Petroleum and Natural Gas Systems (Subpart W) Reporting Year 2016 Form

U.S. Environmental Protection Agency

Greenhouse Gas Reporting Program (GHGRP)

March 2017

Overview of Webinar

- Review changes to the Subpart W reporting form for RY16
- Uploading and submitting
- XML reporting
- Resources

Changes in RY16 Reporting

Beginning RY16, new data collection for:

- Oil well completions and workovers with hydraulic fracturing
- Well identification reporting for Onshore petroleum and natural gas production
- Gathering and boosting systems
- Blowdowns of natural gas transmission pipelines

For more detailed information on the reporting requirements for the new segments, Onshore petroleum and natural gas gathering and boosting or Onshore natural gas transmission pipelines, please see Subpart W 2015 Revisions Rule Implementation webinar slides: https://www.epa.gov/sites/production/files/2016-03/documents/subpart-w_2016_implementation_webinar.pdf

Best Available Monitoring Methods (BAMM) Requirements

- BAMM automatically granted for RY16 for monitoring and measurements for:
  - Oil well completions and workovers with hydraulic fracturing
  - Onshore petroleum and natural gas gathering and boosting segment (specific sources)
  - Natural gas transmission pipeline segment (blowdowns)

- FAQ829: What are the Subpart W BAMM provisions for reporting year 2016?

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 RY16 Reporting Form

Introduction
(aa)(1) Onshore Production
(aa)(2-11) Facility Overview
(b) NG Pneumatic Devices
(c) NG Driven Pneumatic Pumps
(d) Acid Gas Removal Units
(e) Dehydrators
(f) Liquids Unloading
(g) Wells with Fracturing
(h) Wells without Fracturing
(i) Blowdown Vent Stacks
(j) Atmospheric 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 5 are substantively similar to another source or unchanged from Reporting Year 2015 (RY15) and are not reviewed in today's presentation.

Onshore petroleum and natural gas gathering and boosting requirements

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Emission source category	Citations		Reporting form
	Calculations	Reporting	
Natural gas pneumatic devices	§ 98.233(a)	§ 98.236(b)	Tab (b)
Natural gas pneumatic pumps	§ 98.233(c)	§ 98.236(c)	Tab (c)
Acid gas removal units	§ 98.233(d)	§ 98.236(d)	Tab (d)
Dehydrators	§ 98.233(e)	§ 98.236(e)	Tab (e)
Blowdown vent stacks	§ 98.233(i)	§ 98.236(i)	Tab (i)
Atmospheric storage tanks	§ 98.233(j)	§ 98.236(j)	Tab (j)
Flare stacks	§ 98.233(n)	§ 98.236(n)	Tab (n)
Centrifugal compressors	§ 98.233(o)	§ 98.236(o)	Tab (o)
Reciprocating compressors	§ 98.233(p)	§ 98.236(p)	Tab (p)
Equipment leaks	§ 98.233(r)	§ 98.236(r)	Tab (q,r)
Gathering pipeline equipment leaks	§ 98.233(r)	§ 98.236(r)	Tab (q,r)
Combustion equipment	§ 98.233(z)	§ 98.236(z)	Tab (z)
Facility Overview		§ 98.236(aa)(10)	Tab (aa)(2-11)

Onshore natural gas transmission pipeline requirements

Emission source category	Citations		Reporting form
	Calculations	Reporting	
Blowdown vent stacks	§ 98.233(i)	§ 98.236(i)	Tab (i)
Facility Overview		§ 98.236(aa)(10)	Tab (aa)(2-11)

Introduction tab

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

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)]
- ○ Onshore petroleum and natural gas gathering and boosting [98.230(a)(9)]
- ○ Onshore natural gas transmission pipeline [98.230(a)(10)]

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

Facility Name:	
GHGRP ID:	
Reporting Period:	2016
Comments:	

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)

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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_2O Emissions (mt N_2O)
Onshore Production [98.236(aa)(1)]	Yes	Go to Form	N/A	N/A	N/A
Facility Overview [98.236(aa)(2-11)]	No	Go to Form			
Natural Gas Pneumatic Devices [98.236(b)]	Yes	Go to Form			
Natural Gas Driven Pneumatic Pumps [98.236(c)]	Yes	Go to Form			
Acid Gas Removal Units [98.236(d)]	Yes	Go to Form			
Dehydrators [98.236(e)]	Yes	Go to Form			
Well Venting for Liquids Unloading [98.236(f)]	Yes	Go to Form			
Completions and Workovers with Hydraulic Fracturing [98.236(g)]	Yes	Go to Form			
Completions and Workovers without Hydraulic Fracturing [98.236(h)]	Yes	Go to Form			
Blowdown Vent Stacks [98.236(i)]	No	Go to Form	0.0	0.00	N/A
Atmospheric Storage Tanks [98.236(j)]	Yes	Go to Form	0.0	0.00	0.000
[illegible]			0.0	0.00	0.000
[illegible]					
Enhanced Oil Recovery Injection Pumps [98.236(w)]	Yes	Go to Form	0.0	N/A	N/A
Enhanced Oil Recovery Hydrocarbon Liquids [98.236(x)]	Yes	Go to Form	0.0	N/A	N/A
Combustion Equipment at Onshore Petroleum and Natural Gas Production Facilities, Onshore Petroleum and Natural Gas Gathering and Boosting Facilities, and Natural gas Distribution Facilities [98.236(z)]	Yes	Go to Form	0.0	0.00	0.000

				Total CO2e Emissions (mt CO_2e)
Totals	0.0	0.00	0.000	0.00

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

98.236(aa) requirements

- Requirements specified in 98.236(aa) are split between tabs for (aa)(1) and (aa)(2-11)
- Reporting required in 98.236(aa)(1) and 98.236(f), (g), (h), (l) and (m) are consolidated in tab (aa)(1)
  - Well IDs are reported once in Table AA.1.iii

(aa)(1) Onshore Production

Onshore petroleum and natural gas production facility level requirements under 98.236(aa)(1)

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Worksheet Instructions:

Each onshore petroleum and natural gas production facility must report the information specified in 98.236(aa)(1). In addition, certain well-specific requirements of 98.236(f), (g), (h), (l), and (m) should be reported below.

Tables AA.1.i and AA.1.ii are unchanged from RY15

Well-specific requirements for Onshore petroleum and natural gas production facilities are consolidated in Table AA.1.iii.

Table AA.1.iii Onshore petroleum and natural gas production: Well Characterization

Well ID Number [98.236(aa)(1)], [98.236(f)(1)(i)], [98.236(f)(1)(ii)], [98.236(g)(1)], [98.236(g)(5)(ii)], [98.236(g)(6)(iii)], [98.236(h)(1)(i)], [98.236(h)(2)(i)], [98.236(h)(3)(i)], [98.236(h)(4)(i)], [98.236(l)(1)(ii)], [98.236(l)(2)(ii)], [98.236(l)(3)(ii)], [98.236(l)(4)(ii)], [98.236(m)(1)], [98.236(m)(7)(i)], [98.236(m)(8)(i)]	Additional data indicator	Sub-basin [98.236(aa)(1)], [98.236(f)(1)(i)], [98.236(g)(1)], [98.236(h)(1)(i)], [98.236(h)(2)(i)], [98.236(h)(3)(i)], [98.236(h)(4)(i)], [98.236(m)(1)], [98.236(m)(7)(i)], [98.236(m)(8)(i)]

(aa)(1) Onshore Production

Table AA.1.iii Onshore petroleum and natural gas production: Well Characterization

Well-specific requirements for facilities subject to 98.236(aa)(1) Select all applicable columns for each well				
Producing at end of calendar year? [98.236(aa)(1)(ii)(D)]	Producing well acquired during calendar year? [98.236(aa)(1)(ii)(E)]	Producing well divested during calendar year? [98.236(aa)(1)(ii)(F)]	Completed during calendar year? [98.236(aa)(1)(ii)(G)]	Permanently taken out of production during calendar year? [98.236(aa)(1)(ii)(H)]

The requirements in this section of Table AA.1.iii mirror the well count requirements in Table AA.1.ii, and serve to respond to the requirement to provide a list of the well ID numbers in 98.236(aa)(1)(ii).

(aa)(1) Onshore Production

Table AA.1.iii Onshore petroleum and natural gas production: Well Characterization

RETURN TO LIQUIDS UNLOADING									
Well-specific requirements for facilities with Liquids Unloading subject to 98.236(f)									
			Wells tested and subject to 98.236(f)(1)(xi) and (xii)						
Calculation Method [98.236(f)(2)(ii)]	Tubing Diameter Group/Pressure Group [98.236(f)(1)(ii)]	Were Plunger Lifts used? [98.236(f)(1)(iii)]	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)]	
Calculation Methodology 1 [98.233(f)(1)] - Tested Well		Yes							
Calculation Methodology 1 [98.233(f)(1)] - Tested Well		No							
Calculation Methodology 1 [98.233(f)(1)] - Calculated Well									
Calculation Methodology 2 and 3 [98.233(f)(2-3)]									
No liquids unloading reporting required for this well per 98.236(f)									

This section of Table AA.1.iii should be completed for those wells with liquids unloading subject to reporting under 98.236(f). The reporting requirements are determined by the calculation method used, and whether or not plunger lifts were used for each well.

(aa)(1) Onshore Production

Table AA.1.iii Onshore petroleum and natural gas production: Well Characterization

RETURN TO COMPLETIONS AND WORKOVERS WITH HYDRAULIC FRACTURING					
Well-specific requirements for facilities with Completions or Workovers With Hydraulic Fracturing subject to 98.236(g)					
Completions or Workovers [98.236(g)]	Well Type [98.236(g)(2)(i)]	Is gas flared? [98.236(g)(2)(ii)]	Reduced Emission Completion or Workover? [98.236(g)(2)(iii)]	Oil or Gas Well [98.236(g)(2)(iv)]	Equation Used (Select) [98.236(g)(4)]

This section of Table AA.1.iii should be completed for those well completions and workovers with hydraulic fracturing subject to reporting under 98.236(g). The reporting requirements are determined by the gas/oil well type selection and the equation used.

This section addresses the requirements for provisions of lists of well ID numbers in 98.236(g)(1).

(aa)(1) Onshore Production

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Table AA.1.iii Onshore petroleum and natural gas production: Well Characterization

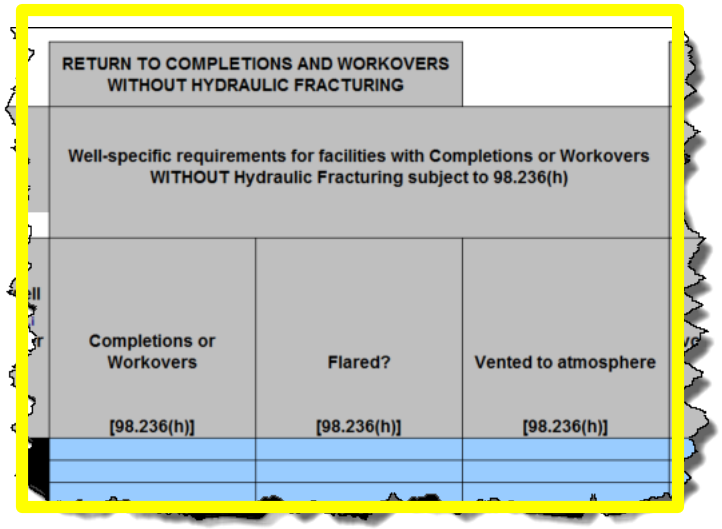
*Note: If Equation W-10A is used, the operational practices for the measured well should be similar to the wells in the sub-basin for which the well is considered representative. If any of the following W-10A parameters are zero or cannot be determined for the well even using missing data procedures, for purposes of Equation W-10A the well would not be considered a representative well and the well should be listed as a Calculated Well: $T_{p,i}$, $T_{p,s}$, $PR_{s,p}$, FRM_i, FRM_s, $FR_{p,i}$, $FR_{s,p}$, GOR_p, and V_p.

Il-specific requirements for facilities with Completions or Workovers With Hydraulic Fracturing subject to 98.236(g)									
			When using Equation W-10A		When Using Equation W-10A and Equation W-12C		When using Equation W-10B		
	Oil or Gas Well [98.236(g)(2)(iv)]	Equation Used (Select) [98.236(g)(4)]	Are the only wells in the sub-basin used to calculate "Measured average flowback rates", "GOR" or "Volume of oil produced" wildcat or delineation wells subject to a 2-year delay in reporting? [98.236(g)(5)(iii)(A)] [98.236(g)(5)(iii)(B)] [98.236(g)(5)(ii)]	Measured average flowback rate for W-10A measured well, $FR_{s,p}$ (standard cubic feet per hour) [98.236(g)(5)(ii)]	Gas to oil ratio, GOR_p (standard cubic feet per barrel of oil) [98.236(g)(5)(iii)(A)]	Volume of oil produced during first 30 days of production after completion of newly drilled well, V_p (barrels) [98.236(g)(5)(iii)(B)]	Flow volume vented or sent to a flare for each well in the sub-basin, $FV_{s,p}$ (standard cubic feet) [98.236(g)(6)(i)]	Flow rate at the beginning of the period of time when sufficient quantities of gas are present to enable separation of each well in the sub-basin, $FR_{p,i}$ (standard cubic feet per hour) [98.236(g)(6)(ii)]
	Gas	Equation W-10A, measured well	No						
	Gas	Equation W-10A, calculated well							
	Oil	Equation W-10A, measured well							
	Oil	Equation W-10B							

This snip, continuing the 98.236(g) well-specific reporting requirements, illustrates how the required columns are activated by prior columns.

(aa)(1) Onshore Production

Table AA.1.iii Onshore petroleum and natural gas production: Well Characterization



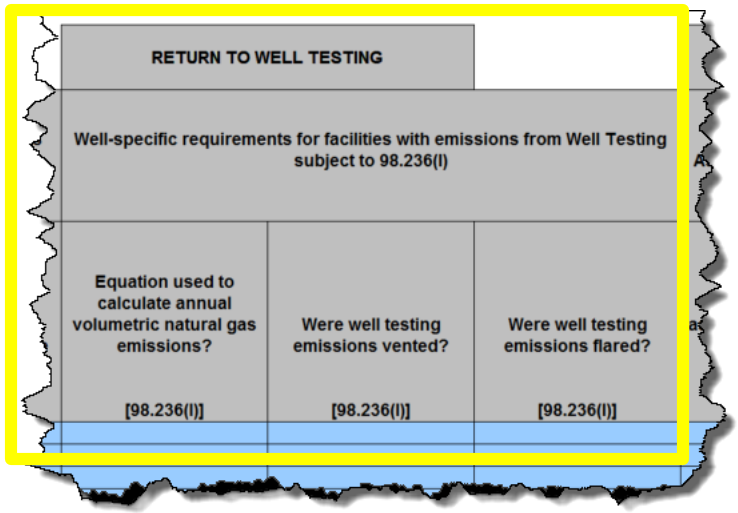
RETURN TO COMPLETIONS AND WORKOVERS WITHOUT HYDRAULIC FRACTURING		
Well-specific requirements for facilities with Completions or Workovers WITHOUT Hydraulic Fracturing subject to 98.236(h)		
Completions or Workovers [98.236(h)]	Flared? [98.236(h)]	Vented to atmosphere [98.236(h)]

This section of Table AA.1.iii should be completed for those well completions and workovers without fracturing that are subject to reporting under 98.236(h).

This section addresses the requirements for provisions of lists of well ID numbers in 98.236(h)(1)(i), (2)(i), (3)(i), and (4)(i).

(aa)(1) Onshore Production

Table AA.1.iii Onshore petroleum and natural gas production: Well Characterization



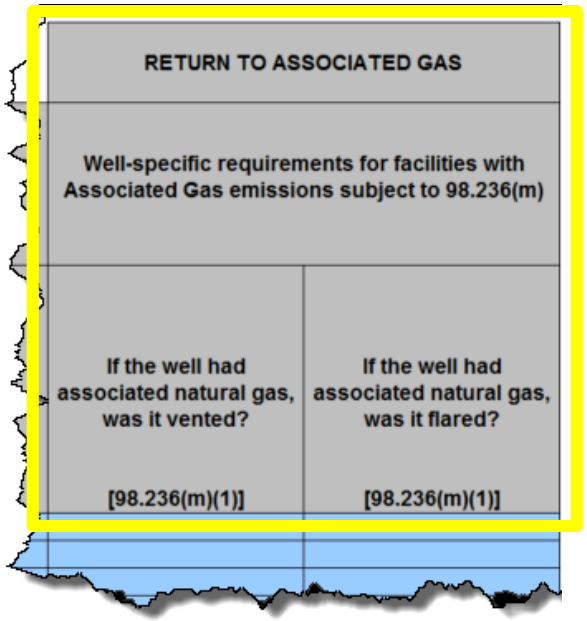
RETURN TO WELL TESTING		
Well-specific requirements for facilities with emissions from Well Testing subject to 98.236(l)		
Equation used to calculate annual volumetric natural gas emissions? [98.236(l)]	Were well testing emissions vented? [98.236(l)]	Were well testing emissions flared? [98.236(l)]

This section of Table AA.1.iii should be completed for those wells with well testing that are subject to reporting under 98.236(l).

This section addresses the requirements for provisions of lists of well ID numbers in 98.236(l)(1)(ii), (2)(ii), (3)(ii), and (4)(ii).

(aa)(1) Onshore Production

Table AA.1.iii Onshore petroleum and natural gas production: Well Characterization



RETURN TO ASSOCIATED GAS	
Well-specific requirements for facilities with Associated Gas emissions subject to 98.236(m)	
If the well had associated natural gas, was it vented? [98.236(m)(1)]	If the well had associated natural gas, was it flared? [98.236(m)(1)]

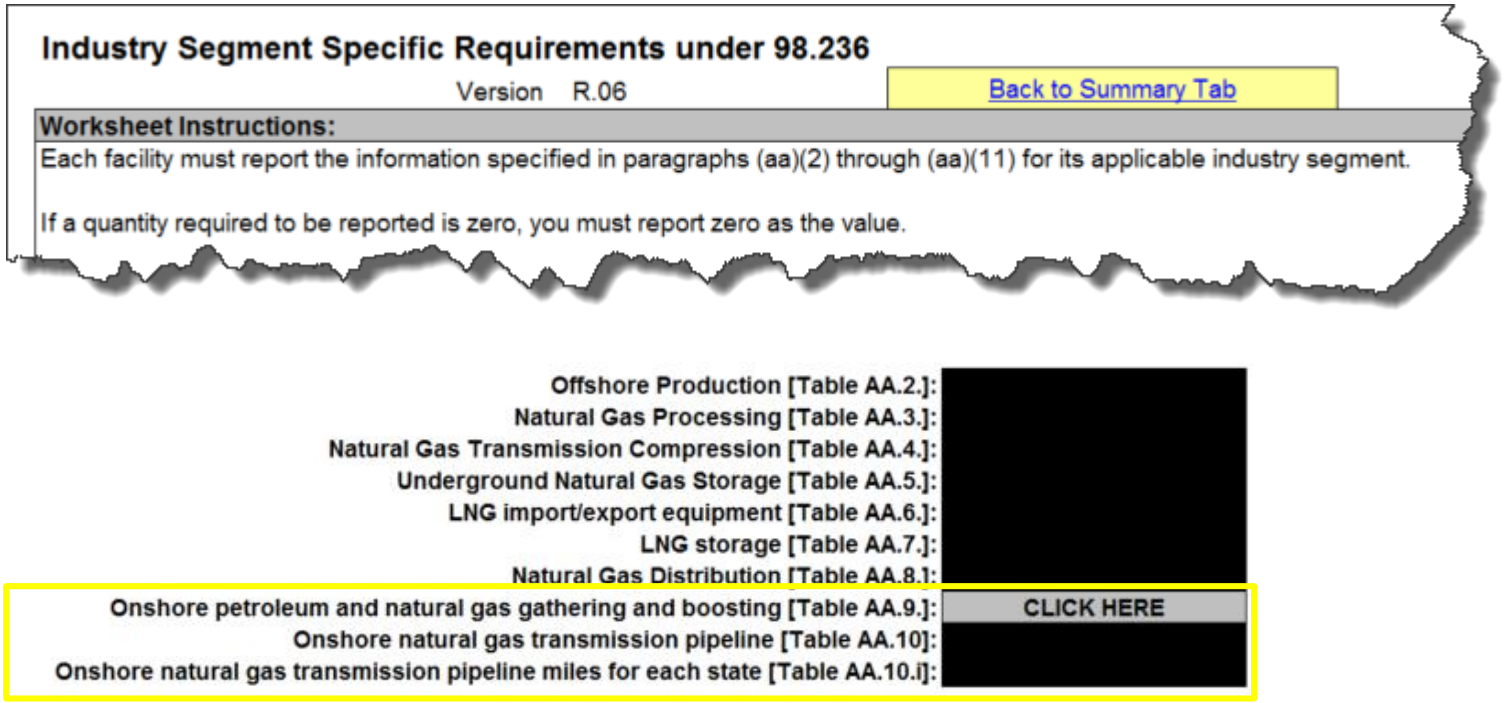
This section of Table AA.1.iii should be completed for those wells with associated gas venting and flaring that are subject to reporting under 98.236(m).

This section addresses the requirements for provisions of lists of well ID numbers in 98.236(m)(1), (7)(i), and (8)(i).

(aa)(2-11) Facility Overview

New tables were added for the Onshore petroleum and natural gas gathering and boosting and Onshore natural gas transmission pipeline industry segments.

Navigation links are activated for the selected industry segment



Industry Segment Specific Requirements under 98.236

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Worksheet Instructions:

Each facility must report the information specified in paragraphs (aa)(2) through (aa)(11) for its applicable industry segment.

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

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.]:	
Onshore petroleum and natural gas gathering and boosting [Table AA.9.]:	CLICK HERE
Onshore natural gas transmission pipeline [Table AA.10]:	
Onshore natural gas transmission pipeline miles for each state [Table AA.10.i]:	

(aa)(2-11) Facility Overview

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Table AA.9. Onshore petroleum and natural gas gathering and boosting as per [98.236(aa)(10)]

Select the basin associated with this facility [98.236(a)(9)]	Quantity of gas received by the gathering and boosting facility in the calendar year (thousand standard cubic feet) [98.236(aa)(10)(i)]	Quantity of gas transported to a natural gas processing facility, a natural gas transmission pipeline, a natural gas distribution pipeline, or another gathering and boosting facility in the calendar year (thousand standard cubic feet) [98.236(aa)(10)(ii)]	Quantity of all hydrocarbon liquids received by the gathering and boosting facility in the calendar year (barrels) [98.236(aa)(10)(iii)]	Quantity of all hydrocarbon liquids transported to a natural gas processing facility, a natural gas transmission pipeline, a natural gas distribution pipeline, or another gathering and boosting facility in the calendar year (barrels) [98.236(aa)(10)(iv)]

(aa)(2-11) Facility Overview

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Table AA.10. Onshore natural gas transmission pipeline facilities as per [98.236(aa)(11)]

Quantity of natural gas received at all custody transfer stations in the calendar year (thousand standard cubic feet) [98.236(aa)(11)(i)]	Quantity of natural gas withdrawn from in-system storage in the calendar year (thousand standard cubic feet) [98.236(aa)(11)(ii)]	Quantity of natural gas added to in-system storage in the calendar year (thousand standard cubic feet) [98.236(aa)(11)(iii)]	Quantity of natural gas transferred to third parties such as LDCs or other transmission pipelines (thousand standard cubic feet) [98.236(aa)(11)(iv)]	Quantity of natural gas consumed by the transmission pipeline facility for operational purposes (thousand standard cubic feet) [98.236(aa)(11)(v)]

Table AA.10.i Onshore natural gas transmission pipeline miles for each state in the facility

State [98.236(aa)(11)(vi)]	Miles of transmission pipeline [98.236(aa)(11)(vi)]

Natural Gas Pneumatic Device Venting

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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)] -Onshore petroleum and natural gas gathering and boosting [98.230(a)(9)]
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.

External Links:	
Subpart W Resources Page	https://www.epa.gov/ghgreporting/subpart-w-petroleum-and-natural-gas-systems
Optional Calculation Spreadsheet	http://www.ccdsupport.com/confluence/display/help/Optional+Calculation+Spreadsheet+Instructions
Help Resources	http://www.ccdsupport.com/confluence/display/help/Subpart+W+-+Petroleum+and+Natural+Gas+Systems

Total Emissions for Pneumatic Device Venting [98.236(b)]		
mt CO_2	mt CH_4	mt N_2O
0.0	0.00	N/A

Applicability	
Does the Facility have any continuous high-bleed pneumatic devices subject to reporting under 98.232 [98.236(b)]?	○ Yes ○ No
Does the Facility have any intermittent bleed pneumatic devices subject to reporting under 98.232 [98.236(b)]?	○ Yes ○ No
Does the Facility have any continuous low-bleed pneumatic devices subject to reporting under 98.232 [98.236(b)]?	○ Yes ○ No

Best Available Monitoring Methods (BAMM) and Missing Data

Were BAMM used for any parameters to calculate GHG emissions?	Provide a brief description of the BAMM used, parameter measured, and time period.	Were missing data procedures used for any parameters to calculate GHG emissions? [98.235]
BAMM not available for NG devices in 2016		

Natural Gas Pneumatic Device Venting, continued

Table B.1 Pneumatic device emissions

Type of Pneumatic Device	Total Number, $Count_t$ [98.236(b)(1)(i)]	Is the Total Number estimated? (Yes / No) [98.236(b)(1)(ii)]	Allowed only for Onshore Petroleum and Natural Gas Production and Onshore Petroleum and Natural Gas Gathering and Boosting facilities in first or second year of reporting. Complete only if you elect to estimate the count of any type of device. 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)]	nu… th… tha…
High-bleed Pneumatic Devices	8	Yes	First	6	2	
Intermittent Bleed Pneumatic Devices	3	No				
Low-Bleed Pneumatic Devices						

Estimated average number of hours in the calendar year that the pneumatic devices were operating, T_t (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)]

Only Onshore production and Onshore gathering and boosting facilities in their first 2 years of reporting may provide an estimated count. All other reporters must report the total actual count.

Natural Gas Pneumatic Device Venting, continued

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Table B.2 Missing data procedures used for Pneumatic Device emission calculations

Type of Pneumatic Device	Parameters	Measurement Frequency	Number of quarters missing data procedures were used [98.236(bb)(1)]	Total number of hours in the year missing data procedure was used [98.3(c)(8)] [98.236(bb)(2)]	Procedures used [98.235(h)]
High-bleed Pneumatic Devices	Concentration of CO2 in produced or processed natural gas	Quarterly			
Low-Bleed Pneumatic Devices	Concentration of CH4 in produced or processed natural gas	Weekly			

Measurement Frequency
Select the measurement frequency stated in your monitoring plan for the data element

If "Other", specify frequency under "Procedures Used"

Natural Gas Driven Pneumatic Pumps

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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)]

-Onshore petroleum and natural gas gathering and boosting [98.230(a)(9)]

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				

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)]
- -Onshore petroleum and natural gas gathering and boosting [98.230(a)(9)]

Applicability	
Does the Facility have any acid gas removal units that vent directly to the atmosphere, to a flare or engine, or to a sulfur recovery plant subject to reporting under 98.232 [98.236(d)]?	○ Yes ○ No

Best Available Monitoring Methods (BAMM) and Missing Data

Were BAMM used for any parameters to calculate GHG emissions? [98.234(g)(4)] [98.234(g)(6)(iii)]	Provide a brief description of the BAMM used, parameter measured, and time period. [98.234(g)(4)] [98.234(g)(6)(iii)]	Were missing data procedures used for any parameters to calculate GHG emissions? [98.235]

For Acid gas removal unit specific information [Table D.1]:	CLICK HERE
For Calculation Method 1 emissions [Table D.2]:	CLICK HERE
For Calculation Method 2 emissions [Table D.3]:	CLICK HERE
For Calculation Method 3 emissions [Table D.4]:	CLICK HERE
For Calculation Method 4 emissions [Table D.5]:	CLICK HERE
For Missing data procedures [Table D.6]:	CLICK HERE

Acid Gas Removal Units (continued)

Table D.1 Acid gas removal unit specific information

Acid gas removal unit reporting is on a unit basis, not a vent basis. If your AGR unit has multiple vents, enter the unit ID, not the vent IDs in Table D.1 and aggregate data from multiple vents as needed in Tables D.2 through D.6.

Unit ID or Name [98.236(d)(1)(i)]	Sub-Basin ID [98.236(d)(1)(vi)] (Required only for Onshore Petroleum and Natural Gas Production)	County and State [98.236(d)(1)(vi)] (Required only for Onshore Petroleum and Natural Gas Gathering and Boosting)	Total feed rate entering the acid gas removal unit for the year (million cubic feet) [98.236(d)(1)(ii)]	Calculation Method 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)]

Table D.2 Calculation Method 1 emissions

Unit ID or Name [98.236(d)(1)(i)]	Annual average fraction of CO_2 content in the vent from the acid gas removal unit (volumetric fraction) [98.236(d)(2)(i)(A)]	Annual volume of gas vented from the acid gas removal unit (standard cubic feet) [98.236(d)(2)(i)(B)]

The first column in Tables D.2-D.5 use form-generated lists of unit IDs drawn from Table D.1

Acid Gas Removal Units (continued)

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Table D.3 Calculation Method 2 emissions

Unit ID or Name [98.236(d)(1)(i)]	Annual average fraction of CO_2 content in the vent from the acid gas removal unit, Vol_{CO2} (volumetric fraction) [98.236(d)(2)(i)(A)]	Annual volume of gas vented from the acid gas removal unit, V_s (actual or standard cubic feet) [98.236(d)(2)(i)(B)]	Annual volume of gas vented reported on an Actual or Standard basis? [98.236]	Temperature used to calculate volume of gas vented (°F) [98.236]	Pressure used to calculate volume of gas vented (psi) [98.236]

Table D.4 Calculation Method 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)]	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)]	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)]	Natural gas flow rates reported on an Actual or Standard basis? [98.236]	Temperature used to calculate natural gas flow rates (°F) [98.236]	Pressure used to calculate natural gas flow rates (psi) [98.236]
	W-4A							
	W-4B							

For Calculation Methods 2 and 3, the annual volume of gas vented and flow rate in/out of the unit can be reported on either an actual or standard basis. You must indicate your basis, and then report the temperature and pressure used to calculate that vent gas volume or rates.

Acid Gas Removal Units (continued)

Table D.5 Calculation Method 4 emissions

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)]

Table D.5 is unchanged from RY15.

Dehydrators

Dehydrators [98.236(e)]

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Worksheet Instructions:

In accordance with 98.232, only the following industry segments must report data for dehydrators:

- -Onshore petroleum and natural gas production [98.230(a)(2)]
- -Onshore natural gas processing [98.230(a)(3)]
- -Onshore petroleum and natural gas gathering and boosting [98.230(a)(9)]

Applicability	
Does the facility have any glycol dehydrators with annual average daily natural gas throughputs less than 0.4MMscfd subject to reporting under 98.232 [98.236(e)]?	○ Yes ○ No
Does the facility have any desiccant dehydrators subject to reporting under 98.232 [98.236(e)]?	○ Yes ○ No
Does the facility have any glycol dehydrators with annual average daily natural gas throughputs greater than or equal to 0.4MMscfd subject to reporting under 98.232 [98.236(e)]?	○ Yes ○ No

Dehydrators (continued)

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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_2O Emissions (mt N_2O) [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			

Table E.2 for Desiccant Dehydrators is identical to Table E.1

Dehydrators (continued)

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Table E.3 Large Glycol Dehydrators

Unit ID or Name [98.236(e)(1)(i)]	Required only for Onshore Petroleum and Natural Gas Production: Sub-Basin ID [98.236(e)(1)(xviii)]	Required only for Onshore Petroleum and Natural Gas Gathering and Boosting: County and State [98.236(e)(1)(xviii)]	Glycol dehydrator feed natural gas flow rate etermined 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)]	Glycol dehydrator absorbent circulation pump type [98.236(e)(1)(v)]

Dehydrator absorbent circulation rate (gallons per minute) [98.236(e)(1)(vi)]	Report type of absorbent used [98.236(e)(1)(vii)]	Report whether stripper gas is used in glycol dehydrator [98.236(e)(1)(viii)]	Report whether a flash tank separator is used in glycol dehydrator [98.236(e)(1)(ix)]	Total time the glycol dehydrator is operating (hours) [98.236(e)(1)(x)]	Temperature of the wet natural gas (°F) [98.236(e)(1)(xi)]	Pressure of the wet natural gas (psig) [98.236(e)(1)(xii)]	Concentration of CO_2 in wet natural gas (mole fraction) [98.236(e)(1)(xiv)]	Concentration of CH_4 in wet natural gas (mole fraction) [98.236(e)(1)(xiii)]

	Complete only if emissions are vented to a flare or regenerator firebox/fire tubes				Complete only if emissions are vented to the atmosphere without being routed to a flare or regenerator firebox/fire tubes		
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)(xvi)]	CO_2 Emissions from Flares or Regenerators (mt CO_2) [98.236(e)(1)(xvi)(A)]	CH_4 Emissions from Flares or Regenerators (mt CH_4) [98.236(e)(1)(xvi)(B)]	N_2O Emissions from Flares or Regenerators (mt N_2O) [98.236(e)(1)(xvi)(C)]	Were any dehydrator emissions vented to the atmosphere without being routed to a flare or regenerator firebox/fire tubes? [98.236(e)(1)(xvii)]	CO_2 Emissions from Venting (mt CO_2) [98.236(e)(1)(xvii)(A)]	CH_4 Emissions from Venting (mt CH_4) [98.236(e)(1)(xvii)(B)]

Well Venting for Liquid Unloading

Table F.1 (not shown) is unchanged from RY15.

Well specific information required for Calculation Method 1 (formerly Table F.2 in RY15) is now collected in Table AA.1.iii.

Table F.2 has been renumbered from RY15 (formerly Table F.3), but otherwise is unchanged.

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

For Sub-basins using Calculation Method 2 (without plunger lifts) and Calculation Method 3 (with plunger lifts), complete following table:
(Note: well-specific information for wells with liquids unloading must be reported in Table AA.1.iii.)

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 [98.233(	No		
	Calculation Methodology 3 [98.233(	Yes		

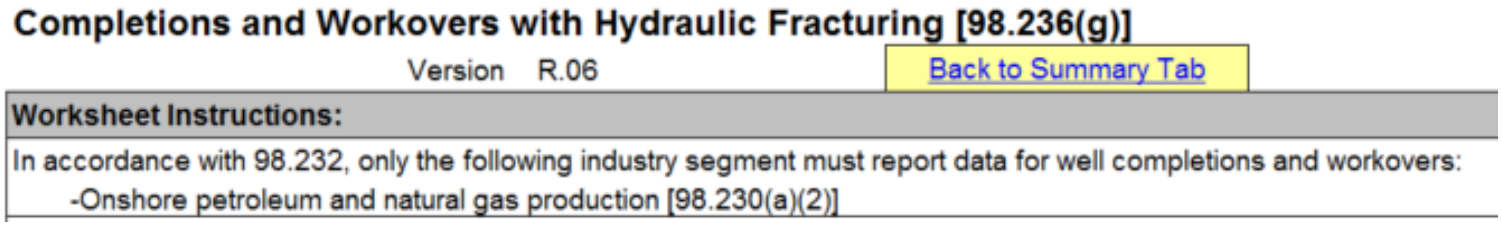
Annual natural gas emissions from well venting for liquids unloading (standard cubic feet) [98.236(f)(2)(vi)]	Total CO_2 Emissions (mt CO_2) [98.236(f)(2)(vii)]	Total CH_4 Emissions (mt CH_4) [98.236(f)(2)(viii)]	Average internal casing diameter, CD_p (inches) (Calc. Method 2) [98.236(f)(2)(ix)]	Average internal tubing diameter, TD_p (inches) (Calc. Method 3) [98.236(f)(2)(x)]

Well Completions and Workovers with Hydraulic Fracturing

Reporting requirements for 98.236(g) and (h) have been reorganized in RY16. Data for these two subparts were previously reported on one tab (g,h), and applied only to gas wells.

In RY16, these two subparts have been separated into tabs (g) and (h).

Tab (g) now includes reporting for oil well completion and workovers.



Completions and Workovers with Hydraulic Fracturing [98.236(g)]

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Worksheet Instructions:
In accordance with 98.232, only the following industry segment must report data for well completions and workovers: -Onshore petroleum and natural gas production [98.230(a)(2)]

Well Completions and Workovers with Hydraulic Fracturing

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Table G.1 Well Completions with Hydraulic Fracturing

Well Type Combination						
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)]	Oil or Gas Well [98.236(g)(2)(iv)]	Total count of completions in the calendar year, W [98.236(g)(3)]	
				Gas		Equ
				Oil		Equ

When using Equation W-10A							
Equation Used (Select) [98.236(g)(4)]	Are the only wells in the sub-basin used to calculate "cumulative gas flowback time" 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, Sum of $T_{p,i}$ values (hours) [98.236(g)(5)(i)]	Cumulative gas flowback time from all wells during completions after sufficient quantities of gas are present to enable separation, Sum of $T_{p,s}$ values (hours) [98.236(g)(5)(i)]	Annual gas emissions, $E_{s,n}$ (standard cubic feet) [98.236(g)(7)]	Annual total CO_2 emissions (mt CO_2) [98.236(g)(8)]	Annual total CH_4 emissions (mt CH_4) [98.236(g)(9)]	Annual total N_2O emissions (mt N_2O) [98.236(g)(10)]
Equation W-10A							
Equation W-10B							

*Table G.1 collect information on well **completions** with hydraulic fracturing, while Table G.2 collects the same information for well **workovers**. These tables gather information at the sub-basin level.*

Note the new column specifying whether reporting is for gas or oil wells.

Well Completions and Workovers without Hydraulic Fracturing

The RY16 tables for completions and workovers without hydraulic fracturing (H.1, H.2, and H.3) are unchanged from RY15, except they are now on a stand-alone tab for 98.236(h) reporting.

Blowdown Vent Stacks

Blowdown Vent Stacks [98.236(i)]

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Worksheet Instructions:

In accordance with 98.232, only the following industry segments must report data for blowdown vent stacks:

- -Onshore natural gas processing [98.230(a)(3)]
- -Onshore natural gas transmission compression [98.230(a)(4)]
- -LNG import and export equipment [98.230(a)(7)]
- -Onshore petroleum and natural gas gathering and boosting [98.230(a)(9)]
- -Onshore natural gas transmission pipeline [98.230(a)(10)]

Table I.1 Blowdown Vent Stacks Emissions Type

How were emissions determined? [98.236(i)]
Combination of flow meters and calculating by equipment or event type

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 [98.236(i)(1)] [98.236(i)(2)]	For Onshore natural gas transmission pipeline facilities only: Equipment or event type [98.236(i)(1)] [98.236(i)(2)]	Total number of blowdowns for equipment or event type, N [98.236(i)(1)(i)]	Annual total CO_2 emissions for each equipment or event type ($mt CO_2$) [98.236(i)(1)(ii)]	Annual total CH_4 emissions for each equipment or event type ($mt CH_4$) [98.236(i)(1)(iii)]

Blowdown Vent Stacks

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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) [98.236(i)(2)(i)]	Annual total CH_4 emissions calculated by flow meter (mt CH_4) [98.236(i)(2)(ii)]

Table I.4 Onshore natural gas transmission pipeline characterization

U.S. State [98.236(i)(3)]	Annual total CO_2 emissions (mt CO_2) [98.236(i)(3)(i)]	Annual total CH_4 emissions (mt CH_4) [98.236(i)(3)(ii)]	Annual number of blowdown events [98.236l(i)(3)(iii)]

Atmospheric Storage Tanks

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Worksheet Instructions:
In accordance with 98.232, only the following industry segments must report data for gas from hydrocarbon liquids sent to atmospheric tanks: -Onshore petroleum and natural gas production [98.230(a)(2)] -Onshore petroleum and natural gas gathering and boosting [98.230(a)(9)]

Applicability	
Did the facility send hydrocarbon liquids to atmospheric storage tanks that are subject to reporting under 98.232 [98.236(j)]?	(●) Yes ( ) No

Calculation Method and Malfunctioning Dump Valves [98.236(j)]	
Was Calculation Method 1 used to calculate emissions [(98.233(j)(1)]?	(●) Yes ( ) No
Was Calculation Method 2 used to calculate emissions [(98.233(j)(2)]?	( ) Yes (●) No
Was Calculation Method 3 used to calculate emissions [(98.233(j)(3)]?	(●) Yes ( ) No
If Calculation Method 1 or 2 were used, were any atmospheric tanks observed to have malfunctioning dump valves during the calendar year?	(●) Yes ( ) No

Complete Table J.1 for gas-liquid separator, non-separator equipment, or well flows using Calculation Method 1

Complete Table J.2.i for gas-liquid separator, non-separator equipment, or well flows using Calculation Method 3; additionally, complete Table J.2.ii for non-flared emissions, and complete Table J.2.iii for flared emissions

Complete Table J.3 for improperly functioning dump valves

Atmospheric Storage Tanks (continued)

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Table J.1 Gas-liquid separator, non-separator equipment, or well with oil throughput ≥10 barrels/day using Calculation Method 1 or 2

Required only for Onshore Petroleum and Natural Gas Production	Required only for Onshore Petroleum and Natural Gas Gathering and Boosting			Total volume of oil				
Sub-Basin ID [98.236(j)(1)(i)]	County and State [98.236(j)(1)(i)]	Select Calculation Method Used (Select from list) [98.236(j)(1)(ii)]	Name of software package used for Calculation Method 1 [98.236(j)(1)(ii)]	For Onshore petroleum and natural gas production facilities, 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 gas-liquid separators and direct from wells or non-separator equipment (bbl per yr) [98.236(j)(1)(iii)]	Average gas-liquid separator or non-separator equipment temperature (°F) [98.236(j)(1)(iv)]	Average gas-liquid separator or non-separator equipment 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		Required only for Onshore Petroleum and Natural Gas Production		Required only for Onshore Petroleum and Natural Gas Production
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)]

Emissions controlled with vapor recovery systems						Emissions vented directly to atmosphere		
Were any emissions from atmospheric tanks controlled with vapor recovery systems? [98.236(j)(1)(xii)]	Count of tanks that control emissions with vapor recovery systems [98.236(j)(1)(xii)(A)]	Total CO_2 mass that was recovered (mt CO_2) [98.236(j)(1)(xii)(B)]	Total CH_4 mass that was recovered (mt CH_4) [98.236(j)(1)(xii)(C)]	Annual CO_2 emissions from tanks with vapor recovery systems (mt CO_2) [98.236(j)(1)(xii)(D)]	Annual CH_4 emissions from tanks with vapor recovery systems (mt CH_4) [98.236(j)(1)(xii)(E)]	Were any emissions from atmospheric tanks vented directly to the atmosphere? [98.236(j)(1)(xiii)(	Annual CO_2 emissions from	Annual CH_4 emissions from

Emissions vented to flare(s)				
Were any emissions from atmospheric tanks vented to flare(s)? [98.236(j)(1)(xiv)]	Count of tanks with flaring emission control measures [98.236(j)(1)(xiv)(A)]	Annual CO_2 emissions from flaring (mt CO_2) [98.236(j)(1)(xiv)(B)]	Annual CH_4 emissions from flaring (mt CH_4) [98.236(j)(1)(xiv)(C)]	Annual N_2O emissions from flaring (mt N_2O) [98.236(j)(1)(xiv)(D)]

Atmospheric Storage Tanks (continued)

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Table J.2.i Wells, separators, and non-separator equipment with oil throughput <10 barrels/day using Calculation Method 3

For wells, separators, and non-separator equipment with oil throughput <10 barrels per day using Calculation Method 3, complete the following table:

The oil/condensate throughput and counts of tanks and wells reported in this table should only include those assessed using Calculation Method 3

			Required only for Onshore Petroleum and Natural Gas Production		Annual oil throughput	
Estimate of fraction of oil/condensate throughput sent to tanks in basin with flaring [98.236(j)(2)(i)(B)]	Estimate of fraction of oil/condensate 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)]	For Onshore petroleum and natural gas production facilities, are the only wells in the sub-basin that were used to calculate the total annual oil/condensate throughput wildcat or delineation wells subject to a 2 year delay in reporting? [98.236(j)(2)(i)(A)]	Total annual oil/condensate throughput that is sent to all atmospheric tanks (barrels per year) [98.236(j)(2)(i)(A)]

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

For wells, separators, and non-separator equipment with oil throughput <10 barrels per day without flaring using Calculation Method 3, complete the following table for each sub-basin or county and state:

Required only for Onshore Petroleum and Natural Gas Production	Required only for Onshore Petroleum and Natural Gas Gathering and Boosting			
Sub-Basin ID [98.236(j)(2)(ii)(A)]	County and State [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 flares (mt CH_4) [98.236(j)(2)(ii)(D)]

Atmospheric Storage Tanks (continued)

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Table J.2.iii Data for wells, separators, and non-separator equipment with oil throughput <10 barrels/day, with flaring, using Calculation Method 3

For wells, separators, and non-separator equipment with oil throughput<10 barrels per day with flaring using Calculation Method 3, complete the following table for each sub-basin or county and state:

When emissions from atmospheric storage tanks are routed to flares, section 98.233(j)(5)(i) requires reporters to use the 'volume and gas composition in this section.' For Calculation Method 3, this means the volume of flared gas should be the sum of the volume of CO_2 plus the volume of CH_4 calculated using Equation W-15. This sum should be used for the term V_s in Equations W-19 and W-20. Additionally, you should assume that CO_2 and CH_4 are the only compounds in the flared gas.

Required only for Onshore Petroleum and Natural Gas Production	Required only for Onshore Petroleum and Natural Gas Gathering and Boosting				
Sub-Basin ID [98.236(j)(2)(iii)(A)]	County and State [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_2O emissions from flaring (mt N_2O) [98.236(j)(2)(iii)(E)]

Table J.3 Emissions from improperly functioning dump valves

If Calculation Method 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 or county and state:

Required only for Onshore Petroleum and Natural Gas Production	Required only for Onshore Petroleum and Natural Gas Gathering and Boosting				
Sub-Basin ID [98.236(j)(3)]	County and State [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)]

Well Testing

For RY16, in addition to the information required in Table L.1, well IDs for wells that were tested is required in Table AA.1.iii.

Table L.1 Well testing emissions

					For Equation W-17A		For Equation W-17B
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)(iii)] [98.236(l)(2)(iii)] [98.236(l)(3)(iii)] [98.236(l)(4)(iii)]	Are the only wells used to calculate "flow rates" or "production rates" wildcat or delineation wells subject to a 2-year delay in reporting? [98.236(l)(1)(v)] [98.236(l)(2)(v)] [98.236(l)(3)(iv)] [98.236(l)(4)(iv)]	Average Gas to Oil Ratio (GOR) for Wells Tested (cubic feet of gas per barrel oil) [98.236(l)(1)(iv)] [98.236(l)(2)(iv)]	Average flow rate for well(s) tested, FR (barrels of oil per day) [98.236(l)(1)(v)] [98.236(l)(2)(v)]	Average annual production rate for well(s) tested (cubic feet per day) [98.236(l)(3)(iv)] [98.236(l)(4)(iv)]
W-17A	Vented			No			
W-17A	Flared			No			
W-17B	Vented			No			
W-17B	Flared			No			

			Venting Emissions		Flaring Emissions		
Is GOR (for W-17A) or production rate (for W-17B) reported on an Actual or Standard basis? [98.236]	Temperature used to calculate GOR or production rate (°F) [98.236]	Pressure used to calculate GOR or production rate (psi) [98.236]	Total CO_2 emissions from venting (mt CO_2) [98.236(l)(1)(vi)] [98.236(l)(3)(v)]	Total CH_4 emissions from venting (mt CH_4) [98.236(l)(1)(vi)] [98.236(l)(3)(vi)]	Total CO_2 emissions from flaring (mt CO_2) [98.236(l)(2)(vi)] [98.236(l)(4)(v)]	Total CH_4 emissions from flaring (mt CH_4) [98.236(l)(2)(vii)] [98.236(l)(4)(vi)]	Total N_2O emissions from flaring (mt N_2O) [98.236(l)(2)(vii)] [98.236(l)(4)(vii)]

Associated Gas

Table M.1 Associated Gas Venting and Flaring

For RY16, the reporting requirements in Table M.1 are unchanged from RY15.
Well IDs for wells for which associated gas was vented or flared are included in Table AA.1.iii.

Flare Stacks

Flare Stacks [98.236(n)]

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Worksheet Instructions:
In accordance with 98.232, only the following industry segments must report data for flare stacks: -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)] -LNG storage [98.230(a)(6)] -LNG import and export equipment [98.230(a)(7)] -Onshore petroleum and natural gas gathering and boosting [98.230(a)(9)]
IMPORTANT NOTE: The flare emissions reported here must be corrected for flare emissions calculated and reported under other tabs to avoid double counting of these emissions [98.233(n)(9)]

Table N.1 Flare Stacks

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)]

as	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 (mt CO_2) [98.236(n)(9)]	CH_4 Emissions (mt CH_4) (Eq. W-19) [98.236(n)(10)]	N_2O Emissions (mt N_2O) (Eq. W-40) [98.236(n)(11)]

Centrifugal and Reciprocating Compressors

Centrifugal Compressors [98.236(o)]

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Worksheet Instructions:

In accordance with 98.232, only the following industry segments must report data for centrifugal compressors:

- -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)]
- -Onshore petroleum and natural gas gathering and boosting [98.230(a)(9)]

For RY16, the reporting requirements in Tables O.1/P.1, O.2.ii/P.2.ii, O.3.ii/P.3.ii and O.4/P.4 are unchanged from RY15. These tables are not applicable for Onshore production or Onshore gathering and boosting facilities.

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 and Natural Gas Production and Onshore Petroleum and Natural Gas Gathering and Boosting segments):

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)]	*Leave column blank if no changes made* Unit Name or ID for leak or vent if release point changed or controls added during the reporting year [98.236(o)(2)(i)(C)]

Centrifugal and Reciprocating Compressors (continued)

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Table P.3.i Leak or Vent "As Found" Measurement Sample Data

Complete the following table for each reciprocating compressor leak or vent with "as found" measurement sample data determined using 98.233(p)(2) or (4) (except for those in the Onshore Petroleum and Natural Gas Production and Onshore Petroleum and Natural Gas Gathering and Boosting segments):

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(p)(3)(i)(C)].

If multiple measurements events for a specific leak/vent occurred, report these events on separate rows of Table P.3.i.

					Mode for each compressor during leak or vent measurement [98.236(p)(3)(i)(E)]		
Unique Name or ID for leak or vent (Specify) [98.236(p)(2)(i)(C)] [98.236(p)(3)(i)(A)]	Measurement date (mm/dd/yyyy) [98.236(p)(3)(i)(B)]	Measurement method [98.236(p)(3)(i)(C)]	Measured flow rate (standard cubic feet/hour) [98.236(p)(3)(i)(D)]	Is the measurement location prior to or after commingling with non-compressor emission sources? [98.236(p)(3)(i)(F)]	Compressors in "Operating mode"	Compressors in "Standby-pressurized mode"	Compressors in "Not-operating mode"

Table O.5 Onshore Petroleum and Natural Gas Production and Onshore Petroleum and Natural Gas Gathering and Boosting 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)]

Equipment Leaks

Other Emissions from Equipment Leaks Estimated Using Emission Factors [98.236(q,r)]

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Worksheet Instructions:

In accordance with 98.232, only the following industry segments must report data for other emissions from equipment leaks estimated using emission factors:

- -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)]
- -Onshore petroleum and natural gas gathering and boosting [98.230(a)(9)]

For RY16, the reporting requirements in Tables Q.1, Q.2, Q.3, R.2, R.3 are unchanged from RY15. These tables are not applicable for Onshore production or Onshore gathering and boosting facilities.

Table R.1 Equipment leaks calculated using population counts and factors (for Onshore Petroleum and Natural Gas Production and Onshore Petroleum and Natural Gas Gathering and Boosting 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)(i)]	Total number of emission source type, $Count_e$ (for gathering pipelines, this value is the number of miles of pipeline per material type) [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)]

Equipment Leaks (continued)

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

Component count calculation method for all emission source types in Table R.1 other than gathering pipelines [98.236(r)(3)(i)]	

	Major Equipment Type [98.236(r)(3)(ii)]	Equipment type present at facility? [98.236(r)(3)(ii)(A)]	Count of Major Equipment Type in Eastern US [98.236(r)(3)(ii)(B)]	Count of Major Equipment Type in Western US [98.236(r)(3)(ii)(B)]
Natural gas production and Gathering and boosting equipment (Table W-1B) [98.236(r)(3)(ii)]	Wellhead	No		
	Separators	Yes		
	Meters/piping	Yes		
	Compressors			
	In-line heaters			
	Dehydrators			
Crude oil production equipment (Table W-1C) [98.236(r)(3)(ii)]	Wellhead			
	Separators			
	Heater-treater			
	Header			

Combustion Equipment

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

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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)] -Onshore petroleum and natural gas gathering and boosting [98.230(a)(9)]

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)]	
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)]	

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?	
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?	

Combustion Equipment (continued)

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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_2O Emissions (mt N_2O) [98.236(z)(2)(vi)]

How to Submit Your Report

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How to Submit Your Report
(continued)

MLH Resources

Subpart W: Petroleum and Natural Gas Systems (2016)

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.

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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	W3065V3	**Object Type:** (h) Wells without Fracturing - WellCompletionsWithoutHydraulicFracturingWithoutFlaring **Sub-Basin ID:** 984 - KODIAK ISLAND, AK (150) - Oil **File Name:** MLH Resources Test File for Tab G.xls	Total number of hours that gas vented directly to atmosphere, Sum of all Tp [98.236(h)(1)(iii)]. This data element is required for this sub-basin ID.
Data Completeness	W3072V3	**Object Type:** (h) Wells without Fracturing - WellCompletionsWithoutHydraulicFracturingWithoutFlaring **Sub-Basin ID:** 984 - KODIAK ISLAND, AK (150) - Oil **File Name:** MLH Resources Test File for Tab G.xls	Annual total CH4 emissions that resulted from venting gas directly to the atmosphere for completions, Es,p (mt CH4) [98.236(h)(1)(vi)]. This data element is required for this sub-basin.

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 2016
- The XML reporting schema and updated instructions for Subpart W can be downloaded at http://www.ccdsupport.com/confluence/display/help/XML+Reporting+Instructions

Resources

GHGRP Help Desk

Email: ghgreporting@epa.gov

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

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.

Resources

ccdsupport.com/confluence/display/help/home

Welcome to GHGRP Help

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