the project. CARB is in the process of transferring \$60,000 to WGA to support this project. Additional resources will be provided by NMED, and potentially other funding sources. The deliverables from this project are for the direct use of CCAR, CARB, and NMED. Funding provided by Chevron or other private sector organizations to WGA for this project is given with no expectation or promise of control of the process or products from the project. WGA will use private sector funds provided for this project, solely for the development of the Oil & Gas Exploration & Production and Natural Gas Gathering & Processing Greenhouse Gas Accounting Protocol described in this project plan.

At this time, specific breakdowns of costs for WRAP staff time and contractor support for writing the protocol and meeting support have not been calculated. The project will include contractor support through a contract to be issued by WGA. The amount of contract funds is to be determined based on the response to the RFP scope of work; if needed, WRAP staff time will be adjusted in response the contract effort as well.

Staff

Tom Moore, Air Quality Program Manager, WGA:	0.25 FTE
Lee Gribovicz, Air Quality Project Manager, WGA:	FTE to be determined

Outside contractor support through a WGA contract will use project resources to develop:

- Technical paper for Workgroup use on O&G Field GHG emissions
- Drafts of the protocol and support Workgroup meetings

Deliverables

WRAP staff (up to \$50k)

- Project development and coordination, status reports
- Develop, issue, award, and manage contract for technical paper and protocol drafts
- Meeting and phone call organization, arrangements, and logistics
- Delivery of project results via <http://www.wrapair.org/WRAP/ClimateChange/GHGProtocol/>

Contractor support (~\$100k)

- Technical report on “what can and should be tracked in the protocol” for Workgroup use in developing the draft reporting protocol
- Drafts of the Protocol, including Workgroup meeting participation
- Analysis and response to Workgroup comments on Protocol drafts
- Final draft protocol for public comment
- Analysis and response to public comment on final draft protocol
- Final protocol document for action by NMED and CARB

Appendix A

Protocol Development Work

GHGs are produced and emitted by various sources during the exploration, well development, production, and site abandonment phases. The American Petroleum Institute (API) categorizes the emissions sources of all oil and gas operations (including refineries) into five classifications:

- A. Combustion Devices—includes stationary (burners, flares) and mobile (trucks, ships) sources
- B. Point Sources—includes emissions from stacks, vents, ducts
- C. Non-point Sources—includes fugitive emissions of methane, wastewater treatment facilities, and other sources involved in waste handling
- D. Non-routine activities—activities associated with non-scheduled maintenance or emergency operations
- E. Indirect emissions—emissions associated with company operations but physically occurring elsewhere, such as purchased electricity.

The following is a listing of the process of oil and gas exploration and production, and the possible sources of greenhouse gas emissions associated with them:

1. Exploration Phase: GHG Emissions: Depending on method used, CO₂ emissions from truck motors used in vibroseis or the use of explosive devices.

2. Well Development Phase: see below:

A. Clearing Area for the Well Pad: GHG Emissions: CO₂ combustion emissions from fuel used in trucks. Additionally, one-time and potentially long-term effects could include lost carbon sinks due to surface and vegetation disturbance.

B. Constructing Roads: Generally, there are two types of roads:

- 1. Access Roads –shorter roads that lead the resource road to the individual well pad
- 2. Resource Roads--longer, wider, more arterial roads that feed into the access roads

GHG Emissions: Combustion emissions, CO₂, from fuel used in trucks. Additionally, one-time effects could include lost carbon sinks due to surface and vegetation disturbance.

C. Rigging Up and Drilling: GHG Emissions: CO₂ combustion emissions from fuel used by rigs. Many rigs are powered with electricity. Therefore, indirect CO₂ emissions could occur from the fuel input used in the electrical generating unit.

D. Drilling Fluids: GHG Emissions: Possible CO₂ and CH₄ from flaring or venting of the vapors associated with the drilling fluids

E. Casing: GHG Emissions: Although likely to be insignificant, possible CH₄ fugitive emissions leaks.

F. Well Completion and Testing (drilling is complete): CO₂ and CH₄ may be emitted during the process, depending on which method is used. Fugitive emissions of methane from initial rock fracturing, from flaring, and from compressor stations may occur during this stage.

1. **Fracturing:** *GHG Emissions:* Fugitive CH₄ emissions, CO₂ from fuel used in injection machinery. Diesel trucks are often used.
2. **Flaring:** *GHG Emissions:* CO₂ and CH₄ However, in California, flaring is allowed only in specific circumstances and it is on a case by case basis. The company must apply for a permit to flare, which is issued by the county or local air board.
3. **Venting:** *GHG Emissions:* Because venting in California is not allowed, CO₂ or CH₄ from fugitive emissions could occur. All tanks are covered tanks, and often, a unit will have a vapor recovery system attached. Also important to note is that compliance with venting procedures could be a critical factor in the estimation of GHG emissions.
4. **Compressor Engines:** *GHG Emissions:* CO₂ associated with combustion of fuel input (diesel or natural gas) into the compressor engine.
5. **Tubing Installation:** *GHG Emissions:* Fugitive CH₄ emissions and CO₂ emissions from fuel combustion associated with installation of equipment.

3. Primary and Secondary Production Phases:

A. Compressor Equipment: *GHG Emissions:* CO₂ and CH₄ associated with combustion of fuel input (diesel, natural gas) by the compressor equipment.

B. Secondary and Tertiary Recovery: *GHG Emissions:* Fugitive CH₄ if gas is reinjected; CO₂ from combustion emissions of injection equipment. Fugitive emissions of CO₂ if used as an injectable fluid.

C. Wellsite Visits: *GHG Emissions:* CO₂ from fuel combustion during truck visits

D. Wellsite facilities: Two pieces of important equipment at the well site are the separator and the dehydrator. With these two pieces of equipment, there are sometimes smaller flares to prevent pressure buildup. There are also sometimes disposal wells or evaporation ponds installed next to the well pad.

1. **Separators** – see below.

Crude Oil Separation (oil recovery only): *GHG Emissions:* Fugitive CH₄ emissions and CO₂ emissions associated with separation equipment.

Natural Gas Conditioning (natural gas recovery only): *GHG Emissions:* CO₂ emissions that may be vented after separated from the gas stream

2. **Dehydrator:** *GHG Emissions:* CO₂ or CH₄
Wastewater Disposal: *GHG Emissions:* CO₂, CH₄, and VOCs
3. **Other Facilities:** *GHG Emissions:* CO₂, CH₄, others.

E. Leaks: *GHG Emissions:* CH₄, CO₂, and other VOCs

F. Accidental Acute Release: *GHG Emissions:* CH₄, CO₂ that is a natural part of the gas

4. **Site Abandonment** *GHG Emissions:* CO₂ and CH₄ from venting

Emissions Factors for the Oil and Gas Sector

To be added

Information Sources:

A. Zahniser, California Climate Action Registry: Characterization of Greenhouse Gas Emissions Involved in Oil and Gas Exploration and Production Operations, Review for the California Air Resources Board, October 2007.

American Petroleum Institute: Toward a Consistent Methodology for Estimating Greenhouse Gas Emissions from Oil and Natural Gas Industry Operations

http://www.climatevision.gov/sectors/oil_gas/pdfs/ghg_synopsis.pdf

U.S. Environmental Protection Agency, Office of Compliance Sector Notebook: Project Profile of the Oil and Gas Extraction Industry, October 2000.

<http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/oilgaspt1.pdf>

2007 Draft U.S. Greenhouse Gas Inventory Report Draft Inventory Of U.S. Greenhouse Gas Emissions And Sinks: 1990-2005, February 2007. <http://epa.gov/climatechange/emissions/usinventoryreport07.html>

Canadian Association of Petroleum Producer, Technical Report on A National Inventory of Greenhouse Gas, Criteria Air Contaminant, and Hydrogen Sulphide Emissions by the Upstream Oil and Gas Industry, Volume 4. <http://www.capp.ca/raw.asp?x=1&dt=NTV&e=PDF&dn=86224>