



Oil & Gas Air Emissions Projects: Criteria Pollutants & Greenhouse Gases

IOGCC Public Lands Session

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Santa Fe, New Mexico

Tom Moore

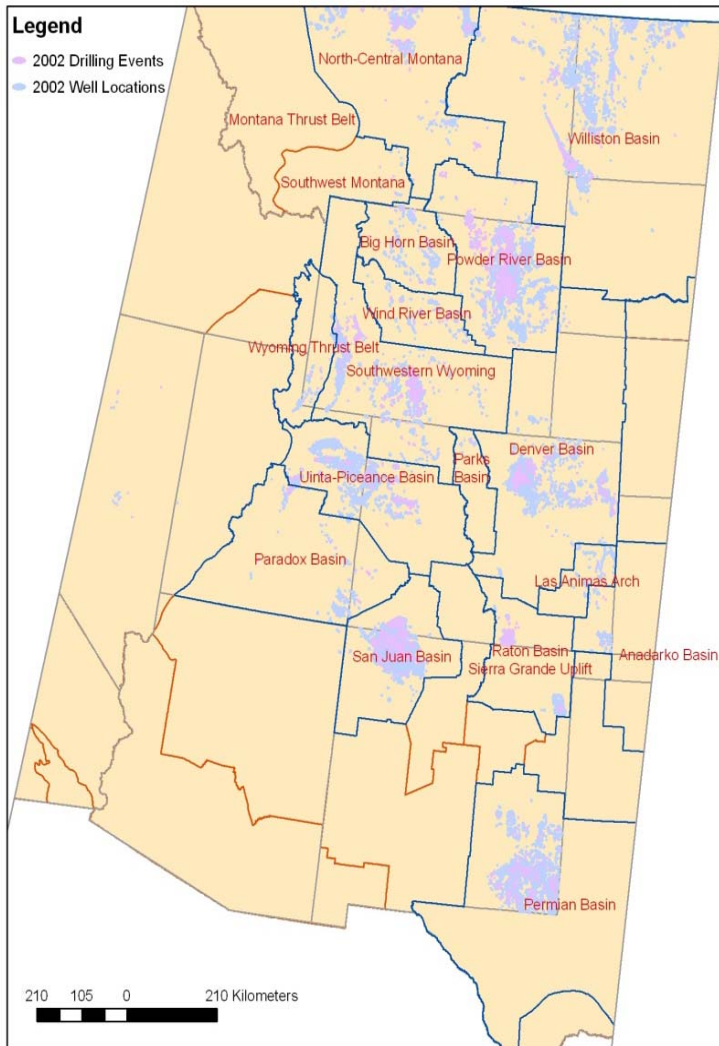
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Joint Rocky Mountain Phase III Oil & Gas Emissions Inventory Project

Oil and Gas Production in the Rocky Mountains



- **Boom in oil and gas production in this region over the last ten years driven by record prices for crude oil and natural gas**
 - Western states gas production in 1996: **3.9 trillion cubic feet**
 - Western states gas production in 2006: **5.9 trillion cubic feet**
- **Activity supported by large fleet of specialized equipment at thousands of individual well sites**
- **Historically only a partial inventory of this equipment was available through state permitting databases**
- **One Reason: Wide state-to-state variation in permitting thresholds and source categories permitted**

State point source permit thresholds (PTE = Potential to Emit)

State	Point Source Inventory Threshold
Alaska	PTE 100 TPY
Arizona	PTE 40 TPY
Colorado	2 TPY actual emissions
Montana	PTE 25 TPY
New Mexico	PTE 25 TPY
North Dakota	PTE 100 TPY
Nevada	PTE 5 TPY
Oregon	PTE 100 TPY
South Dakota	PTE 100 TPY
Utah	PTE 100 TPY
Wyoming	PTE 25 TPY

WRAP O&G Emissions Inventory: Phase I - 2005

- **The first regional inventory for the western U.S. to address oil and gas area sources not previously inventoried**
- **Intent was to create a regionally consistent inventory methodology for oil and gas area source emissions estimates for all of the western states**
- **Output data were model-ready emissions of all criteria pollutants for use in WRAP regional haze modeling for the western U.S.**

History of Oil and Gas EIs – WRAP Phase II - 2007



- Focused on improving the methodology from the Phase I work for two specific major NO_x source categories: compressors and drill rigs
- Utilized direct industry survey to obtain detailed information from the oil and gas companies on this equipment by basin
- Updated baseline year from 2002 to 2005

- Reviewed and updated SO₂ emissions from large gas plants

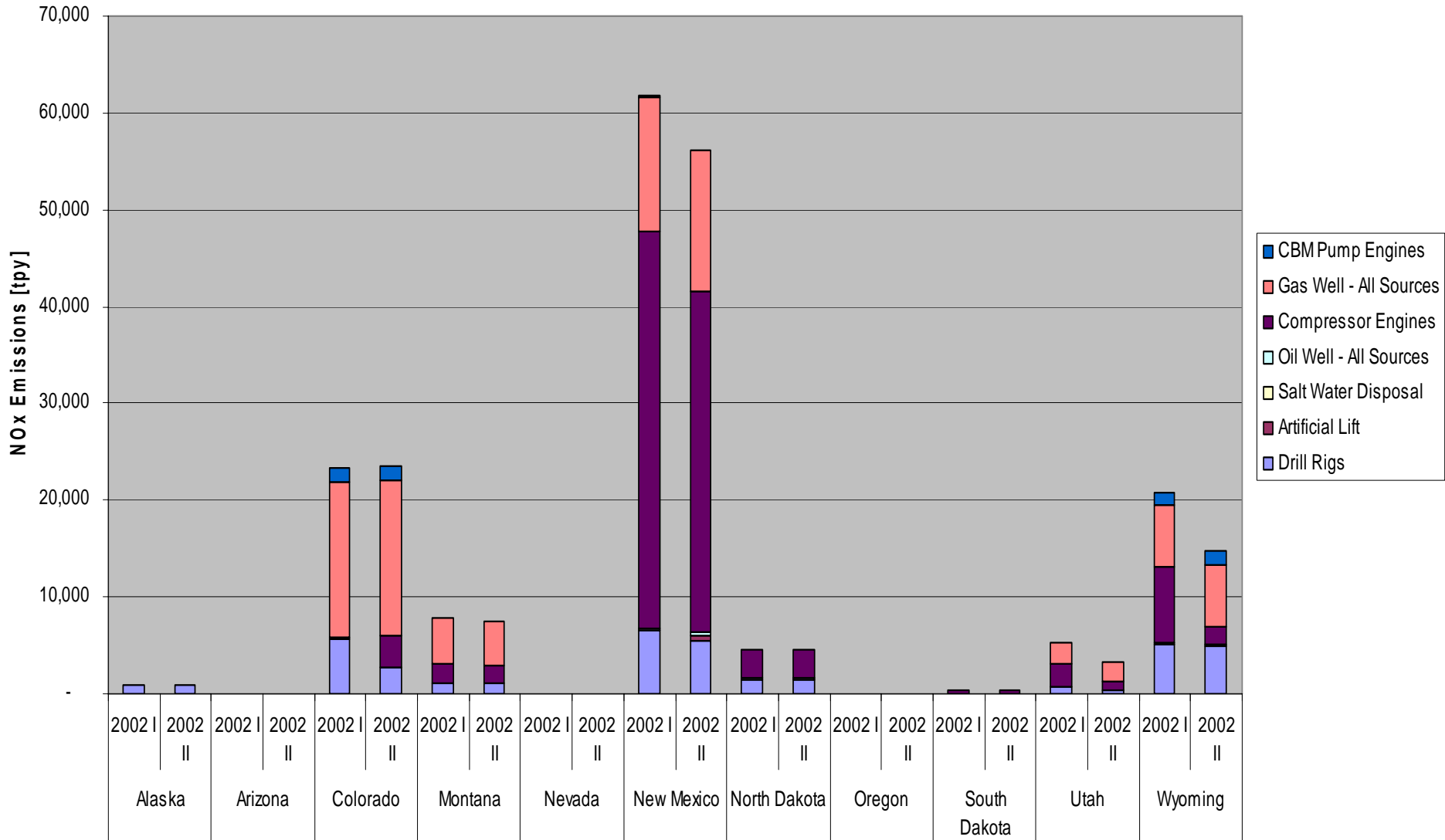


WRAP O&G Emissions Inventory: Phases I & II

- **Phase I completed December 2005**
- **Phase II completed September 2007**
- **Documentation available at:**
<http://www.wrapair.org/forums/ogwg/Phases I and II Inventories.html>
- **Technical reports for both Phases detailing the workplan and methodologies used, with appendices showing quantitative results**

WRAP O&G Emissions Inventory: Phases I & II

NO_x “Area Source” Emissions (Phase II total: 118,887 tons/year)



WRAP O&G Emissions Inventory: Phase II - 2002 NO_x Inventory

States	All <u>Area</u> Sources	All <u>Point</u> Sources	Total	Percent of WRAP
Alaska (#3)	886	45,431	46,317	16.1
Arizona	17	642	659	0.2
California	8,070	10,809	18,879	6.6
Colorado (#2)	23,518	25,219	48,737	16.9
Idaho		2,590	2,590	0.9
Montana	7,557	3,996	11,553	4.0
Nevada	62	83	145	0.1
New Mexico (#1)	55,640	56,900	112,540	39.1
North Dakota	4,631	4,638	9,269	3.3
Oregon	85	1,182	1,267	0.4
South Dakota	361	323	684	0.2
Utah	3,335	3,049	6,384	2.2
Washington		480	480	0.2
Wyoming (#4)	14,725	13,423	28,148	9.8
WRAP Total	118,887	168,765	287,652	100.0

Why a Phase III?

- **Phases I and II focused primarily on NO_x and SO₂**
 - ✓ *Phase III includes all criteria pollutants including VOCs, to be useful for all kinds of air quality analyses*
- **Provides opportunity for greater industry participation**
 - ✓ *Phase III uses producer reports of detailed local equipment and activity data to improve baseline emissions inventories for all basins for all source categories*

Why a Phase III?, continued

- **Updates baseline year to 2006 to reflect continued increase in O&G production, and makes use of best available O&G production statistics (IHS database)**
- **Improves estimates/assumptions from Phases I & II**
 - *Based on comments received on those inventories – accounts for well declines, technology advances, new regulations*
- **Analyzes both unpermitted O&G sources and state permit data to generate complete oil and gas inventory for all major source categories**

IPAMS-WRAP Phase III

- **Project initiated & funded by the Independent Petroleum Association of the Mountain States**
- **IPAMS solicited WRAP Stakeholder participation:**
 - **Foster a sense of reviewer confidence in the integrity and acceptability of results**
 - **WRAP O&G Workgroup (State & Tribal Agencies, EPA, Federal Land Managers, O&G Industry, & Environmental Groups)**
 - **Broad representation**
 - **Feedback on the Scope and Methodology**
- **Limitations of Phase III**
 - **No emissions from on- and non-road mobile sources associated with O&G field operations**
 - **No Hazardous Air Pollutant or Greenhouse Gas emissions associated with O&G field operations**

Phase III Emissions Inventory

- **All basins will have complete source inventories of exploration and production activities for:**
 - **2006 base year**
 - **2010 or 2012 mid-term projection year; and**
 - **2018 far future year projection.**

- **Pollutants:**
 - **NO_x, SO₂, PM, VOC, CO**

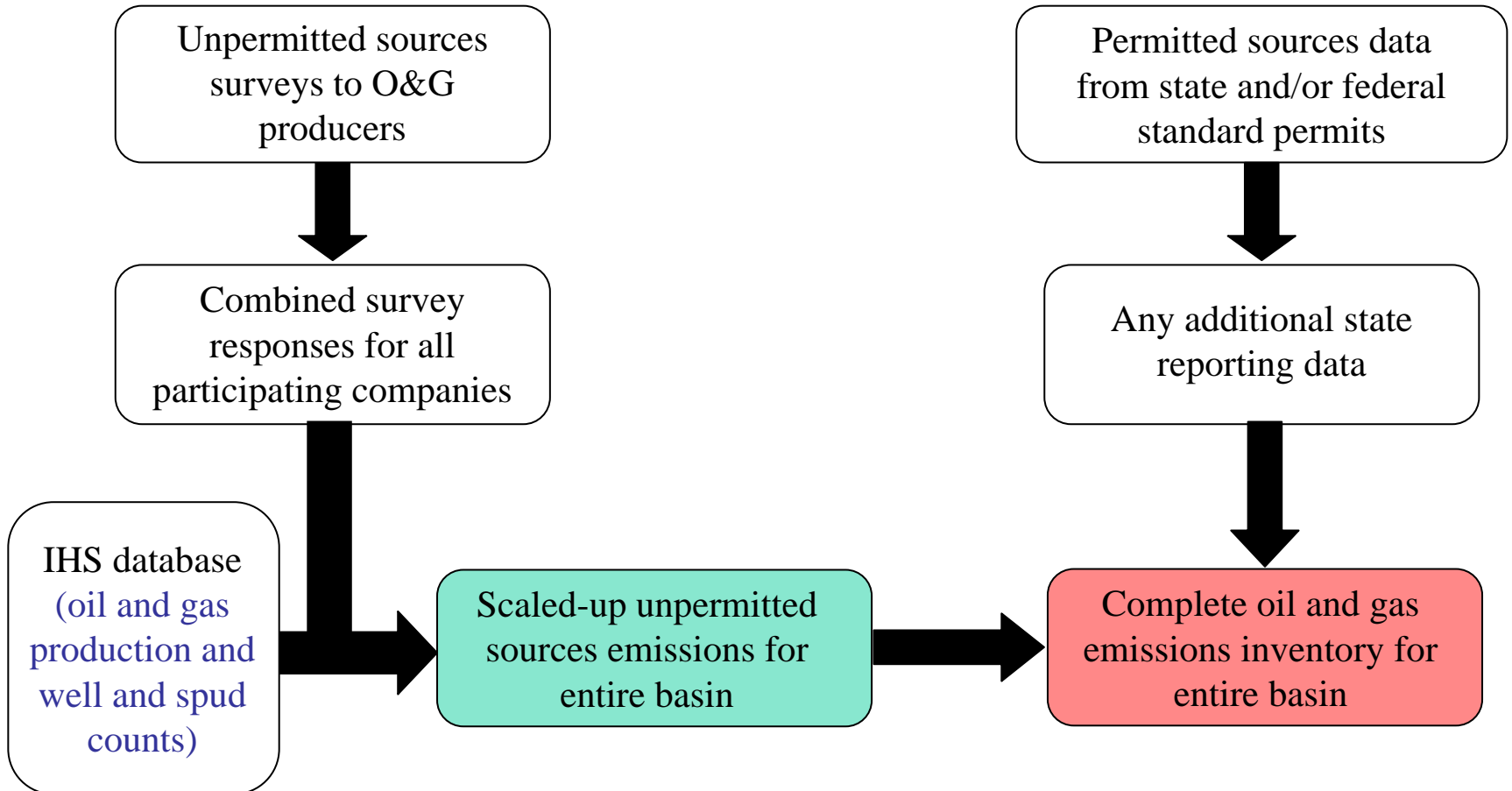
Phase III Basins



Phase III Emissions Inventory Sources

- **Natural Gas Processing Plants**
- **Compressor Stations**
- **Wellhead Compressor Engines**
- **CBM Pump Engines**
- **Miscellaneous/Exempt Engines**
- **Drilling/Workover Rigs**
- **Salt-water Disposal Engines**
- **Artificial Lift Engines
(Pumpjacks)**
- **Vapor Recovery Units (VRUs)**
- **Oil/Gas Well Heaters**
- **Hydrocarbon Liquid Storage
Tanks**
- **Well Completions**
- **Fugitive Emissions**
- **Completion Venting**
- **Well Blowdowns**
- **Dehydration Units**
- **Amine Units**
- **Hydrocarbon Liquid
Loading**
- **Landfarms**
- **Water Treatment/Injection**
- **Flaring**
- **Pneumatic Devices**
- **Produced Water Tanks**

Phase III Methodology Diagram for Inventory Development



Phase III Study Schedule

<p>November 2007 – June 2008</p>	<ul style="list-style-type: none"> • Completed D-J Basin baseline 2006 emissions and mid-term 2012 projections in April '08 • Begin Uinta Basin baseline 2006 and mid-term 2012 projections • Begin Piceance Basin baseline 2006 emissions
<p>July</p>	<ul style="list-style-type: none"> • Complete <u>draft</u> Uinta Basin baseline 2006 projections • Complete <u>draft</u> Piceance Basin baseline 2006 emissions • Begin Piceance Basin mid-term 2012 projections • Begin North San Juan baseline 2006 emissions and mid-term 2012 projections • Begin South San Juan Basin baseline 2006 and mid-term emissions
<p>August – September</p>	<ul style="list-style-type: none"> • Complete <u>draft</u> Uinta Basin mid-term 2012 projections • Complete <u>draft</u> Piceance Basin mid-term 2012 projections • South San Juan Basin Surveys to Producers
<p>October</p>	<ul style="list-style-type: none"> • Complete North San Juan Basin baseline 2006 emissions • Wyoming Surveys to Producers

Phase III Study Schedule, continued

<p>November 2008</p>	<ul style="list-style-type: none"> • Complete North San Juan Basin mid-term 2012 projections • Complete South San Juan Basin baseline 2006 & mid-term 2012 emissions
<p>December</p>	<ul style="list-style-type: none"> • Complete all Wyoming basins baseline 2006 emissions • Begin Wyoming basins mid-term 2012 projections
<p>January 2009</p>	<ul style="list-style-type: none"> • <u>Anticipated Release</u> Uinta & Piceance Basin Emissions • Complete Wyoming basins mid-term 2012 projections • Williston, Great Plains & Paradox Basins Surveys to Producers
<p>March</p>	<ul style="list-style-type: none"> • Complete Williston, Great Plains & Paradox Basins 2006 Baseline
<p>April</p>	<ul style="list-style-type: none"> • Complete Williston, Great Plains & Paradox Basins mid-term 2012 projections
<p>May</p>	<ul style="list-style-type: none"> • Begin Far Future Year 2018 Projections for all Basins
<p>June 2009</p>	<ul style="list-style-type: none"> • Final Project Report

Phase III Study Review Process

- **WRAP O&G Workgroup will study base and future years' emission inventory results for each basin and review final technical memo**
- **Workgroup participants represent: States & Tribal Agencies, EPA, Federal Land Managers, Industry, Environmental Interest Groups**
- **WRAP staff will summarize comments from each basin workgroup session**
- **Phase III work products at:**
http://www.wrapair.org/forums/ogwg/PhaseIII_Inventory.html

IPAMS-WRAP Phase III Oil & Gas Emission Inventory Project

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Oil & Gas Exploration & Production and Natural Gas Gathering & Processing Greenhouse Gas Accounting Protocol Development



The Climate Registry

What is a Protocol?

Framework document that informs consistent, comparable, transparent, accurate GHG inventory methodology

- Describes how to do voluntary reporting with verification method
- Definitions
- Scope & boundary requirements
- Calculations (emission factors, methodologies)

Adoption by TCR provides consistent and transparent accounting method for all users – industry, governments, non-governmental organizations

Why Oil and Gas?

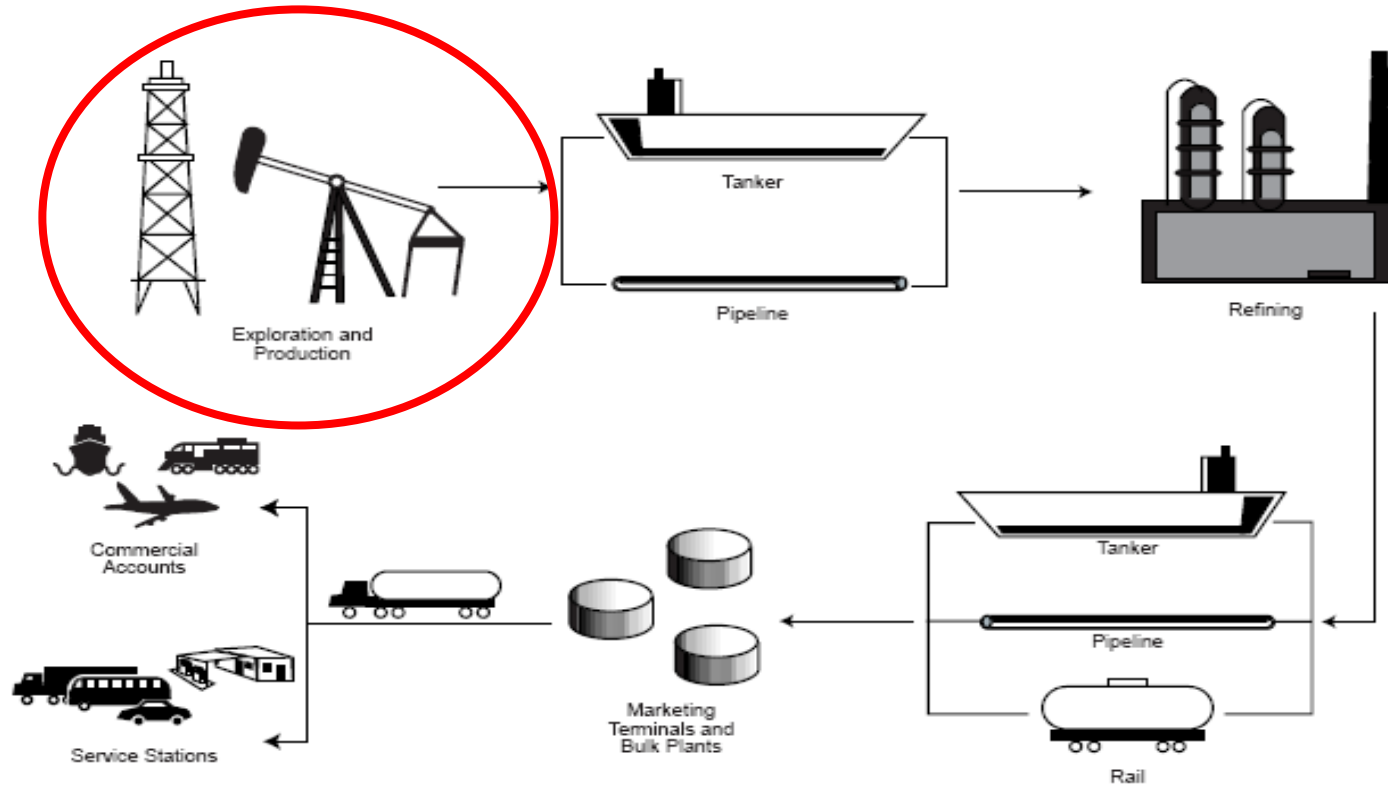


Figure 1—Major Emission Sources for an Integrated Oil Company

Figure 1—Oil and Gas Industry Schematic of GHG Emissions

Source: American Petroleum Institute: *Toward a Consistent Methodology for Estimating Greenhouse Gas Emissions from Oil and Natural Gas Industry Operations*. Page 4.

Project Direction & Advisory Groups

- Project Steering Committee:
 - New Mexico Environment Department
 - California Air Resources Board
 - The Climate Registry
- Technical WorkGroup (~20 members)
 - O&G companies & associations
 - State environmental agencies & O&G commissioners
 - EPA & local agency experts
 - Environmental Groups & NGOs
- Protocol Advisory Group
 - TWG & all interested groups/individuals

Scope of the Technical Review of emissions quantification methods for high-priority sources & the Protocol

- North America
- All O&G source activities upstream of:
 - Oil refineries (covered by CCAR protocol)
 - Gas sale pipeline transfer points (also CCAR protocol)
- Minimum effort: Conventional O&G E&P
 - “Conventional” fields – including methods to increase & sustain O&G production, also new gas production
 - Coalbed Methane fields
 - Offshore
- Expanded effort: “Unconventional” O&G E&P
 - Oil sands
 - Oil shale

Work Products #1

- Technical background and scoping paper
 - Overview of GHG sources
 - Assesses estimation methods available for O&G field operations
 - Includes E&P activities, gas processing plants, and the operation of collection systems delivering oil and gas products to processing and refining facilities
- Proposed work product outlines (regulatory & protocol)
 - Prioritize sources in terms of their known or projected contributions to GHG emissions, both:
 - Within the partner jurisdictions of the Western Climate Initiative
 - Within North America
 - Address emissions from all 6 Kyoto gases within this sector
 - Underpins preparation of voluntary GHG protocol

Work Products #2

- Technical review document of emissions quantification methods for high-priority sources identified in the background and scoping paper
 - Designed to inform and guide development of mandatory reporting requirements by partner jurisdictions in the Western Climate Initiative
- Reporting & verification protocol, to align with TCR's existing General Reporting Protocol & General Verification Protocol
 - Protocol drafts and final approval by The Climate Registry

Technical Paper & Protocol Development Schedule

- September 08 Finalize project plan, Issue Technical Support Contractor RFP
- October Review bids, Contractor interviews
- November Issue contract, begin regular Technical Workgroup calls & meetings
- Dec.– Feb. 09 Draft technical paper, followed by other work products, TWG meeting 1/09
- March Begin protocol drafting with TWG and Protocol Advisory Group
- May Review of draft final protocol
- June Public comment period for TCR
- July Protocol action & approval by TCR!

Budget

- ~\$300K to complete – funding primarily from NMED and CARB
- BP & Chevron have seeded with \$10k
- \$100K project management & facilitation
- up to \$200K technical support contract
- In-kind stakeholder expertise



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

For More Information:

Project webpage:

<http://www.wrapair.org/ClimateChange/GHGProtocol/index.html>

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