

WRAP OGWG O&G EI STUDY

TARGETED SURVEY OF O&G

WELL-SITE SOURCES

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February 11, 2019

EMISSION INVENTORY IMPROVEMENTS

- **Purpose:** Improve the baseline emission inventory by updating inventory inputs
- **Priorities:**
 - Equipment counts, characteristics, and age by well configuration (wellhead production equipment setup, drilling/fracing engines)
 - Control penetration rates (fraction of equipment controlled by type)
 - Gas compositions (by well type)
- **Considerations:**
 - Prioritize data gathering to focus on plays where current development activity is happening
 - Distinguish gathered data by well type and spud type

SURVEY PROCESS

- Survey will be filled-out in two phases
 - Phase 1: Agencies fill-out survey based on internal data sets (completed in Jan. 2019)
 - Phase 2: Operators fill-out survey (in-progress, completion in Mar. 2019)
- Individual agencies responsible for:
 - Filling-out survey with internal data in survey Phase 1
 - Determining basins and operators to survey
 - Each state was provided with by state, basin, and operator O&G activity statistics summaries
 - Determining which survey to send to operators: (1) full survey or (2) controls only
 - Sending survey to operators and performing operator follow-up (Ramboll staff available to answer technical questions)
- Many states have deferred collection of survey data to operators (Phase 2); therefore, operator response is critical for this effort

WRAP OGWG SURVEY CONTENT

Source Category	Survey Data Fields
Upstream Exploration	
Drill Rigs	representative engine configuration (number, hours per spud, horsepower), engine age distribution, fleet turnover frequency
Fracing Engines	representative engine configuration (number, hours per spud, horsepower), engine age distribution, fleet turnover frequency
Upstream Production	
Condensate Tanks	tank/separator configuration, VOC flashing emission rate, control type and prevalence, capture efficiency and basis, inspection type and frequency
Oil Tanks	VOC flashing emission rate, control type and prevalence, capture efficiency and basis, inspection type and frequency
Wellhead Engines	Number of engines per well by function (compressor, artificial lift, etc.), representative engine configuration (number, hours per spud, horsepower), fleet turnover frequency
Gas Composition	
Produced Gas	Extended gas composition by spud type and/or well type.
Flash Gas Composition	Extended gas composition by spud type and/or well type; sample method

DRILLING CONFIGURATION EXAMPLE

A. Representative Drill Rig Data for Well Type and Spud Type Configuration 1

Spud Type	Vertical
Well Type	Gas
Average Total Well Depth (ft)	

		EPA O&G Tool v2.1 Default Rig Data			Survey Responder Representative Rig Data				
		<i>Note: EPA tool provides two rig configurations :- (1) Diesel-mechanical and (2) Diesel-electric (DE) powered drill rig. ONLY mechanical drill rig configuration defaults are presented below for a selected basin</i>							
		Engine 1	Engine 2	Engine 3	Engine 1	Engine 2	Engine 3	Engine 4	Engine 5
Representative Engine Configuration									
Engine Function		Draw Rig	Mud Pump	Generator					
Number of Engine per Rig (number/rig)		0.54	0.75	1.71					
Rated Horsepower (hp/engine)		277	257	479					
Hours of Operation (hours/spud)		82	70	198					
Percent of Engines Electrified (%)		0%	0%	0%					
Fuel Type		Diesel	Diesel	Diesel					
Fleet Control Data									
Percent of Engines by Tier Level	Uncontrolled	N/A	N/A	N/A					
	Tier 1	N/A	N/A	N/A					
	Tier 2	N/A	N/A	N/A					
	Tier 3	N/A	N/A	N/A					
	Tier 4	N/A	N/A	N/A					
Average Engine Turnover Frequency (years)		N/A	N/A	N/A					

WELLHEAD ENGINE EXAMPLE

A. Representative Wellhead Engine Data for Well Type and Spud Type Configuration 1

Well Type	Gas
Spud Type	Vertical

		Wellhead Compressor Engines		Lateral Compressor Engines		Generators		Water Pump Engines		Vapor Recovery Engines (VRUs)	
		EPA O&G Tool v2.1 Default Data	Survey Responder Data	EPA O&G Tool v2.1 Default Data	Survey Responder Data	EPA O&G Tool v2.1 Default Data	Survey Responder Data	EPA O&G Tool v2.1 Default Data	Survey Responder Data	EPA O&G Tool v2.1 Default Data	Survey Responder Data
Representative Engine Configuration											
Number	Average No. of Engines per Well	0.229		N/A		Not Available		Not Available		Not Available	
	Number of Well(s) per Engine	N/A	Not Applicable	78			Not Applicable		Not Applicable		Not Applicable
Rated Horsepower (hp/engine)		133		332							
Hours of Operation (hours/engine)		8,319		8,160							
Percent of Engines Electrified (%)		0%		0%							
Fuel Type		Natural Gas		Natural Gas							
If Other Fuel Type Selected then, Please Provide Name of Other Fuel		N/A		N/A							
If Natural Gas Fuel Type, Percent of Engines	Lean Burn	19%		38%							
	Rich Burn	81%		62%							
Fleet Control Data											
Percent of Engines Meeting NSPS subpart JJJJ Standards [provide input for either (1) or (2)]	(1) All Pollutants Inclusive	N/A		N/A							
	(2) By Pollutant: NOx/VOC/CO	34%/0%/57%		34%/0%/57%							
Average Engine Turnover Frequency (years)		40		40							

QUESTIONS?

Additional Information:

- [WRAP OGWG](#) project webpage
- OGWG Emissions Survey for State Air Agencies and O&G Operators
 - [Complete survey](#) (January 2019)
 - [Fleet turnover and controls-focused survey](#) (January 2019)