



APPLYING SUBPART W REPORTING INFORMATION IN THE GREATER SAN JUAN BASIN O&G EMISSION INVENTORY

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Stakeholder Workshop on EPA GHG Data on Petroleum and Natural Gas Systems



OVERVIEW

- Well location and production data
- Midstream permit and registration data
- Structure and completion of surveys, Subpart W reporting information

ACKNOWLEDGMENTS

- Mary Uhl - New Mexico State Office, Bureau of Land Management, Dept. of the Interior
- John Grant, Amnon Bar-Ilan, and Ralph Morris – Ramboll-Environ
- Lee Gribovicz - Airstar Consulting
- States of Colorado and New Mexico
- Tribes - Navajo, Southern Ute, and Ute Mtn. Ute
- EPA Regions 6 and 8
- Oil & Gas operators

GREATER SAN JUAN BASIN - EMISSION INVENTORY

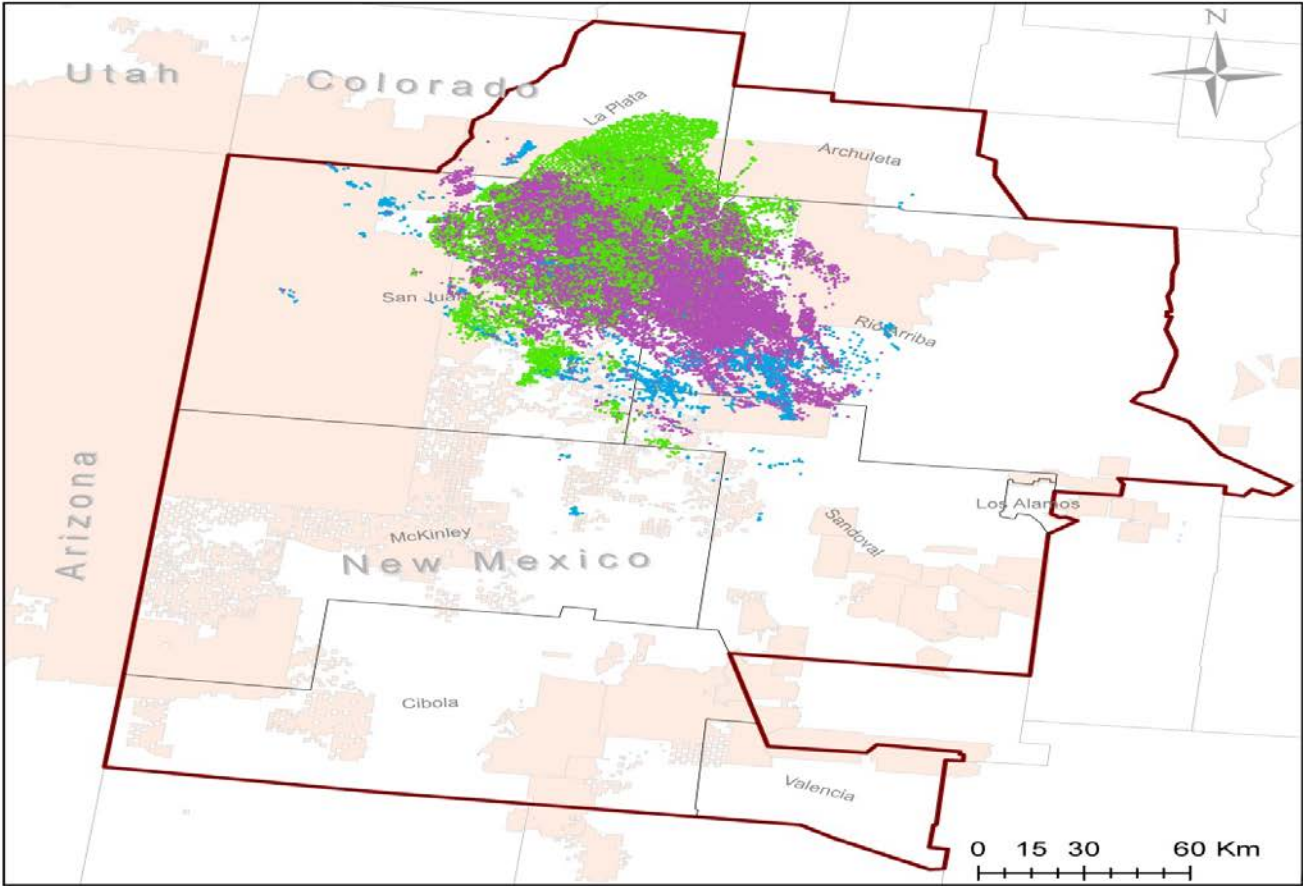
- Provide regulatory, planning-grade criteria pollutant inventories of oil & gas (exploration and production) emissions, including methane
 - Well-documented and comprehensive
 - Develop current data by building a 2014 “base year” with projections to future years
 - Multiple data sources studied through an integrated analysis
 - 1) well-drilling and production information from a high-quality commercial dataset;
 - 2) permitted emissions from state, tribal, and federal databases; and
 - 3) operator and producer activity surveys

GREATER SAN JUAN BASIN 2014 O&G ACTIVITY DATA

Activity Metric		Basin-wide Totals	Percent by State	
			Colorado	New Mexico
Active Well Count	Gas Wells	16,047	5%	95%
	Oil Wells	1,725	5%	95%
	CBM Wells	7,098	32%	68%
	Total	24,870	13%	87%
Liquid Hydrocarbon Production (Mbbbl/yr)	Primary Oil	4,413	1%	99%
	Condensate	1,653	<1%	>99%
	Total	6,066	1%	99%
Gas Production (BCF/yr)	Natural Gas	427	6%	94%
	Associated Gas	24	<1%	>99%
	Coalbed Methane	610	53%	47%
	Total	1,060	33%	67%

Greater San Juan Basin

Wells by Well Type



Legend

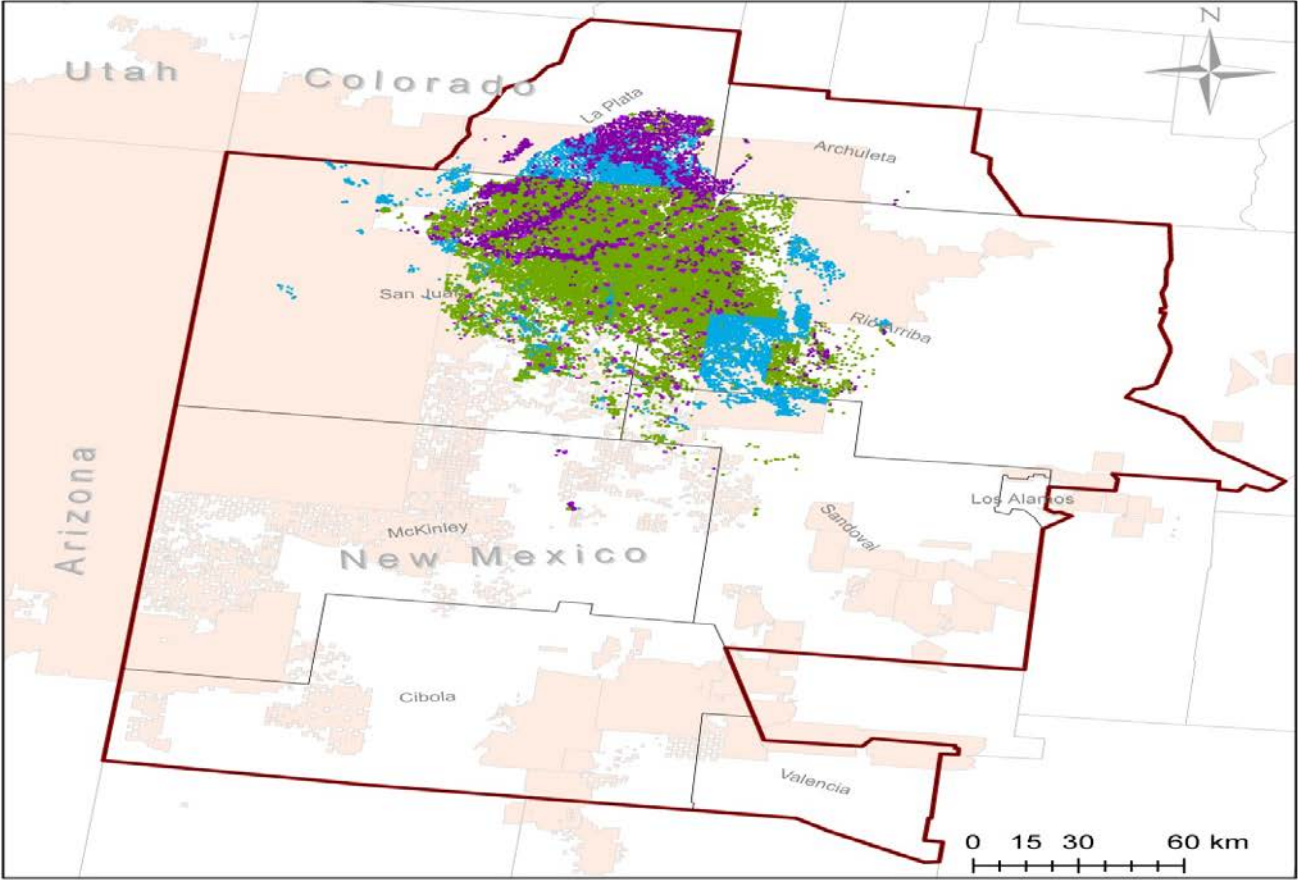
- Greater San Juan Basin (consistent with GHGRP Subpart W definition)
- Tribal Lands

Well Type

- Oil
- CBM
- Gas

Greater San Juan Basin

Wells by Mineral Ownership



Legend

- Greater San Juan Basin (consistent with GHGRP Subpart W definition)
- Tribal Lands

Mineral Ownership (2014 Wells)

- Private/State
- Tribal
- Federal

MIDSTREAM PERMITTED EMISSION SUMMARY

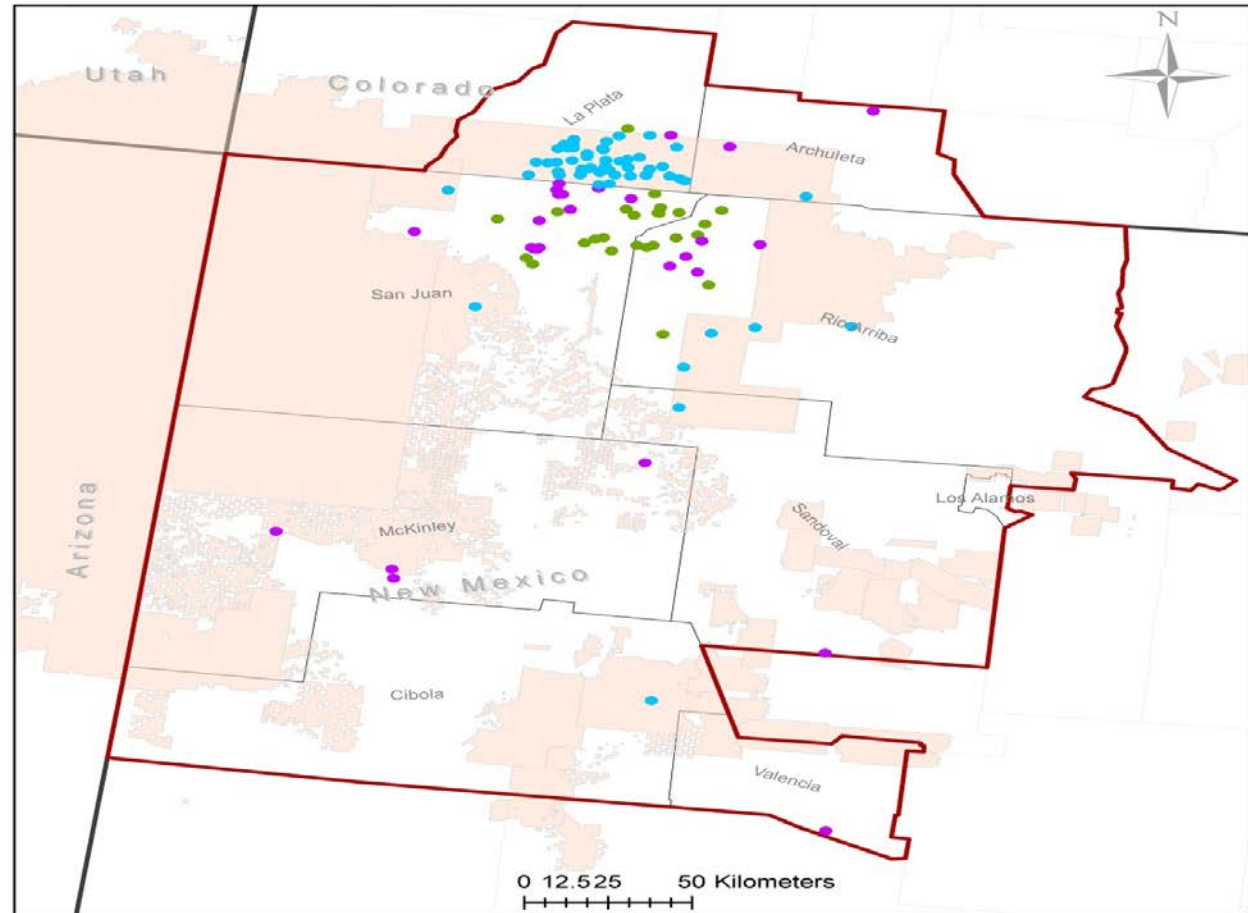
By Emission Data Source					
Emission Data Source	NOx	VOC	CO	PM10	SO2
Colorado Dept. Public Health	89	26	88	2	0
New Mexico Environment Dept.	7,651	3,000	5,114	270	186
EPA Region 8 (Tribal MNSR)	609	449	803	11	1
EPA Region 6 (Title V/Part 71)	618	377	257	4	0
EPA Region 8 (Title V/Part 71)	249	126	0	1	0
Total	9,216	3,979	6,262	287	187

By Mineral Ownership					
Mineral Ownership	NOx	VOC	CO	PM10	SO2
Federal	2,572	1,806	2,907	62	19
Private/State Fee	2,927	1,021	1,831	129	157
Tribal	3,717	1,152	1,524	96	11
Total	9,216	3,979	6,262	287	187

preliminary – data to be finalized when complete inventory is developed


Midstream Facilities by Ownership

Greater San Juan Basin



Legend

 Greater San Juan Basin (consistent with GHGRP Subpart W definition)

 Tribal Lands

Ownership

 Federal

 Private/State

 Tribal

SURVEY OVERVIEW

- Timeline
 - Draft survey sent out for comment in September 3, 2015
 - Final survey sent to operators on September 19, 2015
 - Request completion of survey by mid-November
- Survey leverages data collected/submitted as part Subpart W GHGRP
- Survey Data (for source categories where Subpart W data are not sufficient/available to estimate criteria pollutant emissions)
- Operators that reported under Subpart W GHGRP represent:
 - 94% of basin-wide gas production
 - 90% of basin-wide oil production
 - 88% of basin-wide active well count



OVERVIEW OF SURVEY DATA COLLECTION

- **GHGRP Submission** by well type

- **GHGRP Supporting Information**

Either, (A) By source category information (see slides that follow)

Or, (B) Each producer's Subpart W calculation database

- **Supporting Data**

- Lab Analyses: Produced gas composition analysis by well type and sub-basin

- Model Input/Output

- Tanks: representative E&P Tank, HYSYS, or alternative model

- Dehydrators: representative GlyCalc, HYSYS, or alternative model input/output by well type

- **Survey Data**

- Engines: well development and production phase (prevalence/population, horsepower, hours, load factor)

- Oil and condensate truck loading and water tanks

SUBPART W SUPPLEMENTAL (1)

Source Category		Calculation parameters not included in Subpart W Submission
Pneumatic Devices		Annual hours of operation by device type (assume 8760 unless operators provide alternative data)
Natural Gas Driven Pneumatic Pump		Annual hours of operation (assume 8760 unless operators provide alternative data)
Dehydrators	Glycol dehydrators with throughput <0.4 mmscfd	Fraction of dehydrator emissions controlled by each control type, volume of emission gas sent to flare, fraction of gas sent to unlit flare
	Dehydrators of any size that use desiccant	Annual natural gas emissions (scf) at standard conditions
	Glycol dehydrators with throughput >= 0.4 mmscfd	Control Efficiency by control type (assume GHGRP defaults if no control information is provided), volume of emission gas sent to flare, fraction of gas sent to unlit flare
Associated Gas Venting and Flaring		Volume of oil produced from wells that don't send gas to pipeline, fraction of associated gas from wells that don't send gas to pipeline that is flared and vented
Fugitives (Equipment Leaks)		Annual hours of operation by component and media type (assume 8760 unless operators provide alternative data)

SUBPART W SUPPLEMENTAL (2)

Source Category		Calculation parameters not included in Subpart W Submission
Well Testing		Average annual flow rate in barrels of oil per day for oil wells being tested, and average annual production rate in actual cubic feet per day for gas wells being tested, fraction of emitted gas by well type that is vented and sent to flares
Well Venting for Liquid Unloading	For operators that used GHGRP Calculation Methodology 1	Cumulative amount of time in hours of venting for all wells of the same tubing diameter group and pressure group combination by sub-basin (hours)
	For operators that used GHGRP Calculation Methodology 2	Average well depth, shut-in or surface pressure, number of unloading events per well per year, average flow-line rate, average hours that each well was left open to the atmosphere per event
	For operators that used GHGRP Calculation Methodology 3	Average tubing depth, average flow-line pressure, average flow-line rate, hours that well was left open per event

SUBPART W SUPPLEMENTAL (3)

Source Category		Calculation parameters not included in Subpart W Submission
Gas from Produced Oil Sent to Atmospheric Tanks		Limited data is reported in operator submissions for this source category. Operator needs to supply supporting data needed to calculate emissions. This can be limited to VOC emission factors (lb/bbl or SCF/bbl) and the fraction of emissions controlled by flare and VRU.
Process Heaters	All heaters with heating capacity less than or equal to 5 mmbtu/hr	Number of heaters by well type, heating capacity, and annual hours of use.
	All heaters with heating capacity greater than 5 mmbtu/hr	None
Gas well completions and work overs		Limited data is available with respect to the volume of gas vented, flared, or controlled by green completion techniques. Operator needs to provide (1) representative gas volumes by gas fate (i.e. vented to atmosphere, flared, or sent to closed-loop system) per event by sub-basin, or (2) by event gas volumes by gas fate.

SAN JUAN BASIN O&G 2014 EMISSION INVENTORY PROJECT

[HTTP://WWW.WRAPAIR2.ORG/SANJUANPERMIAN.ASPX](http://www.wrapair2.org/sanjuanpermian.aspx)

QUESTIONS ?

INTERMOUNTAIN WEST DATA WAREHOUSE:

HOW DOES IT WORK?

The screenshot shows the homepage of the Intermountain West Data Warehouse. At the top, there is a blue header with the site logo (a blue cube) and the text "Intermountain West Data Warehouse". Navigation links include "HOME", "DATA", "RESOURCES", "FORUMS", "MEETINGS", and "WIKI". There are also links for "Sign Out" and "Your Account". Below the header is a "Home" section with three landscape images and links for "Contact us" and "Page status". A main text block describes the warehouse's purpose: "The Western Air Quality Data Warehouse provides air quality data and analysis tools to support regulatory, research, and academic applications. Available datasets include emissions inventories, meteorological data, monitoring data, and air quality modeling platforms. Available modeling platforms support consistent photochemical grid modeling for National Environmental Policy Act projects and other modeling studies." To the right of this text is a vertical menu titled "DATA" with icons and labels for: "Get Modeling Data", "Get Monitoring Data", "Emissions Review", "Source Apportionment", "Model-to-Obs Tool", "Model Performance", "Haze Summary", "Ozone Summary", "Wet Deposition", and "Dry Deposition". Below the main text are three boxes: "GET DATA" with a data visualization image and the text "Access a wide variety of monitored, modeled, emissions, and met data."; "DOCUMENT NEEDS REVIEW !" for a "WAQS WRF Model Draft Modeling Protocol 2014 Modeling Year and RtC document" with a "WRF" icon; and "FINAL DOCUMENT AVAILABLE" for a "WAQS Modeling Plan for Conducting Source Apportionment Modeling for the 2011 Modeling Year" with an "IWDW" icon. At the bottom left is a "USER FORUMS" section with a table of forum topics.

Intermountain West Data Warehouse

Sign Out | Your Account

HOME - DATA - RESOURCES - FORUMS - MEETINGS - WIKI

Home Contact us Page status

The Western Air Quality Data Warehouse provides air quality data and analysis tools to support regulatory, research, and academic applications. Available datasets include emissions inventories, meteorological data, monitoring data, and air quality modeling platforms. Available modeling platforms support consistent photochemical grid modeling for National Environmental Policy Act projects and other modeling studies.

GET DATA

Access a wide variety of monitored, modeled, emissions, and met data.

DOCUMENT NEEDS REVIEW !

WAQS WRF Model Draft Modeling Protocol 2014 Modeling Year and RtC document

FINAL DOCUMENT AVAILABLE

WAQS Modeling Plan for Conducting Source Apportionment Modeling for the 2011 Modeling Year

FINAL DOCUMENT AVAILABLE

USER FORUMS

Forum	Topic	Posts	Last Post
Forum Discussions			
Permitting	Information about new releases and files. Mediators: Administration	0	No Posts
Regulation	Part requests you might have in this Forum. Mediators: Administration	0	No Posts
Rules			

- Hosts
 - Monitoring data
 - Emissions data
 - Modeling results
 - Data visualization tools
- Delivers, tracks, and receives data from various modeling studies.
- Conducts routine baseline simulations and model performance evaluations.
- Website address:
<http://views.cira.colostate.edu/tsdw/>