EPA PROPOSED Mandatory Greenhouse Gas Reporting Rule

Presentation to the
Rocky Mountain EHS Peer Group
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URS

EPA's Proposed Greenhouse Gas (GHG) Reporting Rule

1. Key Aspects
2. Reporting Requirements
3. Affected Source Categories
4. Emission Reporting (Oil and Gas Sector)
5. Fuel Supplier Reporting (Oil and Gas Sector)
6. Applicability Examples
7. Comments, Issues, Recommendations

Key Aspects


Stuff
Sales
%
214.29
501.43
544.29
462.21
667.85
476.40
615.86
408.32
338.36
248.57
581.66
530.70
885.54
311.67
222.32
287.40
190.55
157.90
53.57
125.36
114.38
23.54
43.50
76.61
35.00
166.96
119.10
153.96
102.08
84.59
62.14
145.41
132.68
221.38
157.84
134.04
193.68
138.16
178.60
654.70
791.00
930.59
941.18
82.88
79.88
78.95
67.90
18.69
15.60
27.31
50.46
88.87
735.44
528.96
103.51
40.60
50.63
33.58
78.13
41.99
94.31
865.22
622.31
759.45
917.56
928.00

GHG Reporting Background

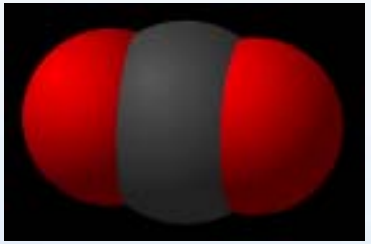
- Recent GHG Developments
  - Supreme Court decision (MA vs. EPA) 04/2007
    - CO_2 meets the definition of a pollutant
  - EPA endangerment finding 04/2009
    - GHGs pose threat to public health and welfare
  - Waxman-Markey US House bill
    - American Clean Energy and Security (ACES) Act of 2009; to be considered this summer
- History of GHG Reporting
  - Voluntary Programs (TCR, CCAR, etc.)
  - State and Regional programs and rules
  - EPA's proposed rule

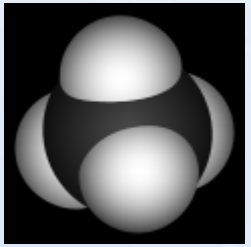
EPA's Proposed GHG Reporting Rule

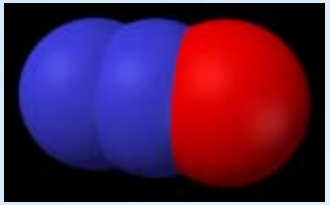
- 40 CFR Part 98, Subparts A - PP
  - Goals: Inform policy and regs; consistency; efficiency
  - Proposed rule date April 10, 2009; 74 FR 16448 (283 pages)
  - 60-day comment period ended June 9, 2009
  - Final rule to be promulgated in 2009
    - FY08 omnibus appropriations requirement
  - Rule, FAQs, background, fact sheets available at www.epa.gov/climatechange/emissions/ghgrulemaking.html

Reportable Greenhouse Gases

Compound	Global Warming Potential (CO_2e)
Carbon dioxide (CO_2)	1
Methane (CH_4)	21
Nitrous oxide (N_2O)	310
Hydrofluorocarbons (HFC)	12 – 11,700
Perfluorocarbons (PFC)	6,500-17,340
Sulfur hexafluoride (SF_6)	23,900
Nitrogen trifluoride (NF_3)	17,200
Hydrofluorinated ethers (HFE)	11-14,900







Definitions

- Metric ton = 1,000 kilograms ≈ 2,200 lbs.
- CO_2 equivalent (CO_2e) = quantity of CO_2 with the same global warming potential as another primary greenhouse gas
- mtpy = metric tons per year
- mtpy CO_2e = metric tons per year of CO_2 equivalent

Structure of the Proposed Rule 40 CFR Part 98, Subparts A-PP

- General Provisions: Subpart A
  - Applicability, definitions, general reporting requirements, etc.
- Stationary Fuel Combustion Sources: Subpart C
  - Definition of source category, calculating GHG emissions, QA/QC requirements, etc.
- Direct emitter sources: Subparts D – JJ
- Suppliers of fossil fuels: Subparts KK – NN
- Suppliers of GHGs: Subparts OO – PP

Example: Oil & Gas Systems Source Category

Sources	40 CFR Part 98, Subpart
Stationary combustion devices	C
Electricity generation	D
Oil and Natural Gas Systems	W
Landfills	HH
Wastewater Treatment	II
Suppliers of NG and NGLs	NN
Suppliers of CO_2	PP

Key Aspects of the Proposed Rule

- Frequency
  - Annual Reporting
  - Effective CY 2010; First reports due on March 31, 2011
- Facility Level Reporting
  - If facility meets emission threshold and/or facility type
- Reporting methodology
  - Based on existing programs
- Verification
  - EPA, not 3rd party
- Once in, always in

Key Definitions of the Proposed Rule (§98.6)

- Facility
  - Similar to single source in PSD and Title V
- Fugitive emissions
  - Based on IPCC definition
  - Includes vent stacks (i.e. flares, blowdowns, etc.)
  - Natural gas systems source category

What is reported to EPA?

- Emitters
  - Total facility emissions aggregated for all source categories
  - Metric tons (mt) per year (mtpy) of each GHG and CO_2e
- GHG Suppliers and Fuel Suppliers
  - Total emissions released by end user
  - Mtpy of each GHG and CO_2e
- Certain Specific Activities
  - Onsite electricity generation in kWh
  - Fertilizer produced

Affected Source Categories

Sources Required to Report

Group 1: Direct Emitters – All Report

- Specific source categories report *regardless of emission level* (e.g., refineries)

Group 2: Direct Emitters – Sum Source Categories ≥ 25,000 (25k) mtpy CO_2e

- Sum of emissions from specific source categories ≥ *25*k mtpy CO_2e

Group 3: Direct Emitters – Solely Stationary Combustion ≥ 25k mtpy CO_2e

- Not in Group 1 or Group 2
- Total combustion units emissions ≥ 25k mtpy CO_2e
- Total combustion units heat input capacity ≥30 MMBtu/hr

Group 4: Fossil Fuel Supplier

- Produce, import, or export fossil fuels

Group 5: Industrial GHG Supplier

- Produce, import, or export industrial GHGs (CO_2, N_2O, Fluorinated Gases)
- All producers; importers and exporters ≥ 25k mtpy CO_2e

Direct Emitters – All Report (Group 1)

Facilities that contain *any* of the following Source Categories *regardless of emission level*

- Production of:
  - Adipic Acid
  - Aluminum
  - Ammonia
  - Cement
  - Lime
  - Nitric Acid
  - Petrochemical Products
  - Phosphoric Acid
  - Silicon Carbide
  - Soda Ash
  - Titanium Dioxide
- Petroleum Refineries
- Electric Power Systems
  - Exceed 7838 kg SF_6 or PFC
- Electricity Generating Facilities
  - Acid Rain or >25k mtpy
- Electronics Manufacturing
  - Capacity thresholds
- HCFC-22 Production
- HFC-23 Destruction
  - Activity threshold
- Underground Coal Mines
  - MSHA regulated
- Manure Management
  - CH_4 and N_2O > 25k mtpy CO_2e
- Landfills
  - Generate CH_4 > 25k mtpy CO_2e

Report ALL GHG emissions

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Direct Emitters – Sum Source Categories > 25k mtpy CO_2e (Group 2)

Facilities that contain *any* of the following Source Categories *and* emit more than 25k mtpy CO_2e

- Production of:
  - Electronics – Solar PV
  - Iron and Steel
  - Ethanol
  - Lead
  - Ferroalloy
  - Magnesium
  - Fluorinated GHGs
  - Glass
  - Hydrogen
  - Zinc
- Electricity Generation
- Industrial Landfills
- Oil and Natural Gas Systems
- Food Processing
- Pulp and Paper Manufacturing
- Industrial Wastewater

Report ALL GHG emissions:

Above Source Categories
+ Stationary Fuel Combustion
+ Miscellaneous Carbonate Use
If sum >25k mtpy CO_2e

Direct Emitters – Stationary Combustion > 25k mtpy CO_2e (Group 3)

Facilities that emit more than 25k mtpy CO_2e from one or more of the following stationary combustion sources and have a combined heat input capacity of 30 MMBtu/hr or more

- Boilers
- Stationary Engines
- Process Heaters
- Combustion Turbines
- Other Fuel Combustion Equipment

Report ONLY GHG emissions from stationary combustion :

If sum >25k mtpy CO_2e

Fossil Fuel Suppliers (Group 4)

Facilities that produce, import, or export fossil fuels

- Coal
- Coal-based Liquid Fuels
- Natural Gas
- Natural Gas Liquids
- Petroleum Products

Report GHG Emissions from:

Complete oxidation of the volume of fuel sold

Industrial GHG Suppliers (Group 5)

Facilities that produce, import, or export GHGs

- **All producers**
- **Importers or exporters ≥ 25k mtpy CO_2e**

  - Carbon Dioxide
  - Nitrous Oxide
  - Fluorinated Gases

Report GHG Emissions from:

Complete release of the volume of product sold

Exempt Sectors and Categories

- Mobile source fleet operators
- Indirect emissions from the purchase of electricity
- Certain stationary fuel combustion equipment
  - Portable equipment
  - Permitted emergency generators

Emission Reporting

Oil and Gas Sector

O & G Sector Emission Reporting 40 CFR 98 Subpart W

Facility Type

GHG Reporting Required

- NG processing facilities
  - NG gathering and boosting stations*
- Underground NG storage
- LNG storage, import, and export operations
- NG transmission compression facilities
- Offshore Production Facilities

GHG Reporting Not Required

- Onshore Production facilities (May be included in final rule)
- Crude oil transportation
- Pipeline segments between facilities
- Natural gas distribution fugitive emissions

Differs from Subpart NN definition of natural gas processing facility

*Differs from Subpart NN definition of NG Processing Facility

O & G Sector Emission Reporting 40 CFR 98 Subpart W (Cont.)

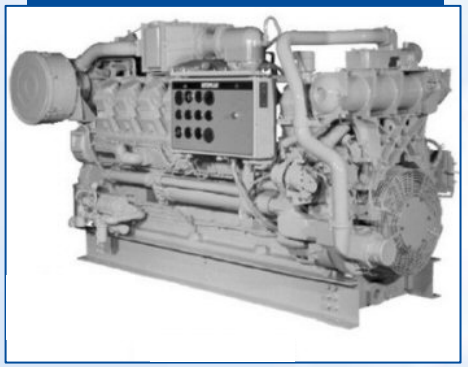
Equipment Types for Which GHG Reporting is Required

VENT STACKS
- Blowdown
- Acid gas removal
- Dehydrator
- Storage Tanks

FLARE STACKS

PNEUMATIC DEVICES
- Pumps
- Manual valve actuator devices
- Valve bleed devices

STATIONARY COMBUSTION



O & G Sector Emission Reporting 40 CFR 98 Subpart W (Cont.)

FUGITIVE EMISSIONS

Facilities:

- LNG import and export facilities
- LNG storage stations
- Processing facilities
- Storage stations
- Storage wellheads
- Transmission stations

FUGITIVE EMISSIONS

Equipment:

- Compressors
- Centrifugal compressor wet and dry seals
- Reciprocating compressor rod packing
- Compressor wet seal degassing vents
- Non-pneumatic pumps
- Open-ended lines
- Pump seals

O & G Sector Emission Calculations
40 CFR 98 Subpart W

Source	*Quantification Method:*
Stationary combustion	*Emission Factor x Fuel use x High Heating Value (HHV) (or other alternative, depending on available data)*
Acid gas removal vent stacks	*Model (e.g. ASPEN™ or AMINECalc™)*
Blowdown vent stacks	*Engineering estimate. Log of blowdown events and gas composition required.*
Dehydrator vent stacks	*Model (e.g. GLYCalc™)*
Flare stacks	*Engineering estimate. Measurement of gas flow, T and P to flare, and gas composition required.*
Natural gas-driven pneumatic pumps and manual valve actuator devices	*Engineering estimate. Gas composition, V of liquid pumped or number of actuations, and device emission factor required.*
Natural gas-driven pneumatic valve bleed devices	*Engineering estimate. Gas composition, op time, and device bleed rate required.*
Storage tanks	*Engineering estimate based on test data.*

O & G Sector Emission Calculations
40 CFR 98 Subpart W (Cont.)

Fugitive Emissions Quantification Method:
Two step approach

1. **Leak detection using**
   - Infrared camera,
   - Organic vapor analyzer, or
   - Toxic vapor analyzer

2. **If leak is detected, direct measurement using**
   - High volume sampler,
   - Calibrated bag, or
   - Meter

Stationary Combustion Emission Calculations 40 CFR 98 Subpart C

Tier 1:	Tier 2:	Tier 3:	Tier 4:
1. Fuel usage records 2. Default HHV 3. Default Emission Factor (EF)	1. Monthly Fuel usage records 2. Monthly / weekly sampled and measured High Heating Value (HHV) 3. Default EF	1. Fuel measured directly 2. Measured fuel carbon content (depending on fuel)	1. Hourly Continuous Emissions Monitoring System (CEMS) Measurement 2. May need to update existing CEMS to meet the requirement

Increasing Data Requirements and Accuracy

GHG Combustion Emission Screening Tool

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Greenhouse Gas Emission Screening Tool & Reference Sheet

Proposed Greenhouse Gas (GHG) Emission Reporting Rule

40 CFR Part 98, Subpart C, Proposed Rule, Tier 1 Calculation Methodology, 10 April 2009 (74 FR 16531)

Disclaimer: *This compliance information was current when developed in April 2009 and is based on the proposed rule. Users should verify applicable regulatory requirements in the final rule and should not rely solely on the information provided below.*

LOOK-UP TABLE: FUEL USE EQUIVALENT TO 25,000 METRIC TONS OF CO_2e FROM STATIONARY FUEL COMBUSTION SOURCES

Natural Gas				Diesel				Bituminous Coal			
MMSCF	Btu per SCF[1]	kg CO2e per MMBtu[1,2]	Metric Tons CO_2e	Million Gallons	MMBtu per gallon[1]	kg CO2e per MMBtu[1,2]	Metric Tons CO_2e	Short Tons	MMBtu per Short Ton[1]	kg CO2e per MMBtu[1,2]	Metric Tons CO_2e
468.7	1027	53.0699	25,000	2.6	0.139	73.3490	25,000	10,660	24.93	94.0750	25,000

CALCULATE CO_2 EQUIVALENT (CO_2e) EMISSIONS FROM STATIONARY COMBUSTION

Replace fuel use numbers in yellow-highlighted cells with your facility's fuel use.

Natural Gas						
Annual Fuel Use in MMSCF	Btu per SCF[1]	Greenhouse Gas	kg per MMBtu[1,2]	Metric Tons Emitted	Global Warming Potential[3]	Metric Tons CO_2e
76	1027	CO_2	53.02	4,084	1	4,084
		CH_4	0.0009	0.07	21	1
		N_2O	0.0001	0.01	310	2
					Total Metric Tons CO_2e	4,088

Diesel						
Annual Fuel Use in Million Gallons	MMBtu per gallon[1]	Greenhouse Gas	kg per MMBtu[1,2]	Metric Tons Emitted	Global Warming Potential[3]	Metric Tons CO_2e
0.6	0.139	CO_2	73.1	5,080	1	5,080
		CH_4	0.003	0.21	21	4
		N_2O	0.0006	0.04	310	13
					Total Metric Tons CO_2e	5,088

Bituminous Coal						
Annual Fuel Use in Short Tons	MMBtu per Short Ton[1]	Greenhouse Gas	kg per MMBtu[1,2]	Metric Tons Emitted	Global Warming Potential[3]	Metric Tons CO_2e
9,000	24.93	CO_2	93.4	20,956	1	20,956
		CH_4	0.01	2.24	21	47
		N_2O	0.0015	0.34	310	104
					Total Metric Tons CO_2e	21,108

[1] Table C-1 of Subpart C—Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel.
[2] Table C-3 of Subpart C—Default CH_4 and N_2O Emission Factors for Various Types of Fuel.
[3] Table A-1 of Subpart A—Global Warming Potentials (100-Year Time Horizon).

Total Metric Tons CO_2e for All Fuels Above
30,283

If the total metric tons of CO_2e value is RED, annual emissions potentially equal or exceed the reporting threshold of 25,000 metric tons of CO_2e.

Notes:

1. These calculations illustrate the proposed Tier 1 GHG emission calculation method for certain types of stationary fuel combustion sources subject to 40 *CFR* Part 98, Subpart C.
2. For some stationary combustion sources, owners or operators must determine GHG emissions using Tier 2, 3, or 4 emission calculation methods in Subpart C, and may need to install or modify emission monitoring equipment.
3. Owners or operators may need to estimate GHG emissions from additional sources at their facilities. Industry-specific and equipment-specific requirements are included in proposed 40 *CFR* Part 98, Subparts D through PP.
4. General emission inventory development, monitoring, reporting, and recordkeeping requirements are included in 40 *CFR* Part 98, Subpart A.
5. Under the proposed rule, the the first GHG emission report would be for calendar year 2010 and would be due on March 31, 2011. USEPA expects to finalize the GHG emission reporting rule in late 2009.

Acronyms and Units:

BTU	British thermal unit	MMSCF	Million standard cubic feet
CH_4	Methane	N_2O	Nitrous oxide
CO_2	Carbon dioxide	SCF	Standard cubic feet
CO_2e	Carbon dioxide equivalent	USEPA	U.S.Environmental Protection Agency
CFR	*Code of Federal Regulations*		
FR	*Federal Register*		
GHG	Greenhouse gas		
kg	Kilograms		
MMBtu	Million British thermal units		

Unit Conversion		
Unit Type	Pounds	Kilograms
Metric Ton	2,205	1,000
Short Ton	2,000	907.2

URS can provide the following services:

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- GHG emission reporting applicability determinations
- GHG emission inventory protocol development
- GHG emission calculations and reporting
- Strategies for reducing GHG emissions
- GHG data management system development
- Development of quality assurance performance plans (QAPPs)

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Fuel Supplier Reporting

Oil and Gas Sector

Suppliers of Natural Gas and Natural Gas Liquids Source Category – 40 CFR 98 Subpart NN

- Natural gas processing plants
  - **Unlike Subpart W definition, does not include field gathering and boosting stations**
- Local natural gas distribution companies

"Natural Gas Processing Plants are installations designed to separate and recover NGLs or other gases and liquids from a stream of produced natural gas through the processes of condensation, absorption, adsorption, refrigeration, or other methods and to control the quality of natural gas marketed. This does not include field gathering and boosting stations."

Calculation Methods and Monitoring Natural gas suppliers - Subpart NN

Natural gas processing plants report GHG emissions from combustion of their products by end users

- Report mtpy CO_2e from end-user combustion of NGL
- Based on propane, butane, ethane, i-butane and bulk NGLs sold or delivered for use off site
- CO_2e in mtpy = emission factor x quantity

Recordkeeping and Reporting Requirements

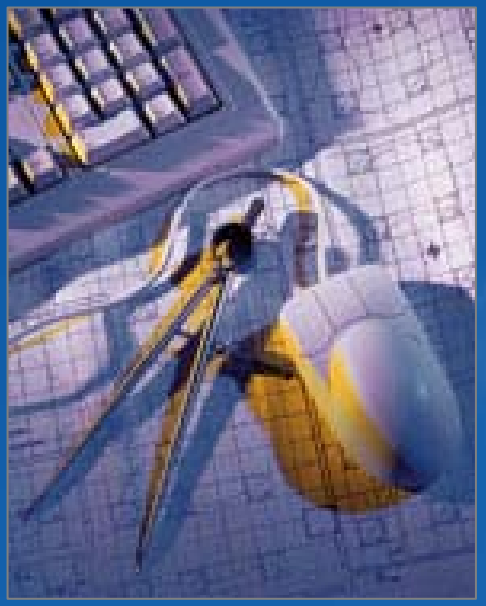
Documentation Required

- GHG Emission Reports
  - Electronic submittal
  - Electronic signature
- GHG Emissions Calculation Records
  - Calculations and methods used
  - Data used to calculate emissions
    - Facility operating data or process information used in calculations
    - Input and output of computer models
    - Instrument calibration records
    - Gas and NGL composition analyses
  - Documentation of the process used to collect the data
  - Emission factors used (e.g. default emission factors based on fuel heating value)

Documentation Required (Cont.)

- Written quality assurance performance plan (QAPP)
  - Measurement methods
  - Calibration methods (ASTM, API, EPA, etc.)
  - Personnel training / qualifications to perform monitoring
- Records Retention
  - All records must be retained 5 years
- Bottom Line: Inventory must be verifiable.

Applicability Examples



GHG Reporting Applicability Examples (Cont.)

O&G Production Facility

- Emits
  - 25k mtpy CO_2e (as methane) from well completion, and
  - 19k mtpy CO_2e from stationary combustion sources (diesel generators)
- *Do they report?* – No
- *Why Not?*
  - Production emissions are not included in the oil and gas sector category (Subpart W) or any other category, so these emissions are not counted
  - Stationary combustion emissions are <25k mtpy CO_2e reporting threshold

GHG Reporting Applicability Examples (Cont.)

Natural Gas Processing Plant

- Emits – 22k mtpy CO_2e from processing operations (e.g. combustion, fugitives)
- Supplies – Y-grade mixture of NGL 6 million mtpy CO_2e from complete oxidation

- *Do they report?*
  - No; not as emitters (Subpart W)
  - Yes; as suppliers (Subpart NN)

- *Why not?*
  - Natural gas processing is a Group 2 source category (Oil and Natural Gas Systems), but
  - Direct emissions are <25k mtpy CO_2e reporting threshold (Subpart W)
- *Why?*
  - All NGL suppliers report (Subpart NN)

GHG Reporting Applicability Examples (Cont.)

Gathering System Compressor Station

- Emits
  - 13.5k mtpy CO_2e (as methane) from fugitives, and 12.2k mtpy CO_2e from stationary combustion sources (diesel generators)
- *Do they report?*
  - Yes
- *Why?*
  - Natural gas gathering is included in the Oil and Natural Gas Systems source category, so fugitive emissions are counted
  - The sum of the CO_2e emissions from fugitive and stationary combustion sources is >25k mtpy CO_2e

Comments,
Issues,
Recommendations

General Comments / Issues (1 of 3)

- States want reporting system integrated with other national emission inventory reporting systems
- Third party verification (states & others for verification; industry against)
- Conflict with existing regulatory and voluntary reporting programs

General Comments (2 of 3)

- Reporting rule should have a “sunset” provision
- Change annual reporting deadline to June 30
- Desire to delay implementation
  - First inventory year should be 2011; first report in 2012
- Consider reporting framework of The Climate Registry

General Comments (3 of 3)

- De minimis emission sources should be exempted
- “Once in, Always in” is a disincentive for reducing emissions
- Definitions need clarification
  - “Fugitive emissions”
  - “Facility” (natural gas processing, electrical transmission and distribution, etc.)

Oil and Gas Industry Comments (1 of 6)

Supporting Comments

- Reporting threshold of 25,000 mtpy CO_2e
- Actual emissions, not PTEs
- Excluding NG pipeline segments
- Excluding onshore NG production
- Oil & Gas sources do not have to report electricity purchases

Oil and Gas Industry Comments (2 of 6)

Supporting Comments, cont'd

- Facility-level reporting
- Data collection & enforcement to remain with EPA (not individual states)
- Support tiered approach for combustion sources
- Support reporting structure that imposes reporting on both downstream & upstream sources, rather than alternative presented by EPA to limit downstream reporting

Oil and Gas Industry Comments (3 of 6)

Other Comments

- Allow screening methods to determine applicability (de minimus concept)
  - Applying a full 'calculation' methods, just to determine applicability, is overly burdensome (98.2(b)(1))
  - Negates the intent of the 25K mtpy CO_2e threshold
- Clarify "fugitive emissions" & "vented emissions"
- Allow engineering estimation for storage tanks
- Definition of a leak – how to know when a leak is "detected," & which sources require measurement

Oil and Gas Industry Comments (4 of 6)

- Fugitive emissions requirements are overly burdensome, impossible to implement, accuracy
  - Can be estimated by factors instead of direct measurement; alternative approaches suggested
- Support for determination of how long to assume a fugitive emission occurs
- Possible difficulties procuring measurement equipment (optical imaging devices, high flow samplers, etc.) and “trained” technicians
- Flare metering may be difficult & very dangerous

Oil and Gas Industry Comments (5 of 6)

- Cost of compliance may be significantly underestimated
  - Commenter estimate = $100K-$200K per facility, 1st yr
  - EPA estimate = $27K per covered entity, 1st yr
- Subpart W puts disproportionate and "cost-ineffective" burden on this sector
  - Especially in light of other industries being allowed to use accepted estimation methods
- Concern about EPA conducting both enforcement and 3rd-party verification

Oil and Gas Industry Comments (6 of 6)

- Question legal authority under Clean Air Act and the Consolidated Appropriations Act to implement the program
  - Over-reaching their authority under Sections 114 and 208 of the CAA
  - The Appropriations Act has limited funding
  - The Appropriations Act does not grant enforcement authority to EPA
- Request to clarify this rule does not make CO_2 or GHGs “subject to regulation” under CAA, despite “links” in the proposed regulation (definitions)

Recommended Steps to Prepare for GHG Reporting Rule

- Pro forma inventory
  - Identification of facility sources vs. sources in EPA Rule
  - Rough estimate of emissions
- Target emission reduction projects to “borderline” facilities
  - Avoid “Once in always in”
- Determine data/documentation needs
  - Current and available data vs. new rule requirements
  - Monitoring? Fuel analyses? Quality Assurance Performance Plan?
  - Facility Measurement upgrades
  - Inventory data collection and data management → Environmental Management Information System (EMIS)

Questions and Comments?

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