



Petroleum and Natural Gas Systems (Subpart W) Reporting Form for 2015

U.S. Environmental Protection Agency
Greenhouse Gas Reporting Program (GHGRP)
February 2016

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- Overview of this webinar
- Review changes to the Subpart W reporting form for RY15
- Uploading and submitting
- XML reporting
- Resources

- Report CH₄ and N₂O in metric tons for each emission source type (previously reported metric tons CO₂e for each of these GHGs)
- Gas volumes for some emission source types can now be reported at either actual or standard conditions
- Table columns now more closely follow order of reporting elements as specified in 98.236
- BAMM reporting tables removed (except liquids unloading, completions and workovers, and compressors)
- Missing data procedure tables added

Download the Forms and Schema

- The final forms and XML reporting schema for Subpart W can be downloaded at <http://www.ccdsupport.com/confluence/display/help/Reporting+Form+Instructions>
- The regulations describing the changes to the reporting requirements can be found at <http://www.epa.gov/ghgreporting/rulemaking-notices-ghg-reporting>

Sheets in RY15 Reporting Form

- Introduction
- (aa) Facility Overview
- (b) NG Pneumatic Device
- (c) NG Pneumatic Pumps
- (d) Acid Gas Removal Units
- (e) Dehydrators
- (f) Liquids Unloading
- (g, h) Completions and Workovers
- (i) Blowdown Vent Stacks
- (j) Production Storage Tanks
- (k) Transmission Storage Tanks
- (l) Well Testing
- (m) Associated NG
- (n) Flare Stacks
- (o) Centrifugal Compressors
- *(p) Reciprocating Compressors**
- (q,r) Equipment Leaks
- *(s) Offshore Emissions**
- (w) EOR Injection Pumps
- *(x) EOR Hydrocarbon Liquids**
- (z) Combustion Equipment

* These 3 are substantively similar to another source or unchanged from Reporting Year 2014 and are not reviewed in today's presentation.

Introduction tab

Subpart W: Petroleum and Natural Gas Systems

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1.) Select the applicable industry segment for this workbook:

- Offshore petroleum and natural gas production [98.230(a)(1)]
- Onshore petroleum and natural gas production [98.230(a)(2)]
- Onshore natural gas processing [98.230(a)(3)]
- Onshore natural gas transmission compression [98.230(a)(4)]
- Underground natural gas storage [98.230(a)(5)]
- Liquefied natural gas (LNG) storage [98.230(a)(6)]
- LNG import and export equipment [98.230(a)(7)]
- Natural gas distribution [98.230(a)(8)]

2.) Fill out the following table with general information about this facility:

Facility Name:	
GHGRP ID:	
Reporting Period:	2015
Comments:	

As in prior years, the Introduction requires selection of the applicable industry segment for the report.

For RY15, the liquid and gaseous annual throughputs have been moved to the Facility Overview sheet.

Note: One workbook must be submitted for each industry segment. If your facility is required to report emissions under more than one industry segment, a workbook should be filled out for each industry segment under which that facility falls.

Introduction tab (continued)

3.) Fill out the applicable source reporting forms for your industry segment, as indicated with a green "Yes", below:

	Required for Onshore petroleum and natural gas production [98.230(a)(2)]:	Go to Reporting Spreadsheet	Total Reported CO ₂ Emissions (mt CO ₂)	Total Reported CH ₄ Emissions (mt CH ₄)	Total Reported N ₂ O Emissions (mt N ₂ O)
Facility Overview [98.236(aa)]	Yes	Go to Form	N/A	N/A	N/A
Natural Gas Pneumatic Devices [98.236(b)]	Yes	Go to Form	0	0	N/A
Natural Gas Driven Pneumatic Pumps [98.236(c)]	Yes	Go to Form	0	0	N/A
Acid Gas Removal Units [98.236(d)]	Yes	Go to Form	0	N/A	N/A
Dehydrators [98.236(e)]	Yes	Go to Form	0		
Well Venting for Liquids Unloading [98.236(f)]	Yes	Go to Form	0		
Gas Well Completions and Workovers [98.236(g,h)]	Yes	Go to Form	0		
Blowdown Vent Stacks [98.236(i)]	No	Go to Form	0		
Production Storage Tanks [98.236(j)]	Yes	Go to Form	0		
Equipment Leaks Surveys and Population Counts [98.236(q,r)]	Yes	Go to Form	0		
Offshore Petroleum and Natural Gas Production [98.236(s)]	No	Go to Form	0	0	0
Enhanced Oil Recovery Injection Pumps Blowdown [98.236(w)]	Yes	Go to Form	0	N/A	N/A
Enhanced Oil Recovery Hydrocarbon Liquids [98.236(x)]	Yes	Go to Form	0	N/A	N/A
Combustion Equipment at Onshore Petroleum and Natural Gas Production and Natural Gas Distribution Facilities [98.236(z)]	Yes	Go to Form	0	0	0

The selected industry segment activates links to the applicable sources. Once completed, emissions for those sources are tallied on this sheet automatically.

					Total CO₂e Emissions (mt CO₂e)
Totals	0.00	0.00	0.00	0.00	0.00

- New tab for requirements specified in 98.236(aa)
- Replacing former “Sub-basin” tab
- Expanded industry-specific reporting, tailored to each industry segment

Industry Segment Specific Requirements under 98.236(aa)

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Worksheet Instructions:

Each facility must report the information specified in paragraphs (aa)(1) through (9) for its applicable industry segment.

If a quantity required to be reported is zero, you must report zero as the value.

- Navigation links are activated for the selected industry segment

Onshore petroleum and natural gas production: Basin Characterization [Table AA.1.i]:
Onshore petroleum and natural gas production: Sub-Basin Characterization [Table AA.1.ii]:
Offshore Production [Table AA.2.]:
Natural Gas Processing [Table AA.3.]:
Natural Gas Transmission Compression [Table AA.4.]:
Underground Natural Gas Storage [Table AA.5.]:
LNG import/export equipment [Table AA.6.]:
LNG storage [Table AA.7.]:
Natural Gas Distribution [Table AA.8.]:

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Facility Overview (continued)

Table AA.1.i Onshore petroleum and natural gas production: Basin Characterization

Select the basin associated with this facility [98.236(aa)(1)(i)]

The quantity of gas produced for sales and the quantity of crude oil and condensate produced for sales are revised data elements for RY15.

Quantity of gas produced in the calendar year from wells (thousand standard cubic feet) [98.236(aa)(1)(i)(A)]	
Quantity of gas produced in the calendar year for sales (thousand standard cubic feet) [98.236(aa)(1)(i)(B)]	
Quantity of crude oil and condensate produced in the calendar year for sales (barrels) [98.236(aa)(1)(i)(C)]	

Facility Overview (continued)

Table AA.1.ii Onshore petroleum and natural gas production: Sub-Basin Characterization

Seven elements in the middle of Table AA.1.ii are new (others are the same as on the “Sub-basin Selection” sheet in reporting forms for previous years.

Select the County and State in which the Sub-Basin is located [98.236(aa)(1)(ii)(A-B)]	Select the Formation Type of the Sub-Basin [98.236(aa)(1)(ii)(C)]	Sub-Basin ID				
Number of producing wells at the end of the calendar year [98.236(aa)(1)(ii)(D)]	Number of producing wells acquired during the calendar year [98.236(aa)(1)(ii)(E)]	Number of producing wells divested during the calendar year [98.236(aa)(1)(ii)(F)]	Number of wells completed during the calendar year [98.236(aa)(1)(ii)(G)]	Number of wells permanently taken out of production [98.236(aa)(1)(ii)(H)]		
		Complete These Rows ONLY if the Formation Type is Oil				
Average mole fraction of CH ₄ in produced gas [98.236(aa)(1)(ii)(I)]	Average mole fraction of CO ₂ in produced gas [98.236(aa)(1)(ii)(J)]	Average Gas-to-Oil (GOR) Ratio of all wells (thousand standard cubic feet per barrel) [98.236(aa)(1)(ii)(K)]	Average API gravity of all wells (degrees) [98.236(aa)(1)(ii)(L)]	Average Low Pressure Separator Pressure (psig) [98.236(aa)(1)(ii)(M)]		

Facility Overview (continued)

All elements are new or revised

Table AA.8. Natural Gas Distribution as per [98.236(aa)(9)]

Quantity of natural gas received at all custody transfer stations in the calendar year (thousand standard cubic feet) [98.236(aa)(9)(i)]	Quantity of natural gas withdrawn from in-system storage in the calendar year (thousand standard cubic feet) [98.236(aa)(9)(ii)]	Quantity of natural gas added to in-system storage in the calendar year (thousand standard cubic feet) [98.236(aa)(9)(iii)]

Quantity of natural gas delivered to end users (thousand standard cubic feet) [98.236(aa)(9)(iv)]	Quantity of natural gas transferred to third parties such as other LDCs or pipelines (thousand standard cubic feet) [98.236(aa)(9)(v)]	Quantity of natural gas consumed by the LDC for operational purposes (thousand standard cubic feet) [98.236(aa)(9)(vi)]	Estimated quantity of gas stolen in the calendar year (thousand standard cubic feet) [98.236(aa)(9)(vii)]

Natural Gas Pneumatic Device Venting

Natural gas pneumatic device venting [98.236(b)]

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Worksheet Instructions:

In accordance with 98.232, only the following industry segments must report data for natural gas pneumatic device venting:

- Onshore petroleum and natural gas production [98.230(a)(2)]
- Onshore natural gas transmission compression [98.230(a)(4)]
- Underground natural gas storage [98.230(a)(5)]

Table B.1 must be completed by all facilities with pneumatic devices subject to reporting under 98.232.

Table B.2 is required for the identification of missing data procedures used for pneumatic device emission calculations.

Table B.1 Pneumatic device emissions

Allowed only for Onshore Petroleum and Natural Gas Production facilities in first or second year of reporting

Complete only if you elect to estimate the count of any type of device

Type of Pneumatic Device	Total Number, Count [98.236(b)(1)(i)]	Is the Total Number estimated? (Yes / No) [98.236(b)(1)(ii)]	Specify whether the calendar year is the first calendar year of reporting or the second calendar year of reporting (First / Second) [98.236(b)(1)(ii)(C)]	Actual Count [98.236(b)(1)(ii)(A)]	Estimated Count [98.236(b)(1)(ii)(B)]
High-bleed Pneumatic Devices	8	Yes	First	6	2
Intermittent Bleed Pneumatic Devices	3	No			
Low-Bleed Pneumatic Devices					

This table has been rearranged to clarify that only onshore production facilities in their first 2 years of reporting may provide an estimated count. Everyone else must report the total actual count.

Two data elements are new for RY15.

Estimated average number of hours in the calendar year that the pneumatic devices were operating, T _i (hours) [98.236(b)(2)]	Total CO ₂ Emissions (mt CO ₂) [98.236(b)(3)]	Total CH ₄ Emissions (mt CH ₄) [98.236(b)(4)]

Natural Gas Driven Pneumatic Pumps

Natural Gas Driven Pneumatic Pumps [98.236(c)]

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Worksheet Instructions:

In accordance with 98.232, only the following industry segment must report data for natural gas driven pneumatic pumps:

-Onshore petroleum and natural gas production [98.230(a)(2)]

Table C.1 must be completed by all facilities with NG driven pneumatic pumps subject to reporting under 98.232.

Table C.2 is required for the identification of missing data procedures used for NG driven pneumatic pump emission calculations.

Table C.1 NG Driven Pneumatic Pumps emissions

Type of Pneumatic Pump	Total count of natural gas driven pneumatic pumps, Count [98.236(c)(1)]	Average estimated number of hours in the calendar year that the natural gas driven pneumatic pumps were operated, T (hours) [98.236(c)(2)]	Total CO ₂ Emissions (mt CO ₂) [98.236(c)(3)]	Total CH ₄ Emissions (mt CH ₄) [98.236(c)(4)]
Natural Gas Driven Pneumatic Pumps				

One new data element in RY15.

Acid Gas Removal Units

Acid Gas Removal Units [98.236(d)]

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Worksheet Instructions:

In accordance with 98.232, only the following industry segments must report data for acid gas removal units:

- Onshore petroleum and natural gas production [98.230(a)(2)]
- Onshore natural gas processing [98.230(a)(3)]

Table D.1 must be completed by all facilities with acid gas removal units subject to reporting under 98.232.

Table D.2 is required for emissions determined using Calculation Methodology 1.

Table D.3 is required for emissions determined using Calculation Methodology 2.

Table D.4 is required for emissions determined using Calculation Methodology 3.

Table D.5 is required for emissions determined using Calculation Methodology 4.

Table D.6 is required for the identification of missing data procedures used for acid gas removal unit emission calculations.

The reporting requirements are organized in tables for each calculation methodology.

Table D.1 Acid gas removal unit specific information

Unit ID or Name [98.236(d)(1)(i)]	Sub-Basin ID [98.236(d)(1)(vi)]	Total feed rate entering the acid gas removal unit for the year (million cubic feet) [98.236(d)(1)(ii)]	Calculation Methodology Used (Select from list) [98.236(d)(1)(iii)]	Are any CO ₂ emissions from the acid gas removal unit recovered and transferred outside the facility? (Yes / No) [98.236(d)(1)(iv)]	Total CO ₂ Emissions (mt CO ₂) [98.236(d)(1)(v)]

Required only for Onshore Petroleum and Natural Gas Production

Acid Gas Removal Units (continued)

Table D.2 Calculation Methodology 1 emissions

Unit ID or Name	Annual average fraction of CO ₂ content in the vent from the acid gas removal unit (volumetric fraction)	Annual volume of gas vented from the acid gas removal unit (standard cubic feet)
[98.236(d)(1)(i)]	[98.236(d)(2)(i)(A)]	[98.236(d)(2)(i)(B)]

Table D.3 Calculation Methodology 2 emissions

Unit ID or Name	Annual average fraction of CO ₂ content in the vent from the acid gas removal unit, Vol _{CO2} (volumetric fraction)	Annual volume of gas vented from the acid gas removal unit, V _s (actual or standard cubic feet)	Temperature used to calculate volume of gas vented (°F)	Pressure used to calculate volume of gas vented (psi)
[98.236(d)(1)(i)]	[98.236(d)(2)(i)(A)]	[98.236(d)(2)(i)(B)]	[98.2331]	[98.2331]

For Calculation Method 2, the annual volume of gas vented can be reported on either an actual or standard basis. You must then report the temperature and pressure used to calculate that vent gas volume.

Acid Gas Removal Units (continued)

Table D.4 Calculation Methodology 3 emissions

Unit ID or Name [98.236(d)(1)(i)]	Equation Used (W-4A/W-4B) [98.236(d)(2)(ii)(A)]	Annual average fraction of CO ₂ content of natural gas into the acid gas removal unit, Vol _i (volumetric fraction) [98.236(d)(2)(ii)(C)]	Annual average fraction of CO ₂ content of natural gas out of the acid gas removal unit, Vol _o (volumetric fraction) [98.236(d)(2)(ii)(B)]
	W-4A		
	W-4B		
Natural gas flow rate into the acid gas removal unit, V _{in} (actual or standard cubic feet) (Eq. W-4A) [98.236(d)(2)(ii)(D)1]	Natural gas flow rate out of the acid gas removal unit, V _{out} (actual or standard cubic feet) (Eq. W-4B) [98.236(d)(2)(ii)(D)1]	Temperature used to calculate natural gas flow rates (°F) [98.2331]	Pressure used to calculate natural gas flow rates (psi) [98.2331]

For Calculation Method 3, the equation used determines whether the flow rate into or out of the AGR unit is reported. These flow rates can be reported on either an actual or standard basis, with the temperature and pressure used to calculate those rates.

Acid Gas Removal Units (continued)

Table D.5 Calculation Methodology 4 emissions

All data elements are new.

Unit ID or Name [98.236(d)(1)(i)]	Name of simulation software package used [98.236(d)(2)(iii)(A)]	Natural gas feed temperature (°F) [98.236(d)(2)(iii)(B)]	Natural gas feed pressure (psi) [98.236(d)(2)(iii)(C)]

Natural gas feed flow rate (standard cubic feet per minute) [98.236(d)(2)(iii)(D)]	Acid gas content of feed natural gas (mole percent) [98.236(d)(2)(iii)(E)]	Acid gas content of outlet natural gas (mole percent) [98.236(d)(2)(iii)(F)]	Unit operating hours (excluding downtime for maintenance or standby) [98.236(d)(2)(iii)(G)]

Exit temperature of the natural gas (°F) [98.236(d)(2)(iii)(H)]	Solvent pressure (psi) [98.236(d)(2)(iii)(I)]	Solvent temperature (°F) [98.236(d)(2)(iii)(J)]	Solvent circulation rate (gallons per minute) [98.236(d)(2)(iii)(K)]	Solvent weight (pounds per gallon) [98.236(d)(2)(iii)(L)]

Dehydrators

Table E.1 Small Glycol Dehydrators

If the facility has any glycol dehydrators with a throughput <0.4 MMscfd (i.e., "small" dehydrators), complete following tables:

Total Number of Small Glycol Dehydrators [98.236(e)(2)(i)]	
---	--

Type of Device	Vent Controls Used (select all that apply) [98.236(e)(2)(ii)] [98.236(e)(2)(iii)] [98.236(e)(2)(iv)]	Number of Small Glycol Dehydrators By Vent Control Type, Count [98.236(e)(2)(ii)] [98.236(e)(2)(iv)(A)]
Vapor Recovery		
Dehydrator vents to flares or regenerator firebox/fire tubes		
Control devices other than vapor recovery, flare or regenerator firebox/fire tubes		

Control devices other than vapor recovery, flare or regenerator firebox/fire tubes	Specify Type of Other Control Device(s) [98.236(e)(2)(iii)]	Number of Small Glycol Dehydrators By Other Vent Control Type [98.236(e)(2)(iii)]

Type of Emission Point	Total CO ₂ Emissions (mt CO ₂) [98.236(e)(2)(iv)(B)] [98.236(e)(2)(v)(A)]	Total CH ₄ Emissions (mt CH ₄) [98.236(e)(2)(iv)(C)] [98.236(e)(2)(v)(B)]	Total N ₂ O Emissions (mt N ₂ O) [98.236(e)(2)(iv)(D)]
Emissions vented to flare or regenerator firebox/fire tubes			
Emissions that were not vented to a flare or regenerator firebox/fire tubes			

Rearranged for clarity.

Previously allowed only one row for control devices other than vapor recovery, flares, and regenerators; now each type of device can be reported separately.

Form clarifies that N₂O emissions are to be reported only for flares/regenerators.

Dehydrators (continued)

Table E.2 Desiccant Dehydrators

If the facility has any desiccant dehydrators, complete following tables:

Total Number of Desiccant Dehydrators [98.236(e)(3)(i)]	
---	--

Type of Device	Vent Controls Used (select all that apply) [98.236(e)(3)(i)]	Number of Desiccant Dehydrators By Vent Control Type, Count [98.236(e)(3)(i)]
Vapor Recovery		
Dehydrator vents to flares or regenerator firebox/fire tubes		
Control devices other than vapor recovery, flare or regenerator firebox/fire tubes		

Control devices other than vapor recovery, flare or regenerator firebox/fire tubes	Specify Type of Other Control Device(s) [98.236(e)(2)(iii)]	Number of Desiccant Dehydrators By Other Vent Control Type [98.236(e)(2)(iii)]

Type of Emission Point	Total CO₂ Emissions (mt CO ₂) [98.236(e)(3)(i)] [98.236(e)(3)(ii)]	Total CH₄ Emissions (mt CH ₄) [98.236(e)(3)(i)] [98.236(e)(3)(iii)]	Total N₂O Emissions (mt N ₂ O) [98.236(e)(3)(i)]
Emissions vented to flare or regenerator firebox/fire tubes			
Emissions that were not vented to a flare or regenerator firebox/fire tubes			

RY14 report asked for the total CO₂ and CH₄ emissions regardless of control; now collective emissions from flares/regenerators must be reported separately from other vented emissions, and N₂O must be reported from flares/regenerators.

Dehydrators (continued)

Table E.3 Large Glycol Dehydrators

If the facility has any glycol dehydrators with a throughput ≥ 0.4 MMscfd, complete following table:

All new or revised data requirements shown (omitting unchanged elements).

Required only for Onshore
Petroleum and Natural Gas
Production

Unit ID or Name [98.236(e)(1)(i)]	Sub-Basin ID [98.236(e)(1)(xviii)]	Glycol dehydrator feed natural gas flow rate determined by engineering estimate based on best available data (MMscfd) [98.236(e)(1)(ii)]	Dehydrator feed natural gas water content (pounds per MMscf) [98.236(e)(1)(iii)]	Dehydrator outlet natural gas water content (pounds per MMscf) [98.236(e)(1)(iv)]

Dehydrator absorbent circulation rate (gallons per minute) [98.236(e)(1)(vi)]

Were any dehydrator emissions vented to a vapor recovery device? [98.236(e)(1)(xv)]	Were any dehydrator emissions vented to a flare or regenerator firebox/fire tubes? [98.236(e)(1)(xvii)]	CO ₂ Emissions (t) [98.236(e)(1)(xvi)]

Were any dehydrator emissions vented to the atmosphere without being routed to a flare or regenerator firebox/fire tubes? [98.236(e)(1)(xvii)]

Well Venting for Liquid Unloading

Note that Calculation Methodology 1 is reported in two tables (F.1 and F.2).

For Sub-basins using Calculation Methodology 1, complete the following two tables:

Table F.1 Calculation Methodology 1 (counts, time, emissions)

Sub-Basin ID [98.236(f)(1)(i)]	Tubing Diameter Group/Pressure Group [98.236(f)(1)(ii)]	Were Plunger Lifts used? [98.236(f)(1)(iii)]	Number of Wells vented for liquids unloading, h [98.236(f)(1)(iv)]

Percentage of wells for which the monitoring period used to determine the cumulative amount of time venting was not the full calendar year [98.236(f)(1)(v)]	Cumulative amount of time wells were vented, Sum of T _p Values (hours) [98.236(f)(1)(vi)]	Cumulative Number of Unloadings Vented [98.236(f)(1)(vii)]	Annual natural gas emissions from well venting for liquids unloading (standard cubic feet) [98.236(f)(1)(viii)]	Total CO ₂ Emissions (mt CO ₂) [98.236(f)(1)(ix)]	Total CH ₄ Emissions (mt CH ₄) [98.236(f)(1)(x)]

Well Venting for Liquid Unloading (continued)

Table F.2 Calculation Methodology 1 (Characterization of tested wells)

Complete this table for wells tested for Calculation Methodology 1:

Specification of whether plunger lifts were used changes the table's conditional formatting.

Sub-Basin ID [98.236(f)(1)(i)]	Tubing Diameter Group/Pressure Group [98.236(f)(1)(ii)]	Were Plunger Lifts used? [98.236(f)(1)(iii)]
		Yes
		No

Data in these columns refers to each individual well in the sub-basin that was tested						
API Well Number of tested well [98.236(f)(1)(xi)(A)] [98.236(f)(1)(xii)(A)]	Casing pressure (psia) [98.236(f)(1)(xi)(B)]	Internal casing diameter (inches) [98.236(f)(1)(xi)(C)]	Tubing pressure (psia) [98.236(f)(1)(xii)(B)]	Internal tubing diameter (inches) [98.236(f)(1)(xii)(C)]	Depth of the Well (feet) [98.236(f)(1)(xi)(D)] [98.236(f)(1)(xii)(D)]	Average flow rate of the measured well venting, FR (standard cubic feet per hour) [98.236(f)(1)(xi)(E)] [98.236(f)(1)(xii)(E)]

Well Venting for Liquid Unloading (continued)

Table F.3 Calculation Methodology 2 & 3 (with or without plunger lifts)

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For Sub-basins using Calculation Methodology 2 (without plunger lifts) and Calculation Methodology 3 (with plunger lifts), complete following table:

Sub-Basin ID [98.236(f)(2)(i)]	Calculation Methodology	Were Plunger Lifts used? [98.236(f)(2)(iii)]	Number of wells vented for liquids unloading, W [98.236(f)(2)(iv)]	Cumulative number of unloadings vented to the atmosphere, V_p [98.236(f)(2)(v)]
	Calculation Methodology 2 [98.236(f)(2)(ii)]	No		
	Calculation Methodology 3 [98.236(f)(2)(ii)]	Yes		

Annual natural gas emissions from well venting for liquids unloading (standard cubic feet) [98.236(f)(2)(vi)]	Total CO ₂ Emissions (mt CO ₂) [98.236(f)(2)(vii)]	Total CH ₄ Emissions (mt CH ₄) [98.236(f)(2)(viii)]	Average internal casing diameter, CD_p (Calc. Methodology 2) (inches) [98.236(f)(2)(ix)]	Average internal tubing diameter, TD_p (Calc. Methodology 3) (inches) [98.236(f)(2)(x)]

For RY15, a single table is used for both Calculation Methodologies 2 and 3.

Specification of whether plunger lifts were used changes the table's conditional formatting.

Gas Well Completion & Workovers

Table G.1 Gas Well Completions with Hydraulic Fracturing

Complete the following table for gas well completions *with* hydraulic fracturing

Well Type Combination						Are the only wells in the sub-basin used to calculate "cumulative gas flowback time" or "measured flowback rates" wildcat or delineation wells subject to a 2-year delay in reporting?
Sub-Basin ID [98.236(g)(1)]	Well Type [98.236(g)(2)(i)]	Is gas flared? [98.236(g)(2)(ii)]	Reduced Emission Completions? [98.236(g)(2)(iii)]	Total count of completions in the calendar year, W [98.236(g)(3)]	Equation Used (Select) [98.236(g)(4)]	
					Equation W-10A	
					Equation W-10B	

When using Equation W-10A				When using Equation W-10B		
Are the only wells in the sub-basin used to calculate "cumulative gas flowback time" or "measured flowback rates" wildcat or delineation wells subject to a 2-year delay in reporting? [98.236(g)(5)(i)] [98.236(g)(5)(ii)]	Cumulative gas flowback time from all wells during completions from when gas is first detected until sufficient quantities are present to enable separation, $\text{Sum of } T_{p,j}$ values (hours) [98.236(q)(5)(i)]	Cumulative gas flowback time from all wells during completions after sufficient quantities of gas are present to enable separation, $\text{Sum of } T_{p,s}$ values (hours) [98.236(q)(5)(i)]	Measured flowback rate during well completions, $\text{Average of } FR_{s,p}$ (standard cubic feet per hour) [98.236(g)(5)(ii)]	Flow volume vented or sent to a flare, $FV_{s,p}$ (standard cubic feet) [98.236(q)(6)(i)]	Flow rate, $FR_{p,j}$ (standard cubic feet per hour) [98.236(q)(6)(iii)]	Annual gas emissions, $E_{s,n}$ (standard cubic feet) [98.236(g)(7)]

Gas Well Completion & Workovers (continued)

The RY14 table for completions and workovers without hydraulic fracturing has been split into three tables—vented completions (H.1), flared completions (H.2), and workovers (H.3).

Table H.1 Gas well completions WITHOUT hydraulic fracturing (without flaring)

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Complete the following table for gas well completions that vented directly to the atmosphere *without* hydraulic fracturing [98.236(h)(1)]

Sub-Basin ID [98.236(h)(1)(i)]	Total count of completions that vented directly to atmosphere without flaring [98.236(h)(1)(ii)]	Total number of hours that gas vented directly to atmosphere, Sum of all T_p [98.236(h)(1)(iii)]	Average daily gas production rate		Annual total CO ₂ emissions that resulted from venting gas directly to the atmosphere for completions, $E_{s,p}$ (mt CO ₂) [98.236(h)(1)(v)]	Annual total CH ₄ emissions that resulted from venting gas directly to the atmosphere for completions, $E_{s,p}$ (mt CH ₄) [98.236(h)(1)(vi)]
			Are the only wells in the sub-basin used to calculate "average daily gas production rate" wildcat or delineation wells subject to a 2-year delay in reporting? [98.236(h)(1)(iv)]	Average daily gas production rate, Average of all V_p (standard cubic feet/hour) [98.236(h)(1)(iv)]		
			Yes			
			No			

Table H.2 Gas well completions WITHOUT hydraulic fracturing (with flaring)

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Complete the following table for gas well completions with flaring *without* hydraulic fracturing [98.236(h)]

Sub-Basin ID [98.236(h)(2)(i)]	Total count of completions that flared gas [98.236(h)(2)(ii)]	Total Number of hours that gas vented to a flare, Sum of all T_p [98.236(h)(2)(iii)]	Average daily production rate		Annual total CO ₂ emissions that resulted from flares for completions (mt CO ₂) [98.236(h)(2)]	Annual total CH ₄ emissions that resulted from flares for completions (mt CH ₄) [98.236(h)(2)(vi)]	Annual total N ₂ O emissions that resulted from flares for completions (mt N ₂ O) [98.236(h)(2)(vii)]
			Are the only wells in the sub-basin wildcat or delineation wells subject to a 2-year delay in reporting? [98.236(h)(2)(iv)]	Average daily gas production rate, Average of all V_p (standard cubic feet/hour) [98.236(h)(2)(iv)]			
			Yes				
			No				

Gas Well Completion & Workovers (continued)

Table H.3 Gas well workovers WITHOUT hydraulic fracturing

Complete the following table for gas well workovers *without* hydraulic fracturing

Workovers that vented directly to the atmosphere				
Sub-Basin ID [98.236(h)(3)(i)] [98.236(h)(4)(i)]	Did the facility have gas well workovers without flaring within each sub-basin category? [98.236(h)(3)] [98.236(h)(4)]	Total count of workovers that vented directly to atmosphere without flaring [98.236(h)(3)(ii)]	Annual total CO ₂ emissions that resulted from venting gas directly to the atmosphere for workovers, E _{s,wo} (mt CO ₂) [98.236(h)(3)(iii)]	Annual total CH ₄ emissions that resulted from venting gas directly to the atmosphere for workovers, E _{s,wo} (mt CH ₄) [98.236(h)(3)(iv)]

Workovers with flaring			
Total count of workovers with flaring [98.236(h)(4)(ii)]	Annual total CO ₂ emissions that resulted from flares for workovers (mt CO ₂) [98.236(h)(4)(iii)]	Annual total CH ₄ emissions that resulted from flares for workovers (mt CH ₄) [98.236(h)(4)(iv)]	Annual total N ₂ O emissions that resulted from flares for workovers (mt N ₂ O) [98.236(h)(4)(v)]

Table H.3 contains all of same elements as in the past that apply to workovers without hydraulic fracturing.

Blowdown Vent Stacks

Table I.1 Blowdown Vent Stacks Emissions Type

How were emissions determined?
[98.236(i)]

All data elements are new or revised.

Table I.2 Blowdown Vent Stacks Emissions Calculated by Equipment or Event type

Complete the following table for emissions that were calculated by **equipment or event type**

Equipment or event type	Total number of blowdowns for equipment or event type, N	Annual total CO ₂ emissions for each equipment or event type (mt CO ₂)	Annual total CH ₄ emissions for each equipment or event type (mt CH ₄)
[98.236(i)(1)]	[98.236(i)(1)(i)]	[98.236(i)(1)(ii)]	[98.236(i)(1)(iii)]

Table I.3 Blowdown Vent Stacks Emissions Calculated using flow meters

Complete the following table for all blowdown stacks for which emissions were calculated using **flow meters**

Annual total CO ₂ emissions calculated by flow meter (mt CO ₂)	Annual total CH ₄ emissions calculated by flow meter (mt CH ₄)
[98.236(i)(2)(i)]	[98.236(i)(2)(ii)]

Production Storage (Atmospheric) Tanks

Table J.1 Wellhead gas-liquid separator or well with oil throughput ≥ 10 barrels/day using Calculation Methodology 1 or 2

Sub-Basin ID [98.236(j)(1)(i)]	Select Calculation Methodology Used (Select from list) [98.236(j)(1)(ii)]	Name of software package used for Calculation Methodology 1 [98.236(j)(1)(iii)]	Total volume of oil	
			Are the only wells used to calculate "total volume of oil" in the sub-basin wildcat or delineation wells subject to a 2-year delay in reporting? [98.236(j)(1)(iii)]	Total volume of oil sent to tanks from all wellhead separators and direct from wells (bbl per yr) [98.236(j)(1)(iii)]
			Yes	
			No	

Average gas-liquid separator temperature (°F) [98.236(j)(1)(iv)]	Average gas-liquid separator pressure (psig) [98.236(j)(1)(v)]	Average sales oil or stabilized oil API gravity (degrees) [98.236(j)(1)(vi)]	Range of CO ₂ concentration of flash gas		Range of CH ₄ concentration of flash gas	
			Minimum concentration of CO ₂ in flash gas (mole fraction) [98.236(j)(1)(vii)]	Maximum concentration of CO ₂ in flash gas (mole fraction) [98.236(j)(1)(vii)]	Minimum concentration of CH ₄ in flash gas (mole fraction) [98.236(j)(1)(viii)]	Maximum concentration of CH ₄ in flash gas (mole fraction) [98.236(j)(1)(viii)]

Number of wells sending oil to gas-liquid separators or directly to atmospheric tanks [98.236(j)(1)(ix)]	Count of atmospheric tanks [98.236(j)(1)(x)]	Estimated number of atmospheric tanks not on well pads [98.236(j)(1)(xi)]

The amended rule consolidated 4 methods into 2; two RY14 tables were combined in one table for RY15. Some elements now apply more broadly than in RY14 (e.g., the range of CO₂ and CH₄ concentrations in the flash gas now apply to both tanks receiving oil from wellhead separators AND now also for tanks receiving oil direct from wells or from separators off the wellpad).

Production Storage (Atmospheric) Tanks (continued)

Table J.1 Wellhead gas-liquid separator or well with oil throughput ≥ 10 barrels/day using Calculation Methodology 1 or 2

Emissions controlled with vapor recovery systems

Were any emissions from atmospheric tanks controlled with vapor recovery systems?	Count of tanks that control emissions with vapor recovery systems	Total CO ₂ mass that was recovered (mt CO ₂)	Total CH ₄ mass that was recovered (mt CH ₄)	Annual CO ₂ emissions from tanks with vapor recovery systems (mt CO ₂)	Annual CH ₄ emissions from tanks with vapor recovery systems (mt CH ₄)
[98.236(j)(1)(xii)]	[98.236(j)(1)(xii)(A)]	[98.236(j)(1)(xii)(B)]	[98.236(j)(1)(xii)(C)]	[98.236(j)(1)(xii)(D)]	[98.236(j)(1)(xii)(E)]

Emissions vented directly to atmosphere

Were any emissions from atmospheric tanks vented directly to the atmosphere?	Count of tanks that vented directly to the atmosphere	Annual CO ₂ emissions from venting (mt CO ₂)	Annual CH ₄ emissions from venting (mt CH ₄)
[98.236(j)(1)(xiii)(A)]	[98.236(j)(1)(xiii)(A)]	[98.236(j)(1)(xiii)(B)]	[98.236(j)(1)(xiii)(C)]

Emissions vented to flare(s)

Were any emissions from atmospheric tanks vented to flare(s)?	Count of tanks with flaring emission control measures	Annual CO ₂ emissions from flaring (mt CO ₂)	Annual CH ₄ emissions from flaring (mt CH ₄)	Annual N ₂ O emissions from flaring (mt N ₂ O)
[98.236(j)(1)(xiv)]	[98.236(j)(1)(xiv)(A)]	[98.236(j)(1)(xiv)(B)]	[98.236(j)(1)(xiv)(C)]	[98.236(j)(1)(xiv)(D)]

Production Storage (Atmospheric) Tanks (continued)

Table J.2.i Wells and separators with oil throughput <10 barrels/day using Calculation Methodology 3

For wells and separators with oil throughput <10 barrels per day using Calculation Methodology 3, complete the following table:

Estimate of fraction of oil throughput sent to tanks in basin with flaring [98.236(j)(2)(i)(B)]	Estimate of fraction of oil throughput sent to tanks with vapor recovery system control measures [98.236(j)(2)(i)(C)]	Count of atmospheric tanks in basin [98.236(j)(2)(i)(D)]	Count of wells with gas-liquid separators, Count [98.236(j)(2)(i)(E)]	Count of wells without gas-liquid separators, Count [98.236(j)(2)(i)(F)]	Annual oil throughput	
					Are the only wells in the sub-basin used to calculate "annual oil throughput" wildcat or delineation wells subject to a 2-year delay in reporting? [98.236(j)(2)(i)(A)]	Total annual oil throughput that is sent to all atmospheric tanks (barrels per year) [98.236(j)(2)(i)(A)]
					No	

Table J.2.ii Data for wells and separators with oil throughput <10 barrels/day, without flaring, using Calculation Methodology 3

For wells and separators with oil throughput <10 barrels per day without flaring using Calculation Methodology 3, complete the

Sub-Basin ID [98.236(j)(2)(ii)(A)]	Count of tanks that did not control emissions with flares [98.236(j)(2)(ii)(B)]	Annual CO ₂ emissions from tanks without flares (mt CO ₂) [98.236(j)(2)(ii)(C)]	Annual CH ₄ emissions from tanks without flaring (mt CH ₄) [98.236(j)(2)(ii)(D)]

“Count of wells...” data are now reported at the basin level. The reporting of the amount of CO₂ and CH₄ recovered is no longer required.

Table J.2.iii Data for wells and separators with oil throughput <10 barrels/day, with flaring, using Calculation Methodology 3

For wells and separators with oil throughput <10 barrels per day with flaring using Calculation Methodology 3, complete the following table for each sub-basin:

Sub-Basin ID [98.236(j)(2)(iii)(A)]	Count of tanks with flaring emission control measures [98.236(j)(2)(iii)(B)]	Annual CO ₂ emissions from flaring (mt CO ₂) [98.236(j)(2)(iii)(C)]	Annual CH ₄ emissions from flaring (mt CH ₄) [98.236(j)(2)(iii)(D)]	Annual N ₂ O emissions from flaring (mt N ₂ O)

Production Storage (Atmospheric) Tanks (continued)

Table J.3 Emissions from improperly functioning dump valves RETURN TO TOP

If Calculation Methodology 1 or 2 were used, and any gas-liquid separator liquid dump valves did not close properly during the calendar year, complete the following table for each sub-basin:

Sub-Basin ID [98.236(j)(3)]	Count of gas-liquid separators whose liquid dump valves did not close properly [98.236(j)(3)(i)]	Total time the dump valves did not close properly, T_n (hours) [98.236(j)(3)(ii)]	CO ₂ emissions from improperly functioning dump valves (mt CO ₂) [98.236(j)(3)(iii)]	CH ₄ emissions from improperly functioning dump valves (mt CH ₄) [98.236(j)(3)(iv)]

The count of gas-liquid separators whose dump valves did not close properly now must be reported per sub-basin rather than at the basin level.

Equation W-16 has been revised to eliminate the potential double-counting of emissions.

Transmission Storage Tanks

Table K.1 Transmission tank emissions

Fill out the following table for each vent stack:

Unique Name or ID number for the transmission storage tank vent stack [98.236(k)(1)(i)]	Method used to determine if dump valve leakage occurred [98.236(k)(1)(ii)]	Did dump valve leakage occur? [98.236(k)(1)(iii)]	Was there a flare attached to the transmission storage tank vent? [98.236(k)(1)(iv)]
--	---	--	---

Dump valve leakage directly to atmosphere

Most data elements are new this year.

Did scrubber valve leakage occur while the vent stack was vented directly to the atmosphere? [98.236(k)(2)]	Method used to measure leak rate [98.236(k)(2)(i)]	Measured leak rate (standard cubic feet/hour) [98.236(k)(2)(ii)]	Duration or time leak is counted as having occurred (vented to atmosphere) (hours) [98.236(k)(2)(iii)]	CO ₂ emissions from venting gas directly to the atmosphere (mt CO ₂) [98.236(k)(2)(iv)]	CH ₄ emissions from venting gas directly to the atmosphere (mt CH ₄) [98.236(k)(2)(v)]
--	---	---	---	---	--

Flared dump valve leakage

Did scrubber valve leakage occur while the vent stack was vented to a flare? [98.236(k)(3)]	Method used to measure leak rate [98.236(k)(3)(ii)]	Measured leak rate (standard cubic feet/hour) [98.236(k)(3)(iii)]	Duration of time that flaring occurred (hours) [98.236(k)(3)(iii)]	CO ₂ emissions from flaring gas (mt CO ₂) [98.236(k)(3)(iv)]	CH ₄ emissions from flaring gas (mt CH ₄) [98.236(k)(3)(v)]	N ₂ O emissions from flaring gas (mt N ₂ O) [98.236(k)(3)(vi)]
--	--	--	---	--	---	---

Well Testing

*For RY15, oil well testing emissions and activity data (e.g., number of wells tested) is reported separately from gas well testing emissions and activity data.
In addition, the well testing data for wells that vent emissions directly to atmosphere is to be reported separately from data for wells that route the well testing emissions to flares.*

Table L.1 Complete the following table for well testing:

Equation used to calculate annual volumetric natural gas emissions? [98.236(l)]	Were well testing emissions vented or flared? [98.236(l)]	Number of wells tested in calendar year [98.236(l)(1)(i)] [98.236(l)(2)(i)] [98.236(l)(3)(i)] [98.236(l)(4)(i)]	Average number of days wells were tested [98.236(l)(1)(ii)] [98.236(l)(2)(ii)] [98.236(l)(3)(ii)] [98.236(l)(4)(ii)]	Are the only wells used to calculate "GOR", "flow rates" or "production rates" wildcat or delineation wells subject to a 2-year delay in reporting? [98.236(l)(1)(iv)] [98.236(l)(2)(iv)] [98.236(l)(3)(iii)] [98.236(l)(4)(iii)]
W-17A	Vented			
W-17A	Flared			
W-17B	Vented			
W-17B	Flared			

Well Testing

For Equation W-17A		For Equation W-17B			
Average gas to oil ratio, GOR (cubic feet of gas per barrel oil)	Average flow rate for well(s) tested, FR (barrels of oil per day)	Average annual production rate for well(s) tested (cubic feet per day)	Production rate for well reported on an Actual or Standard basis?	Temperature used to calculate production rate (°F)	Pressure used to calculate production rate (psi)
[98.236(l)(1)(iii)] [98.236(l)(2)(iii)]	[98.236(l)(1)(iv)] [98.236(l)(2)(iv)]	[98.236(l)(3)(iii)] [98.236(l)(4)(iii)]	[98.2331]	[98.2331]	[98.2331]

Average production rate for gas wells may be reported at actual or standard conditions (report the temperature and pressure at which the production rate was determined).

Venting Emissions		Flaring Emissions		
Total CO ₂ emissions from venting (mt CO ₂)	Total CH ₄ emissions from venting (mt CH ₄)	Total CO ₂ emissions from flaring (mt CO ₂)	Total CH ₄ emissions from flaring (mt CH ₄)	Total N ₂ O emissions from flaring (mt N ₂ O)
[98.236(l)(1)(v)] [98.236(l)(3)(iv)]	[98.236(l)(1)(vi)] [98.236(l)(3)(v)]	[98.236(l)(2)(v)] [98.236(l)(4)(iv)]	[98.236(l)(2)(vi)] [98.236(l)(4)(v)]	[98.236(l)(2)(vii)] [98.236(l)(4)(vi)]

Associated Gas

For RY15, all data elements are reported per sub-basin rather than at the basin level.

Table M.1 Associated Gas Venting and Flaring

Sub-Basin ID [98.236(m)(1)]	Was the associated natural gas vented or flared? [98.236(m)(2)] [98.236(m)(3)]	Average gas to oil ratio for the Basin, Average of GOR (cubic feet of gas per barrel of oil) [98.236(m)(4)]	Are the only wells in the sub-basin used to determine "volume of oil produced" or "volume of associated gas sent to sales" wildcat or delineation wells subject to a 2-year delay in reporting? [98.236(m)(5)] [98.236(m)(6)]	Volume of oil produced during venting/flaring, Sum of V_{p,q} (barrels) [98.236(m)(5)]	Volume of associated gas sent to sales, Sum of SG (standard cubic feet) [98.236(m)(6)]
			Yes		
			No		

Venting Emissions			Flaring Emissions			
Number of wells venting associated gas [98.236(m)(7)(i)]	Annual CO ₂ emissions from venting (mt CO ₂) [98.236(m)(7)(ii)]	Annual CH ₄ emissions from venting (mt CH ₄) [98.236(m)(7)(iii)]	Number of wells flaring associated gas [98.236(m)(8)(i)]	Annual CO ₂ emissions from flaring (mt CO ₂) [98.236(m)(8)(ii)]	Annual CH ₄ emissions from flaring (mt CH ₄) [98.236(m)(8)(iii)]	Annual N ₂ O emissions from flaring (mt N ₂ O) [98.236(m)(8)(iv)]

Flare Stacks

Table has been reorganized. CO₂ reporting previously was split into combusted versus uncombusted emissions; now only the combined total CO₂ is reported.

Table N.1 Complete the following table for each flare:

Unique Name or ID Number for the Flare Stack [98.236(n)(1)]	Were CEMS used to measure CO ₂ emissions for the flare stack? [98.233(n)(8)] [98.236(n)(12)]	Does the flare stack have a continuous flow monitor on gas to the flare? [98.236(n)(2)]	Does the flare stack have a continuous gas analyzer on gas to the flare? [98.236(n)(3)]	Volume of gas sent to flare, V _s (standard cubic feet) [98.236(n)(4)]	Fraction of feed gas sent to un-lit flare, Z _u [98.236(n)(5)]

Flare combustion efficiency (decimal value) [98.236(n)(6)]	Mole fraction of CH ₄ in flare feed gas, X _{CH4} [98.236(n)(7)]	Mole fraction of CO ₂ in flare feed gas, X _{CO2} [98.236(n)(8)]	CO ₂ emissions [98.236(n)(9)]	CH ₄ Emissions (Eq. W-19) [98.236(n)(10)]	N ₂ O Emissions (Eq. W-40) [98.236(n)(11)]

Centrifugal and Reciprocating Compressors

Table O.1 Compressor-Specific Activity Data

Complete the following table for each centrifugal compressor (except for those in the Onshore Petroleum and Natural Gas Production segment):

Compressor ID or Unique Name [98.236(o)(1)(i)]	Total time in operating-mode (hours) [98.236(o)(1)(ii)]	Total time in not-operating-depressurized-mode (hours) [98.236(o)(1)(iii)]	Compressor measured in operating-mode? [98.236(o)(1)(iv)]	Compressor measured in not-operating-depressurized-mode? [98.236(o)(1)(v)]	
Compressor had blind flanges installed? [98.236(o)(1)(x)]	Dates for blind flange installation (dd/mm/yyyy) [98.236(o)(1)(x)]	Seal Type (wet or dry) [98.236(o)(1)(xi)]	Number of wet seals [98.236(o)(1)(xii)]	Power output of compressor driver (hp) [98.236(o)(1)(xiii)]	Compressor had scheduled depressurized shutdown during reporting year? [98.236(o)(1)(xiv)]
Yes		Wet			

Centrifugal and Reciprocating Compressors (continued)

Table O.2.i Compressor Source-Specific Data

Complete the following table for each compressor source at each centrifugal compressor (except for those in the Onshore Petroleum and Natural Gas Production segment):

Unique Compressor Name or ID [98.236(o)(2)(i)(A)]	Centrifugal compressor source [98.236(o)(2)(i)(B)]	Unique Name or ID for leak or vent [98.236(o)(2)(i)(C)]

Table O.2.ii Compressor Leak or Vent Data

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Complete the following table for each individual leak or vent and each manifolded vent for centrifugal compressors (except for those in the Onshore Petroleum and Natural Gas Production segment):

Unique Name or ID for leak or vent [98.236(o)(2)(i)(C)]	Leak or vent for a single compressor source or a manifolded group? [98.236(o)(2)(ii)(A)] [98.236(o)(1)(vi)]	Where are leak or vent emissions released? [98.236(o)(2)(ii)(A)] [98.236(o)(1)(vii) through (ix)]	Was an "as found" measurement conducted on the leak or vent? [98.236(o)(2)(ii)(B)]	Were continuous measurements conducted on the leak or vent? [98.236(o)(2)(ii)(C)]	CO ₂ emissions vented to atmosphere (mt CO ₂) [98.236(o)(2)(ii)(D)(1)]	CH ₄ emissions vented to atmosphere (mt CH ₄) [98.236(o)(2)(ii)(D)(2)]	Percentage of time the device was operational when compressor source emissions were routed to device [98.236(o)(2)(ii)(E)]
		Atmosphere					
		Flare					

These tables are identical for reciprocating compressors. All data elements are new or revised, except the vented emissions.

Note that flared emissions no longer have to be reported specifically for compressors.

Centrifugal and Reciprocating Compressors (continued)

Table O.3.i Leak or Vent “As Found” Measurement Sample Data

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Complete the following table for each centrifugal compressor leak or vent with “as found” measurement sample data determined using 98.233(o)(2) or (4) (except for those in the Onshore Petroleum and Natural Gas Production segment):

If emissions were not detected, report only the screening method below. If emissions were detected, report only the method subsequently used to report the volumetric emission [as per 98.236(o)(3)(i)(C)].

Unique Name or ID for leak or vent [98.236(o)(3)(i)(A)]	Measurement date (mm/dd/yyyy) [98.236(o)(3)(i)(B)]	Measurement method [98.236(o)(3)(i)(C)]	Measured flow rate, $MT_{s,m}$, $MT_{s,g,avg}$ (standard cubic feet/hour) [98.236(o)(3)(i)(D)]	Is the measurement location prior to or after commingling with non-compressor emission sources? [98.236(o)(3)(i)(F)]	Mode for each compressor during leak or vent measurement [98.236(o)(3)(i)(E)]	
					Compressors in “Operating mode”	Compressors in “Not-operating mode”

Table O.3.ii Reporter Emission Factors for “As Found” Measurement Sample Data

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Complete the following table for each centrifugal compressor mode-source combination with “as found” measurement sample data where a reporter emission factor was calculated using Eq. W-23, and as specified in 98.233(o)(6)(iii) and (iv) (except for those in the Onshore Petroleum and Natural Gas Production segment):

Compressor mode-source combinations for which reporter emission factors were developed		Compressor mode-source combination reporter emission factor, $EF_{s,m}$ (standard cubic feet per hour) [98.236(o)(3)(ii)(B)]	Total number of compressors measured in the compressor mode-source combination in current reporting year and preceding two reporting years [98.236(o)(3)(ii)(C)]	Is the reporter emission factor facility-specific or based on all of the reporter’s applicable facilities? [98.236(o)(3)(ii)(D)]
Compressor Mode [98.236(o)(3)(ii)(A)]	Compressor Source [98.236(o)(3)(ii)(A)]			
Operating	Wet seal			
Operating	Blowdown valve			
Not-operating	Isolation valve			

Table P.3.ii differs from O.3.ii only in the types of applicable compressor mode-source combinations.

Centrifugal and Reciprocating Compressors (continued)

Table O.4 Leak or Vent Continuous Measurement

Complete the following table for each centrifugal compressor leak or vent with "continuous" measurement data determined using 98.233(o)(3) or (5) (except for those in the Onshore Petroleum and Natural Gas Production segment):

Unique Name or ID for leak or vent [98.236(o)(4)(i)]	Measured volume of flow during the reporting year, $Q_{s,v}$, $Q_{s,g}$ (million standard cubic feet) [98.236(o)(4)(ii)]	Did the measured volume of flow during the reporting year include compressor blowdowns? [98.236(o)(4)(iii)]	Is the measurement location prior to or after commingling with non-compressor emission sources [98.236(o)(4)(iv)]

Table O.5 Onshore Petroleum and Natural Gas Production Centrifugal Compressors

Number of Centrifugal Compressors with wet seal oil degassing vents, Count [98.236(o)(5)(i)]	Total annual Centrifugal Compressor emissions CO ₂ Emissions (mt CO ₂) [98.236(o)(5)(ii)]	Total annual Centrifugal Compressor emissions CH ₄ Emissions (mt CH ₄) [98.236(o)(5)(iii)]

For RY15 the count element for centrifugal compressors was revised to be the number of centrifugal compressors with wet seals, whereas in past years, the total number of centrifugal compressors was reported. For reciprocating compressors, the total count of reciprocating compressors is reported in Table P.5, the same as in past years.

Equipment Leaks

Table Q.1 Leak Survey Characterization

Number of complete equipment leak surveys performed during the calendar year	For Natural gas distribution facilities conducting multi-year surveys, number of years in the leak survey cycle
[98.236(q)(1)(i)]	[98.236(q)(1)(ii)]

Table Q.2 Emissions calculated for component types using emissions factors

Complete the following table for each component type that uses emission factors for estimating emissions for equipment leaks found in each leak survey:

if a component type is located at your facility and no leaks were identified from that component, a zero must be entered for data completeness as specified in 98.236(q)(2)	Component Type [98.236(q)(2)(i)]	Total number of surveyed component type identified as leaking, x_p [98.236(q)(2)(ii)]	Average time the surveyed components are assumed to be leaking and operational, $T_{p,z}$ (hours) [98.236(q)(2)(iii)]	CO ₂ Emissions (surveyed components identified as leaking only) (mt CO ₂) [98.236(q)(2)(iv)]	CH ₄ Emissions (surveyed components identified as leaking only) (mt CH ₄) [98.236(q)(2)(v)]
Onshore natural gas processing [98.232(d)(7)]	Compressor Components, Gas Service - Valve				
	Compressor Components, Gas Service - Connector				
	Compressor Components, Gas Service - Open-ended Line				
	Compressor Components, Gas Service - Pressure Relief Valve				
	Compressor Components, Gas Service - Meter				
	Non-Compressor Components, Gas Service - Valve				
	Non-Compressor Components, Gas Service - Connector				
	Non-Compressor Components, Gas Service - Open-ended Line				
	Non-Compressor components, Gas Service - Pressure Relief Valve				
	Non-Compressor components, Gas Service - Meter				

Equipment Leaks (continued)

Table Q.3 Natural gas distribution facility activity and emissions

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Complete the following table for **Natural Gas Distribution** facilities with emission sources listed in 98.232(i)(1)

NOTE: If you do not have any metering-regulating stations or transmission-distribution (T-D) transfer stations, enter zero, do not leave blank. Complete the following table for the facility:

Surveyed in calendar year:

Total number of above grade T-D transfer stations surveyed in the calendar year	[98.236(q)(3)(i)]
Number of meter/regulator runs at above grade T-D transfer stations surveyed in the calendar year, $Count_{MR,y}$	[98.236(q)(3)(ii)]
Average time meter/regulator runs surveyed in calendar year were operational, Average of calendar year $T_{w,y}$ (hours)	[98.236(q)(3)(iii)]

Surveyed in current leak survey cycle:

Number of above grade T-D transfer stations surveyed in current leak survey cycle	[98.236(q)(3)(iv)]
Number of meter/regulator runs at above grade T-D transfer stations surveyed in current leak survey cycle, $Sum\ of\ Count_{MR,y}$	[98.236(q)(3)(v)]
Average time that meter/regulator runs surveyed in the current leak survey cycle were operational, Average of current survey $T_{w,y}$ (hours)	[98.236(q)(3)(vi)]
Meter/regulator run CO ₂ emission factor based on all surveyed T-D transfer stations in current leak cycle, Average of current survey $EF_{S,MR,i}$ (standard cubic feet per operational hour of all meter/regulator runs)	[98.236(q)(3)(vii)]
Meter/regulator run CH ₄ emission factor based on all surveyed T-D transfer stations in current leak cycle, Average of current survey $EF_{S,MR,i}$ (standard cubic feet per operational hour of all meter/regulator runs)	[98.236(q)(3)(viii)]

Surveyed in multiple year leak survey cycle:

Does the facility perform equipment leak surveys across a multiple year leak survey cycle (Yes/No)	Yes
Total number of meter/regulator runs at above grade T-D station facilities, $Count_{MR}$	[98.236(q)(3)(ix)(A)]
Average estimated time that each meter/regulator run at above grade T-D transfer stations was operational in the calendar year, $T_{w,avg}$ (hours)	[98.236(q)(3)(ix)(B)]
Annual CO ₂ emissions from all above grade T-D transfer stations combined (mt CO ₂)	[98.236(q)(3)(ix)(C)]
Annual CH ₄ emissions from all above grade T-D transfer stations combined (mt CH ₄)	[98.236(q)(3)(ix)(D)]

There is no longer a separate sheet for local distribution companies (LDC). Distribution section of Table Q.2 and Tables Q.3 and R.3 replace LDC sheet.

Equipment Leaks (continued)

Table R.1 Equipment leaks calculated using population counts and factors (for Onshore Petroleum and Natural Gas Production only)

Emission Source Type (Eq. W-32A) [98.232(c)(21)] [98.233(r)]	Service Type [98.236(r)(1)(i)]	Geographic Location (according to Table W-1D) [98.236(r)(1)(ii)]	Total number of emission source type, $Count_e$ [98.236(r)(1)(ii)]	Average estimated time that the emission source type was operational in the calendar year, T_e (hours) [98.236(r)(1)(iii)]	CO ₂ Emissions (mt CO ₂) [98.236(r)(1)(iv)]	CH ₄ Emissions (mt CH ₄) [98.236(r)(1)(v)]
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Table R.2 Emissions calculated for component types by population count

Complete the following table for each component type that population counts for estimating emissions for equipment leaks using Equation W-32A:

	Emission Source Type (Eq. W-32A) [98.232] [98.233(r)(1)]	Total number of emission source type, $Count_e$ [98.236(r)(1)(ii)]	Average estimated time that the emission source type was operational in the calendar year, T_e (hours) [98.236(r)(1)(iii)]	CO ₂ Emissions (mt CO ₂) [98.236(r)(1)(iv)]	CH ₄ Emissions (mt CH ₄) [98.236(r)(1)(v)]
Underground natural gas storage [98.232(f)(5)]	Storage wellheads, Gas Service - Valves				
	Storage wellheads, Gas Service - Connector				
	Storage wellheads, Gas Service - Open-ended line				
	Storage wellheads, Gas Service - Pressure Relief Valve				

Equipment Leaks (continued)

Table R.3 Equipment leaks calculated using population counts and factors (for Natural Gas Distribution only)

Number of above grade T-D transfer stations at the facility [98.236(r)(2)(i)]	10
Number of above grade metering-regulating stations that are not T-D transfer stations [98.236(r)(2)(iii)]	5
Total number of meter/regulator runs at above grade metering-regulating stations that are not above grade T-D transfer stations, $Count_{MR}$ [98.236(r)(2)(iii)]	5
Average estimated time that each meter/regulator run at above grade metering-regulating stations that are not above grade T-D transfer stations was operational in the calendar year, $T_{w,avg}$ (hours) [98.236(r)(2)(iv)]	

If your facility has above grade metering-regulating stations that are not above grade T-D transfer stations AND your facility also has above grade T-D transfer stations, you must reporting the following emissions

Annual CO ₂ emissions from above grade metering-regulating stations that are not above grade T-D transfer stations [98.236(r)(2)(v)(A)]	
Annual CH ₄ emissions from above grade metering-regulating stations that are not above grade T-D transfer stations [98.236(r)(2)(v)(B)]	

Equipment Leaks (continued)

Table R.4 Major Equipment Type (for Onshore Petroleum and Natural Gas Production only)

RETURN TO TOP

Calculation method	
[98.236(r)(3)(i)]	

	Major Equipment Type [98.236(r)(3)(ii)(A)]	Equipment type present at facility? [98.236(r)(3)(ii)(A)]	Geographic Location (according to Table W-1D) [98.236(r)(3)(ii)(A)]	Count of Major Equipment Type [98.236(r)(3)(ii)(B)]
Natural gas production equipment (Table W-1B) [98.236(r)(3)(ii)(A)]	Wellhead	Yes		
	Separators			
	Meters/piping			
	Compressors			
	In-line heaters			
	Dehydrators			
Crude oil production equipment (Table W-1C) [98.236(r)(3)(ii)(A)]	Wellhead			
	Separators			
	Heater-treater			
	Header			

EOR Injection Pumps

Did the facility use CO₂ EOR injection during the calendar year [98.236(w)]?

Yes No

Did any EOR injection pump blowdowns occur at the facility during the calendar year [98.236(w)]?

Yes No

Table W.1 EOR injection pump system characterization and emissions:

Sub-Basin ID [98.236(w)(1)]	EOR injection pump system identifier [98.236(w)(2)]	Pump capacity (barrels per day) [98.236(w)(3)]	Total volume of EOR injection pump system equipment chambers, V_v (cubic feet) [98.236(w)(4)]	Number of blowdowns per year [98.236(w)(5)]	Density of critical phase EOR injection gas, R_c (kg/ft ³) [98.236(w)(6)]	Mass fraction of CO ₂ in critical phase EOR injection gas, GHG_{CO_2} [98.236(w)(7)]	CO ₂ emissions (mt CO ₂) [98.236(w)(8)]

Total volume of EOR injection pump system equipment chambers is a revised data element (previously reported the volume of critical phase gas between isolation valves).

Combustion Equipment

Combustion Equipment at Onshore Petroleum and Natural Gas Production Facilities and Natural gas Distribution Facilities [98.236(z)]

Version R.5

[Back to Summary Tab](#)

Worksheet Instructions:

In accordance with 98.232, only the following industry segment must report data for combustion emissions:

- Onshore petroleum and natural gas production [98.230(a)(2)]
- Natural gas distribution [98.230(a)(8)]

Table Z.1 External combustion units with a heat capacity equal to or less than 5 mmBtu/hr or Internal combustion units equal to or less than 1 mmBtu/hr:

Are there external fuel combustion units with a rated heat capacity less than or equal to 5 mmBtu/hr? [98.236(z)(1)(i)]	Yes
Are there internal fuel combustion units that are not compressor-drivers, with a rated heat capacity less than or equal to 1 mmBtu/hr? [98.236(z)(1)(i)]	
Total Number of combustion units meeting the above criteria [98.236(z)(1)(ii)]	

Total number... in Table Z.1 now reports only a single sum of all “small” combustion units rather than separate counts of workover equipment, process heaters, electrical generators, etc.

Table Z.2 External combustion units with a heat capacity greater than 5 mmBtu/hr or Internal combustion units greater than 1 mmBtu/hr:

Are there external fuel combustion units with a rated heat capacity greater than 5 mmBtu/hr? [98.236(z)(2)(i)]	
Are there internal fuel combustion units that are not compressor-drivers, with a rated heat capacity greater than 1 mmBtu/hr? [98.236(z)(2)(i)]	
Are there Internal fuel combustion units of any heat capacity that are compressor-drivers? [98.236(z)(2)(i)]	

All rows in Table Z.2 are new elements—i.e., yes/no indications whether there are any “large” combustion units or any compressor drivers.

Combustion Equipment (continued)

Table Z.3 Large combustion unit emissions:

Type of combustion unit [98.236(z)(2)(i)]	Type of fuel combusted [98.236(z)(2)(ii)]	Quantity of fuel combusted in calendar year [98.236(z)(2)(iii)]	Unit of measure [98.236(z)(2)(iii)]	CO ₂ Emissions (mt CO ₂) [98.236(z)(2)(iv)]	CH ₄ Emissions (mt CH ₄) [98.236(z)(2)(v)]	N ₂ O Emissions (mt N ₂ O) [98.236(z)(2)(vi)]

This table consolidates 4 separate tables from the RY14 form.

As in Tables Z.1 and Z.2, the type of unit for which the information is reported has been changed. In past years, reporting of the type of unit meant the type of unit application such as well drilling, steam boiler, electrical generator, etc. For RY15, reporting is for aggregated “large” external combustion units, aggregated “large” internal combustion units, and aggregated compressor drivers.

No longer required to report the count of “large” external combustion units.

Missing data procedures

Table I.4 Missing data procedures used for Blowdown Vent Stacks emission calculations

Compliance Method	Type	Parameters	Measurement Frequency
Using flow meters		Vented natural gas emissions volume	Continuous
Calculated by equipment or event type	Facility piping	Total number of blowdowns	N/A (i.e., activity data parameters that are determined but not measured)

Tables have been added for most sources for the identification of parameters for which “missing data procedures” were used.

Frequency	Number of quarters missing data procedures were used	Total number of hours in the year missing data procedure was used	Procedures used
	[98.236(bb)(1)]	[98.3(c)(8)] [98.236(bb)(2)]	[98.235(h)]

How to Submit Your Report

The screenshot shows the EPA e-GGRT interface for the 'Foghorn Test Facility'. The top navigation bar includes 'HOME', 'FACILITY REGISTRATION', 'FACILITY MANAGEMENT', and 'DATA REPORTING'. The left sidebar has 'e-GGRT Help' and 'Subpart W Help'. The main content area is titled 'Subpart W: Petroleum and Natural Gas Systems (2015)' and includes a 'Subpart Overview' section with reporting requirements. On the right, three summary boxes show emission values: 2,010.0 for CO2, 1,010.0 for CH4, and 6.000 for N2O. A warning box with a yellow triangle icon says 'Subpart W: View Validation'. Below this, there are sections for 'DOWNLOAD FORM' (with a 'Subpart W GHG Reporting' link) and 'UPLOAD COMPLETED SUBPART W INTEGRATED REPORTING FORM'. The upload section features a 'Browse...' button (highlighted with a red box) showing 'No file selected.' and an 'UPLOAD' button (also highlighted with a red box). A table below the upload section lists an uploaded file: 'Onshore Production Example.xls' by 'Marty Huppert' on 'February 22, 2016'. At the bottom, there is a 'Facility Overview' link and a footer with 'Paperwork Reduction Act Burden Statement | Contact Us' and 'e-GGRT RY2015.R46 | W-overview'.

EPA United States Environmental Protection Agency

HOME FACILITY REGISTRATION FACILITY MANAGEMENT DATA REPORTING

e-GGRT Help
Subpart W Help

Foghorn Test Facility

Subpart W: Petroleum and Natural Gas Systems (2015)

Subpart Overview

OVERVIEW OF SUBPART REPORTING REQUIREMENTS

Subpart W requires affected facilities to report CO₂, CH₄, and N₂O emissions from onshore and offshore petroleum and natural gas production. If you are subject to other subparts (e.g. Subpart C) you should return to the Facility Overview page, select the appropriate subpart(s), and complete the data reporting requirements of each subpart. To satisfy the Subpart W reporting requirements you will first download the Subpart W reporting form(s). Use the link provided to access the form(s) and find instructions for completing those forms. Next, you will upload the completed form(s) and e-GGRT will validate the data contained within them. Use the "View Validation" link to review any issues found in your reporting forms. If necessary, make any revisions necessary to your reporting forms and upload the revised reporting forms.

For additional information about Subpart W reporting, please use the e-GGRT Help link(s) provided.

Annual mass of CO₂ (metric tons) **2,010.0**

Annual mass of CH₄ (metric tons) **1,010.00**

Annual mass of N₂O (metric tons) **6.000**

Subpart W: View Validation

SUBPART W SUMMARY INFORMATION FOR THIS FACILITY

1.) DOWNLOAD FORM

[Subpart W GHG Reporting](#)

2.) UPLOAD COMPLETED SUBPART W INTEGRATED REPORTING FORM

No file selected.

Uploaded File Name	Attached By	Date	Delete
Onshore Production Example.xls	Marty Huppert	February 22, 2016	✖

[Facility Overview](#)

Paperwork Reduction Act Burden Statement | Contact Us e-GGRT RY2015.R46 | W-overview

Login to e-GGRT at:
<https://ghgreporting.epa.gov>


How to Submit Your Report (continued)

Subpart W: Petroleum and Natural Gas Systems (2015)

[Subpart Overview](#) » [Validation Report](#)

SUBPART VALIDATION REPORT


This report contains a complete set of validation messages at the subpart level. Clicking the message text will redirect you to the screen that contains the field that generated the validation message.

[Print-friendly version](#) 


FACILITY-LEVEL VALIDATION MESSAGES

Validation Type ¹	ID ²	Message ³
No facility-level validation messages found.		

FILE-LEVEL VALIDATION MESSAGES

Validation Type ¹	ID ²	Details	Message ³
Data Completeness	W3004	Object Type: (g, h) Completions & Workovers - WellCompletionsWorkoversData File Name: Onshore Production Example.xls	Were BAMM used for any parameters to calculate GHG emissions? [98.234(f)(2)(ii)]? This data element is required.
Data Completeness	W3006	Object Type: (g, h) Completions & Workovers - WellCompletionsWorkoversData File Name: Onshore Production Example.xls	Were missing data procedures used for any parameters to calculate GHG emissions? [98.235] This data element is required.
Data Completeness	W3053 	Object Type: (g, h) Completions & Workovers - WellWorkoversWithHydraulicFracturing Sub-Basin ID: 984 - KODIAK ISLAND, AK (150) - Other tight reservoir rock File Name: Onshore Production Example.xls	Annual gas emissions, Es,n (standard cubic feet) [98.236(g)(7)]. This data element is required for this sub-basin ID.

[← Subpart Overview](#)

 **Critical Validation Error:** Messages that appear with the stop sign icon will prevent you from generating and submitting your annual report. You should first address the errors described. If you feel you have received one of these messages in error, or there's a reason why your report should be submitted despite the message, please [submit a request to the e-GGRT Help Desk](#).

XML-based Submission – Schema Changes

- EPA has revised the XML schema for Subpart W to reflect the reporting requirements for 2015
- The XML reporting schema and updated instructions for Subpart W can be downloaded at <http://www.ccdsupport.com/confluence/display/help/XML+Reporting+Instructions>

GHGRP Help Desk

Email: ghgreporting@epa.gov

Web: <http://www.ccdsupport.com/confluence/display/help/>

Telephone:

1-877-444-1188 (toll free)

1-703-676-4400 (outside U.S.)

As a reminder, please do not submit sensitive or business confidential information to the helpline. Anything you send to the Help Desk may be made available to the public.

ccdsupport.com/confluence/display/help/home

Welcome to GHGRP Help

This site contains news, FAQs, help and other information about EPA's Greenhouse Gas Reporting Program and the electronic Greenhouse Gas Reporting Tool (e-GGRT).



Latest News

- [2015 Reporting Forms and XML Schema Available](#)
- [New e-GGRT Training Webinars Scheduled for RY2015](#)
- [Preparing for RY2015 Reporting](#)

[e-GGRT RSS Feed](#)



Registration Instructions

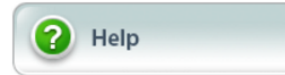
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