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# Subpart W - Petroleum and Natural Gas Systems

 A printer-friendly version (pdf) (129 pp, 2.23MB) of GHG reporting instructions for this subpart

This page provides an overview Subpart W reporting through e-GGRT. More detailed information regarding the Subpart W reporting can be found in the [Subpart W Webinar](#).

Once you have added Subpart W to the list of subparts you will report and clicked on the "Open" link next to Subpart W you will see the following screen:

Click image to expand



The screenshot shows the EPA e-GGRT reporting interface for Subpart W. The page title is "Subpart W: Petroleum and Natural Gas Systems (2011)". The interface includes a navigation menu with options like HOME, FACILITY REGISTRATION, FACILITY MANAGEMENT, DATA REPORTING, and HELP DESK. The main content area is titled "Subpart W: Petroleum and Natural Gas Systems (2011)" and includes an "Overview of Subpart Reporting Requirements" section. This section explains that Subpart W requires affected facilities to report CO<sub>2</sub>, CH<sub>4</sub>, and NO<sub>x</sub> emissions from onshore and offshore petroleum and natural gas production. It also provides instructions on how to download forms, complete them, and upload them. A "Subpart W View Validation" button is visible. Below the overview, there is a "Subpart W Summary Information for this Facility" section with a "Download Form" link and an "Upload Completed Subpart W Integrated Reporting Form" section. The upload section includes a "Browse" button and an "Upload" button. A table below the upload section shows "Uploaded File Name", "Attached By", "Date", and "Delete" columns, with "No files found" listed below. A footer note states: "EPA has finalized a rule that defers the deadline for reporting data elements used as inputs to emission equations for direct emitters. See 76 FR 5367 (published August 25, 2011) and 77 FR 48072 (concerning additional inputs in this subpart, published August 13, 2012). In accordance with the rule, e-GGRT is not currently collecting data used as inputs to emission equations. If you choose to report these inputs to EPA through these simplified reporting pages, please note that the inputs may be subject to public release."

## Subpart W Reporting Form

An integrated reporting form that combines all of the Subpart W segments by source type as listed in 98.236 is available for download at [Reporting Form Instructions](#).

You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet. The EPA has also posted a [Subpart W Calculation Tool Updates](#) page (contains errata and assistance) to help Subpart W reporters identify and correct issues in the earlier versions of the optional Subpart W Calculation Tool.

Subpart W include eight segments which separate reporting requirements:

- Offshore Petroleum and Natural Gas Production
- Onshore Petroleum and Natural Gas Production
- Onshore Natural Gas Processing
- Onshore Natural Gas Transmission Compression
- Underground Natural Gas Storage
- Liquefied Natural Gas (LNG) Storage
- LNG Import and Export Terminals
- Natural Gas Distribution

**Please prepare a separate version of the reporting form for EACH segment** for which your facility must report. The Subpart W upload page as shown above will allow the user to upload multiple reporting forms. Only one reporting form may be uploaded for each segment; if you attempt to upload a reporting form representing a segment that has been previously uploaded the new file will over-write the previous.

All facilities will use the Subpart W Introduction page of the reporting form to identify the facility, the GHGRP Facility ID, the segment being reported, and several other data items. This page also provides a summary of emissions by source for the segment. Reporters in the Onshore Petroleum and Natural Gas Production segment will prepare a [page basin and sub-basin identification page](#). The remainder of the the Subpart W reporting form is organized by source including:

- [Subpart W Introduction](#)
- [Sub-Basin Selection](#)
- [Natural Gas Pneumatic Devices](#)
- [Natural Gas Driven Pneumatic Pumps](#)

- Acid Gas Removal Units
- Dehydrators
- Well Venting for Liquids Unloading
- Gas Well Completions and Workovers
- Blowdown Vent Stacks
- Gas from Produced Oil Sent to Atmospheric Tanks
- Transmission Tanks
- Well Testing
- Associated Gas Venting and Flaring
- Subpart W Flares and Flare Stacks
- Centrifugal Compressors
- Reciprocating Compressors
- Other Emissions from Equipment Leaks Estimated Using Emission Factors
- Local Distribution Companies
- Enhanced Oil Recovery Injection Pump Blowdown
- Enhanced Oil Recovery Hydrocarbon Liquids Dissolved CO2
- Onshore Petroleum and Natural Gas Production and Natural Gas Distribution Combustion Emissions
- Offshore Sources

If you intend to make a request to use Best Available Monitoring Methods (BAMM) for Reporting Year 2014 that request must be submitted through e-GGRT by June 30, 2013. **e-GGRT has a revised Subpart W BAMM request module which will be used for all Subpart W BAMM requests.** For more information on this module click [Subpart W BAMM Help](#).

## Completed Subpart W Reporting Forms

After you have successfully uploaded the upload page will be updated to reflect the file you have uploaded. During the upload e-GGRT will generate a validation report which will list potential deficiencies or issues with your reporting form.

*Click image to expand*

The screenshot shows the EPA e-GGRT interface for Subpart W reporting. The page title is "Subpart W: Petroleum and Natural Gas Systems (2011)". It includes an overview of reporting requirements and a summary table of emissions data.

**OVERVIEW OF SUBPART W REPORTING REQUIREMENTS**  
 Subpart W requires affected facilities to report CO<sub>2</sub>, CH<sub>4</sub>, and H<sub>2</sub>O 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.

**SUBPART W SUMMARY INFORMATION FOR THIS FACILITY**

Annual mass of CO <sub>2</sub> (metric tons)	Annual mass of CH <sub>4</sub> (metric tons)	Annual mass of H <sub>2</sub> O (metric tons)
1,280.7	12.45	0.042

1) DOWNLOAD FORM  
[Subpart W GHG Reporting](#)

2) UPLOAD COMPLETED SUBPART W INTEGRATED REPORTING FORM

EPA has finalized a rule that defers the deadline for reporting data elements used as inputs to emission equations for direct emitters. See 76 FR 53007 (published August 25, 2011) and 77 FR 48072 (concerning additional inputs in this subpart published August 13, 2012). In accordance with the rule, e-GGRT is not currently collecting data used as inputs to emission equations. If you choose to report these inputs to EPA through these simplified reporting pages, please note that the inputs may be subject to public release.

Uploaded File Name	Attached By	Date	Delete
Subpart W Integrated Reporting Form 617.xls	Laurel Snapper	August 17, 2012	

If you attempt to upload a file but your file is not accepted by e-GGRT it is generally because your files has a fatal flaw or is missing essential data - e-GGRT calls these fatal errors **screen errors**. The reason why the file was not acceptable is displayed as a screen error message on the upload page. For an example of a screen error message, see below.

*Click image to expand*

The screenshot shows the EPA e-GGRT interface for Subpart W reporting. The main content area includes:

- OVERVIEW OF SUBPART REPORTING REQUIREMENTS:** A detailed text block explaining the reporting requirements for CO<sub>2</sub>, CH<sub>4</sub>, and H<sub>2</sub>O emissions from onshore and offshore petroleum and natural gas production.
- SCREEN ERRORS:** A yellow box listing two errors: "Annual Throughput: Gaseous Throughput (MMtO). This data element is required." and "Annual Throughput: Liquid Throughput (thousand barrels). This data element is required."
- DOWNLOAD FORM:** A section with a link for "Subpart W GHG Reporting".
- UPLOAD COMPLETED SUBPART W INTEGRATED REPORTING FORM:** A section with a "Browse..." button and an "UPLOAD" button.
- Validation Link:** A red box highlights the "Subpart W: View Validation" link.

Click on the [Subpart W: View Validation](#) link to review your validation report. An explanation of the validation report and the process for correcting validation issues prior to submission is presented in [Reporting Form Validation](#)

Once you have addressed the validation issues to the extent you believe necessary and address the requirements if any other applicable subparts you must generate, review, certify, and submit your annual report as described in [How to Submit an Annual Report](#)

#### **Additional Resources:**

- [Subpart W Rule Guidance](#)
- [Subpart W Rule Language \(eCFR\)](#)
- [Subpart W Calculation Tool Updates](#)
- [Part 98 Terms and Definitions](#)
- [Frequently Asked Questions \(FAQs\)](#)
- [Webinar Slides](#)
- [Additional VOLUNTARY Reporting for Natural Gas STAR Partners](#) *Please note that Gas STAR data is not due until April 30 of each year.*

## **Subpart W Introduction**

### **Introduction**

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

All industry segments must complete this worksheet.

#### **Select the applicable industry segment for this workbook.**

- 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

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

*Note: One workbook must be submitted for each industry segment. If your facility falls within that facility falls.*

<input type="radio"/>	<b>Offshore petroleum and natural gas production [98.230(a)(1)]</b>
<input checked="" type="radio"/>	<b>Onshore petroleum and natural gas production [98.230(a)(2)]</b>
<input type="radio"/>	<b>Onshore natural gas processing [98.230(a)(3)]</b>
<input type="radio"/>	<b>Onshore natural gas transmission compression [98.230(a)(4)]</b>
<input type="radio"/>	<b>Underground natural gas storage [98.230(a)(5)]</b>
<input type="radio"/>	<b>Liquefied natural gas (LNG) storage [98.230(a)(6)]</b>
<input type="radio"/>	<b>LNG import and export equipment [98.230(a)(7)]</b>
<input type="radio"/>	<b>Natural gas distribution [98.230(a)(8)]</b>

**Fill out the general information table.**

- GHGRP ID is required. *(the GHGRP ID on the reporting form must match the facility ID in e-GGRT)*
- Reporting Year is required. *(for RY2012 this must be reported as "2012")*
- Gaseous Throughput is required. *(you may report 0 (zero) throughput if this field does not apply to your facility)*
- Liquid Throughput is required. *(you may report 0 (zero) throughput if this field does not apply to your facility)*

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

Facility Name:	Test Facility	
GHGRP ID:	512869	
Reporting Period:	2011	
Annual throughput [98.236(d)]	Gaseous Throughput (MMscf)	500
Annual throughput [98.236(d)]	Liquid Throughput (thousand barrels)	500
Comments:	This is an example.	

**Below you will find additional guidance on throughput definition for your segment:**

Industry Segment	Segment-Specific Throughput Definition
<b>Onshore Production</b>	<b>Gaseous Throughput:</b> The amount of gas produced in the basin for sales (MMscf) <b>Liquid Throughput:</b> The amount of oil (or condensate) produced in the basin for sales (thousand barrels)
<b>Offshore Production</b>	<b>Gaseous Throughput:</b> The amount of gas produced for sales from the offshore platform (MMscf) <b>Liquid Throughput:</b> The amount of oil (or condensate) produced for sales from the offshore platform (thousand barrels)
<b>Natural Gas Processing</b>	<b>Gaseous Throughput:</b> The amount of gas produced at the facility for sales (MMscf) <b>Liquid Throughput:</b> The amount of natural gas liquids produced at the facility for sales (thousand barrels)
<b>Natural Gas Transmission Compression</b>	<b>Gaseous Throughput:</b> The amount of gas transported through the compressor station (MMscf) <b>Liquid Throughput:</b> Not applicable
<b>Underground Natural Gas Storage</b>	<b>Gaseous Throughput:</b> The amount of gas injected into storage plus the amount of gas withdrawn from storage (MMscf) <b>Liquid Throughput:</b> Not applicable
<b>LNG Import and Export</b>	<b>Gaseous Throughput:</b> The amount of LNG imported plus LNG exported (MMscf) <b>Liquid Throughput:</b> Not applicable
<b>LNG Storage</b>	<b>Gaseous Throughput:</b> The amount of LNG added into storage plus the amount of LNG withdrawn from storage (MMscf) <b>Liquid Throughput:</b> Not applicable
<b>Natural Gas Distribution</b>	<b>Gaseous Throughput:</b> The amount of natural gas received at city gates (MMscf) <b>Liquid Throughput:</b> Not applicable

**Fill out the applicable source reporting forms for your industry segment.**

- The applicable forms are highlighted in green based upon the industry segment selected in Step 1. You can navigate to each form using the "Go to Form" link or by using the tabs at the bottom of the workbook.
- Source Type level emissions are reported in the gray boxes to the left of each form. These are calculated from the roll-ups in each source type.
- Total emissions are reported in the last gray row of the table. These are the sum of each gas emissions reported.

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 [98.236(a)(2)]:	Go to Reporting Spreadsheet	Total Reported CO <sub>2</sub> Emissions (mt CO <sub>2</sub> e)	Total Reported CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e)	Total Reported H <sub>2</sub> O Emissions (mt CO <sub>2</sub> e)	Total Reported Emissions (mt CO <sub>2</sub> e)
Sub-Basin Selection	Yes	<a href="#">Go to Form</a>	N/A	N/A	N/A	N/A
Natural Gas Pneumatic Devices [98.236(c)(1)]	Yes	<a href="#">Go to Form</a>	200	20,000	N/A	20200
Natural Gas Driven Pneumatic Pumps [98.236(c)(2)]	Yes	<a href="#">Go to Form</a>	200	200	N/A	400
Acid Gas Removal Units [98.236(c)(3)]	Yes	<a href="#">Go to Form</a>	1,100	N/A	N/A	1100
Dehydrators [98.236(c)(4)]	Yes	<a href="#">Go to Form</a>	1,250	1,250	10	2510
Well Venting for Liquids Unloading [98.236(c)(5)]	Yes	<a href="#">Go to Form</a>	1,240	1,233	N/A	2473
Gas Well Completions and Workovers [98.236(c)(6)]	Yes	<a href="#">Go to Form</a>	2,660	2,660	48	5368
Blowdown Vent Stacks [98.236(c)(7)]	No	<a href="#">Go to Form</a>	0	0	N/A	0
Gas from Produced Oil Sent to Atmospheric Tanks [98.236(c)(8)]	Yes	<a href="#">Go to Form</a>	1,020	1,020	300	2340
Transmission Tanks [98.236(c)(9)]	No	<a href="#">Go to Form</a>	0	0	0	0
Well Testing Venting and Flaring [98.236(c)(10)]	Yes	<a href="#">Go to Form</a>	11	11	6	28
Associated Gas Venting and Flaring [98.236(c)(11)]	Yes	<a href="#">Go to Form</a>	20	17	0	37.2
Flare Stacks [98.236(c)(12)]	Yes	<a href="#">Go to Form</a>	350	7	0	357.2
Centrifugal Compressors [98.236(c)(13)]	Yes	<a href="#">Go to Form</a>	300	300	N/A	600
Reciprocating Compressors [98.236(c)(14)]	Yes	<a href="#">Go to Form</a>	50	50	N/A	100
Other Emissions from Equipment Leaks Estimated Using Emission Factors [98.236(c)(15)]	Yes	<a href="#">Go to Form</a>	0	0	N/A	0
Local Distribution Companies [98.236(c)(16)]	No	<a href="#">Go to Form</a>	0	0	N/A	0
Enhanced Oil Recovery Injection Pump Blowdown [98.236(c)(17)]	Yes	<a href="#">Go to Form</a>	10,232	N/A	N/A	10232
Enhanced Oil Recovery Hydrocarbon Liquids Dissolved CO <sub>2</sub> [98.236(c)(18)]	Yes	<a href="#">Go to Form</a>	900	N/A	N/A	900
Onshore Petroleum and Natural Gas Production and Natural Gas Distribution Combustion Emissions [98.236(c)(19)]	Yes	<a href="#">Go to Form</a>	0	0	0	0
Offshore Sources [98.236(c)(19)]	No	<a href="#">Go to Form</a>	0	0	0	0
			19,533	26,748	364.4	46645.4

Introduction Sub-Basin Selection (1) Pneumatic Device Venting (2) NG Driven Pneumatic Pumps (3) Acid Gas Removal Units (4) Dehydrators (5) Well Venting (6)

## Sub-Basin Selection

### Sub-Basin Selection and Onshore Requirements Under 98.236(e)

Please see [Subpart W Basin and County Combinations](#) for further information on Sub-Basin combinations.

In accordance with 98.232, only the following industry segment must report data for 98.236(e) requirements: Onshore petroleum and natural gas production.

**Basin** means geologic provinces as defined by the American Association of Petroleum Geologists (AAPG) Geologic Note: AAPG--CSD Geologic Provinces Code Map: AAPG Bulletin, Prepared by Richard F. Meyer, Laure G. Wallace, and Fred J. Wagner, Jr., Volume 75, Number 10 (October 1991) "(incorporated by reference, see 98.7) and the Alaska Geological Province Boundary Map, Compiled by the American Association of Petroleum Geologists Committee on Statistics of Drilling in Cooperation with the USGS, 1978 (incorporated by reference, see 98.7).

**Sub-basin category, for onshore natural gas production**, means a subdivision of a basin into the unique combination of wells with the surface coordinates within the boundaries of an individual county and subsurface completion in one or more of each of the following five formation types: Oil, high permeability gas, shale gas, coal seam, or other tight reservoir rock. The distinction between high permeability gas and tight gas reservoirs shall be designated as follows: High permeability gas reservoirs with >0.1 millidarcy permeability, and tight gas reservoirs with ?0.1 millidarcy permeability. Permeability for a reservoir type shall be determined by engineering estimate. Wells that produce from high permeability gas, shale gas, coal seam, or other tight reservoir rock are considered gas wells; gas wells producing from more than one of these formation types shall be classified into only one type based on the formation with the most contribution to production as determined by engineering knowledge. All wells that produce hydrocarbon liquids and do not meet the definition of a gas well in this sub-basin category definition are considered to be in the oil formation. All emission sources that handle condensate from gas wells in high permeability gas, shale gas, or tight reservoir rock formations are considered to be in the formation that the gas well belongs to and not in the oil formation.

#### Select the Basin in which applicable Sub-Basins are located.

- You must complete this step first. This will populate the county list.
- **Note:** Basins 221 (Gulf Coast Basin - LA) and 222 (Gulf Coast Basin - TX) are listed collectively under Basin 220.



## Subpart W Basin and County Combinations

Basin Number and Name	County
100 - New England Province	ADDISON, VT (1)
	ANDROSCOGGIN, ME (1)
	AROOSTOOK, ME (3)
	BELKNAP, NH (1)
	BENNINGTON, VT (3)
	BERKSHIRE, MA (3)
	BRISTOL, MA (5)
	BRISTOL, RI (1)
	BRONX, NY (5)
	CALEDONIA, VT (5)
	CARROLL, NH (3)
	CHESHIRE, NH (5)
	CHITTENDEN, VT (7)
	COLUMBIA, NY (21)
	COOS, NH (7)
	CUMBERLAND, ME (5)
	DUTCHESS, NY (27)
	ESSEX, MA (9)
	ESSEX, VT (9)
	FAIRFIELD, CT (1)
	FRANKLIN, MA (11)
	FRANKLIN, ME (7)
	FRANKLIN, VT (11)
	GRAFTON, NH (9)
	GRAND ISLE, VT (13)
	HAMPDEN, MA (13)
	HAMPSHIRE, MA (15)
	HANCOCK, ME (9)
	HARTFORD, CT (3)
	HILLSBOROUGH, NH (11)
	KENNEBEC, ME (11)
	KENT, RI (3)
	KNOX, ME (13)
	LAMOILLE, VT (15)
	LINCOLN, ME (15)
	LITCHFIELD, CT (5)



	MERRIMACK, NH (13)
	MIDDLESEX, CT (7)
	MIDDLESEX, MA (17)
	NEW HAVEN, CT (9)
	NEW LONDON, CT (11)
	NEWPORT, RI (5)
	NORFOLK, MA (21)
	ORANGE, VT (17)
	ORLEANS, VT (19)
	OXFORD, ME (17)
	PENOBSCOT, ME (19)
	PISCATAQUIS, ME (21)
	PLYMOUTH, MA (23)
	PROVIDENCE, RI (7)
	PUTNAM, NY (79)
	RENSSELAER, NY (83)
	ROCKINGHAM, NH (15)
	ROCKLAND, NY (87)
	RUTLAND, VT (21)
	SAGADAHOC, ME (23)
	SOMERSET, ME (25)
	STRAFFORD, NH (17)
	SUFFOLK, MA (25)
	SULLIVAN, NH (19)
	TOLLAND, CT (13)
	WALDO, ME (27)
	WASHINGTON, ME (29)
	WASHINGTON, NY (115)
	WASHINGTON, RI (9)
	WASHINGTON, VT (23)
	WESTCHESTER, NY (119)
	WINDHAM, CT (15)
	WINDHAM, VT (25)
	WINDSOR, VT (27)
	WORCESTER, MA (27)
	YORK, ME (31)
110 - Adirondack Uplift	CLINTON, NY (19)
	ESSEX, NY (31)
	FRANKLIN, NY (33)

	FULTON, NY (35)
	HAMILTON, NY (41)
	HERKIMER, NY (43)
	ST LAWRENCE, NY (89)
	WARREN, NY (113)
120 - Atlantic Coast Basin	ACCOMACK, VA (1)
	AIKEN, SC (3)
	ALLENDALE, SC (5)
	ANNE ARUNDEL, MD (3)
	ANSON, NC (7)
	ARLINGTON, VA (13)
	ATLANTIC, NJ (1)
	BALTIMORE CITY, MD (510)
	BAMBERG, SC (9)
	BARNSTABLE, MA (1)
	BARNWELL, SC (11)
	BEAUFORT, NC (13)
	BEAUFORT, SC (13)
	BERKELEY, SC (15)
	BERTIE, NC (15)
	BLADEN, NC (17)
	BRUNSWICK, NC (19)
	BURLINGTON, NJ (5)
	CALHOUN, SC (17)
	CALVERT, MD (9)
	CAMDEN, NC (29)
	CAMDEN, NJ (7)
	CAPE MAY, NJ (9)
	CAROLINE, MD (11)
	CAROLINE, VA (33)
	CARTERET, NC (31)
	CECIL, MD (15)
	CHARLES CITY, VA (36)
	CHARLES, MD (17)
	CHARLESTON, SC (19)
	CHESAPEAKE CITY, VA (550)
	CHESTERFIELD, SC (25)
	CHOWAN, NC (41)
	CLARENDON, SC (27)

	COLLETON, SC (29)
	COLUMBUS, NC (47)
	CRAVEN, NC (49)
	CUMBERLAND, NC (51)
	CUMBERLAND, NJ (11)
	CURRITUCK, NC (53)
	DARE, NC (55)
	DARLINGTON, SC (31)
	DILLON, SC (33)
	DISTRICT OF COLUMBIA, DC (1)
	DORCHESTER, MD (19)
	DORCHESTER, SC (35)
	DUKES, MA (7)
	DUPLIN, NC (61)
	EDGECOMBE, NC (65)
	ESSEX, VA (57)
	FLORENCE, SC (41)
	GATES, NC (73)
	GEORGETOWN, SC (43)
	GLOUCESTER, NJ (15)
	GLOUCESTER, VA (73)
	GREENE, NC (79)
	HALIFAX, NC (83)
	HAMPTON CITY, VA (650)
	HAMPTON, SC (49)
	HANOVER, VA (85)
	HENRICO, VA (87)
	HERTFORD, NC (91)
	HOKE, NC (93)
	HOPEWELL CITY, VA (670)
	HORRY, SC (51)
	HYDE, NC (95)
	ISLE OF WIGHT, VA (93)
	JAMES CITY, VA (95)
	JASPER, SC (53)
	JONES, NC (103)
	KENT, DE (1)
	KENT, MD (29)
	KING AND QUEEN, VA (97)

	KING GEORGE, VA (99)
	KING WILLIAM, VA (101)
	KINGS, NY (47)
	LANCASTER, VA (103)
	LEE, SC (61)
	LENOIR, NC (107)
	LEXINGTON, SC (63)
	MARION, SC (67)
	MARLBORO, SC (69)
	MARTIN, NC (117)
	MATHEWS, VA (115)
	MIDDLESEX, VA (119)
	MONMOUTH, NJ (25)
	NANTUCKET, MA (19)
	NASSAU, NY (59)
	NEW CASTLE, DE (3)
	NEW HANOVER, NC (129)
	NEW KENT, VA (127)
	NEWPORT NEWS CITY, VA (700)
	NORFOLK CITY, VA (710)
	NORTHAMPTON, NC (131)
	NORTHAMPTON, VA (131)
	NORTHUMBERLAND, VA (133)
	OCEAN, NJ (29)
	ONslow, NC (133)
	ORANGEBURG, SC (75)
	PAMLICO, NC (137)
	PASQUOTANK, NC (139)
	PENDER, NC (141)
	PERQUIMANS, NC (143)
	PITT, NC (147)
	PORTSMOUTH CITY, VA (740)
	PRINCE GEORGE, VA (149)
	PRINCE GEORGES, MD (33)
	QUEEN ANNES, MD (35)
	QUEENS, NY (81)
	RICHLAND, SC (79)
	RICHMOND CITY, VA (760)
	RICHMOND, NC (153)

	RICHMOND, NY (85)
	RICHMOND, VA (159)
	ROBESON, NC (155)
	SALEM, NJ (33)
	SAMPSON, NC (163)
	SCOTLAND, NC (165)
	SOMERSET, MD (39)
	SOUTHAMPTON, VA (175)
	ST MARYS, MD (37)
	SUFFOLK CITY, VA (800)
	SUFFOLK, NY (103)
	SUMTER, SC (85)
	SURRY, VA (181)
	SUSSEX, DE (5)
	SUSSEX, VA (183)
	TALBOT, MD (41)
	TYRRELL, NC (177)
	VIRGINIA BEACH CITY, VA (810)
	WASHINGTON, NC (187)
	WAYNE, NC (191)
	WAYNESBORO CITY, VA (820)
	WESTMORELAND, VA (193)
	WICOMICO, MD (45)
	WILLIAMSBURG CITY, VA (830)
	WILLIAMSBURG, SC (89)
	WILSON, NC (195)
	WORCESTER, MD (47)
	YORK, VA (199)
130 - S.GA Sedimentary Prov	APPLING, GA (1)
	ATKINSON, GA (3)
	BACON, GA (5)
	BAKER, GA (7)
	BARBOUR, AL (5)
	BAY, FL (5)
	BEN HILL, GA (17)
	BERRIEN, GA (19)
	BIBB, GA (21)
	BLECKLEY, GA (23)
	BRANTLEY, GA (25)

	BROOKS, GA (27)
	BRYAN, GA (29)
	BULLOCH, GA (31)
	BURKE, GA (33)
	CALHOUN, FL (13)
	CALHOUN, GA (37)
	CAMDEN, GA (39)
	CANDLER, GA (43)
	CHARLTON, GA (49)
	CHATHAM, GA (51)
	CHATTAHOOCHEE, GA (53)
	CLAY, GA (61)
	CLINCH, GA (65)
	COFFEE, AL (31)
	COFFEE, GA (69)
	COLQUITT, GA (71)
	COOK, GA (75)
	CRAWFORD, GA (79)
	CRISP, GA (81)
	DALE, AL (45)
	DECATUR, GA (87)
	DODGE, GA (91)
	DOOLY, GA (93)
	DOUGHERTY, GA (95)
	EARLY, GA (99)
	ECHOLS, GA (101)
	EFFINGHAM, GA (103)
	EMANUEL, GA (107)
	EVANS, GA (109)
	FRANKLIN, FL (37)
	GADSDEN, FL (39)
	GENEVA, AL (61)
	GLASCOCK, GA (125)
	GLYNN, GA (127)
	GRADY, GA (131)
	GULF, FL (45)
	HENRY, AL (67)
	HOLMES, FL (59)
	HOUSTON, AL (69)

	HOUSTON, GA (153)
	IRWIN, GA (155)
	JACKSON, FL (63)
	JEFF DAVIS, GA (161)
	JEFFERSON, FL (65)
	JEFFERSON, GA (163)
	JENKINS, GA (165)
	JOHNSON, GA (167)
	LANIER, GA (173)
	LAURENS, GA (175)
	LEE, GA (177)
	LEON, FL (73)
	LIBERTY, FL (77)
	LIBERTY, GA (179)
	LONG, GA (183)
	LOWNDES, GA (185)
	MACON, GA (193)
	MARION, GA (197)
	MC INTOSH, GA (191)
	MILLER, GA (201)
	MITCHELL, GA (205)
	MONTGOMERY, GA (209)
	MUSCOGEE, GA (215)
	PEACH, GA (225)
	PIERCE, GA (229)
	PIKE, AL (109)
	PULASKI, GA (235)
	QUITMAN, GA (239)
	RANDOLPH, GA (243)
	RICHMOND, GA (245)
	RUSSELL, AL (113)
	SCHLEY, GA (249)
	SCREVEN, GA (251)
	SEMINOLE, GA (253)
	STEWART, GA (259)
	SUMTER, GA (261)
	TATTNALL, GA (267)
	TAYLOR, GA (269)
	TELFAIR, GA (271)

	TERRELL, GA (273)
	THOMAS, GA (275)
	TIFT, GA (277)
	TOOMBS, GA (279)
	TREUTLEN, GA (283)
	TURNER, GA (287)
	TWIGGS, GA (289)
	WAKULLA, FL (129)
	WARE, GA (299)
	WASHINGTON, FL (133)
	WASHINGTON, GA (303)
	WAYNE, GA (305)
	WEBSTER, GA (307)
	WHEELER, GA (309)
	WILCOX, GA (315)
	WILKINSON, GA (319)
	WORTH, GA (321)
140 - Florida Platform	ALACHUA, FL (1)
	BAKER, FL (3)
	BRADFORD, FL (7)
	BREVARD, FL (9)
	BROWARD, FL (11)
	CHARLOTTE, FL (15)
	CITRUS, FL (17)
	CLAY, FL (19)
	COLLIER, FL (21)
	COLUMBIA, FL (23)
	DADE, FL (25)
	DE SOTO, FL (27)
	DIXIE, FL (29)
	DUVAL, FL (31)
	FLAGLER, FL (35)
	GILCHRIST, FL (41)
	GLADES, FL (43)
	HAMILTON, FL (47)
	HARDEE, FL (49)
	HENDRY, FL (51)
	HERNANDO, FL (53)
	HIGHLANDS, FL (55)



	HILLSBOROUGH, FL (57)
	INDIAN RIVER, FL (61)
	LAFAYETTE, FL (67)
	LAKE, FL (69)
	LEE, FL (71)
	LEVY, FL (75)
	MADISON, FL (79)
	MANATEE, FL (81)
	MARION, FL (83)
	MARTIN, FL (85)
	MONROE, FL (87)
	NASSAU, FL (89)
	OKEECHOBEE, FL (93)
	ORANGE, FL (95)
	OSCEOLA, FL (97)
	PALM BEACH, FL (99)
	PASCO, FL (101)
	PINELLAS, FL (103)
	POLK, FL (105)
	PUTNAM, FL (107)
	SARASOTA, FL (115)
	SEMINOLE, FL (117)
	ST JOHNS, FL (109)
	ST LUCIE, FL (111)
	SUMTER, FL (119)
	SUWANNEE, FL (121)
	TAYLOR, FL (123)
	UNION, FL (125)
	VOLUSIA, FL (127)
150 - Piedmont-Blue Ridge Prov	ABBEVILLE, SC (1)
	ADAMS, PA (1)
	ALAMANCE, NC (1)
	ALBEMARLE, VA (3)
	ALEXANDER, NC (3)
	ALEXANDRIA CITY, VA (510)
	ALLEGHANY, NC (5)
	AMELIA, VA (7)
	AMHERST, VA (9)
	ANDERSON, SC (7)

	APPOMATTOX, VA (11)
	ASHE, NC (9)
	AVERY, NC (11)
	BALDWIN, GA (9)
	BALTIMORE, MD (5)
	BANKS, GA (11)
	BARROW, GA (13)
	BEDFORD, VA (19)
	BERGEN, NJ (3)
	BRUNSWICK, VA (25)
	BUCKINGHAM, VA (29)
	BUCKS, PA (17)
	BUNCOMBE, NC (21)
	BURKE, NC (23)
	BUTTS, GA (35)
	CABARRUS, NC (25)
	CALDWELL, NC (27)
	CAMPBELL, VA (31)
	CARROLL, GA (45)
	CARROLL, MD (13)
	CARROLL, VA (35)
	CARTER, TN (19)
	CASWELL, NC (33)
	CATAWBA, NC (35)
	CHAMBERS, AL (17)
	CHARLOTTE, VA (37)
	CHARLOTTESVILLE CITY, VA (540)
	CHATHAM, NC (37)
	CHEROKEE, GA (57)
	CHEROKEE, NC (39)
	CHEROKEE, SC (21)
	CHESTER, PA (29)
	CHESTER, SC (23)
	CHESTERFIELD, VA (41)
	CLARKE, GA (59)
	CLAY, AL (27)
	CLAY, NC (43)
	CLAYTON, GA (63)
	CLEBURNE, AL (29)

	CLEVELAND, NC (45)
	COBB, GA (67)
	COLONIAL HEIGHTS CITY, VA (570)
	COLUMBIA, GA (73)
	COOSA, AL (37)
	COWETA, GA (77)
	CULPEPER, VA (47)
	CUMBERLAND, VA (49)
	DANVILLE CITY, VA (590)
	DAVIDSON, NC (57)
	DAVIE, NC (59)
	DAWSON, GA (85)
	DE KALB, GA (89)
	DELAWARE, PA (45)
	DINWIDDIE, VA (53)
	DOUGLAS, GA (97)
	DURHAM, NC (63)
	EDGEFIELD, SC (37)
	ELBERT, GA (105)
	EMPORIA CITY, VA (595)
	ESSEX, NJ (13)
	FAIRFAX CITY, VA (600)
	FAIRFAX, VA (59)
	FAIRFIELD, SC (39)
	FALLS CHURCH CITY, VA (610)
	FANNIN, GA (111)
	FAUQUIER, VA (61)
	FAYETTE, GA (113)
	FLOYD, VA (63)
	FLUVANNA, VA (65)
	FORSYTH, GA (117)
	FORSYTH, NC (67)
	FRANKLIN, GA (119)
	FRANKLIN, NC (69)
	FRANKLIN, VA (67)
	FREDERICK, MD (21)
	FREDERICKSBURG CITY, VA (630)
	FULTON, GA (121)
	GALAX CITY, VA (640)

	GASTON, NC (71)
	GILMER, GA (123)
	GOOCHLAND, VA (75)
	GRAHAM, NC (75)
	GRANVILLE, NC (77)
	GRAYSON, VA (77)
	GREENE, GA (133)
	GREENE, VA (79)
	GREENSVILLE, VA (81)
	GREENVILLE, SC (45)
	GREENWOOD, SC (47)
	GUILFORD, NC (81)
	GWINNETT, GA (135)
	HABERSHAM, GA (137)
	HALIFAX, VA (83)
	HALL, GA (139)
	HANCOCK, GA (141)
	HARALSON, GA (143)
	HARFORD, MD (25)
	HARNETT, NC (85)
	HARRIS, GA (145)
	HART, GA (147)
	HAYWOOD, NC (87)
	HEARD, GA (149)
	HENDERSON, NC (89)
	HENRY, GA (151)
	HENRY, VA (89)
	HOWARD, MD (27)
	HUDSON, NJ (17)
	HUNTERDON, NJ (19)
	IREDELL, NC (97)
	JACKSON, GA (157)
	JACKSON, NC (99)
	JASPER, GA (159)
	JOHNSON, TN (91)
	JOHNSTON, NC (101)
	JONES, GA (169)
	KERSHAW, SC (55)
	LAMAR, GA (171)

	LANCASTER, PA (71)
	LANCASTER, SC (57)
	LAURENS, SC (59)
	LEE, AL (81)
	LEE, NC (105)
	LINCOLN, GA (181)
	LINCOLN, NC (109)
	LOUDOUN, VA (107)
	LOUISA, VA (109)
	LUMPKIN, GA (187)
	LUNENBURG, VA (111)
	LYNCHBURG CITY, VA (680)
	MACON, NC (113)
	MADISON, GA (195)
	MADISON, NC (115)
	MADISON, VA (113)
	MARTINSVILLE CITY, VA (690)
	MC CORMICK, SC (65)
	MC DOWELL, NC (111)
	MC DUFFIE, GA (189)
	MECKLENBURG, NC (119)
	MECKLENBURG, VA (117)
	MERCER, NJ (21)
	MERIWETHER, GA (199)
	MIDDLESEX, NJ (23)
	MITCHELL, NC (121)
	MONROE, GA (207)
	MONTGOMERY, MD (31)
	MONTGOMERY, NC (123)
	MONTGOMERY, PA (91)
	MOORE, NC (125)
	MORGAN, GA (211)
	MORRIS, NJ (27)
	NASH, NC (127)
	NELSON, VA (125)
	NEW YORK, NY (61)
	NEWBERRY, SC (71)
	NEWTON, GA (217)
	NOTTOWAY, VA (135)

	OCONEE, GA (219)
	OCONEE, SC (73)
	OGLETHORPE, GA (221)
	ORANGE, NC (135)
	ORANGE, VA (137)
	PASSAIC, NJ (31)
	PATRICK, VA (141)
	PAULDING, GA (223)
	PERSON, NC (145)
	PETERSBURG CITY, VA (730)
	PHILADELPHIA, PA (101)
	PICKENS, GA (227)
	PICKENS, SC (77)
	PIKE, GA (231)
	PITTSYLVANIA, VA (143)
	POLK, NC (149)
	POWHATAN, VA (145)
	PRINCE EDWARD, VA (147)
	PRINCE WILLIAM, VA (153)
	PUTNAM, GA (237)
	RABUN, GA (241)
	RANDOLPH, AL (111)
	RANDOLPH, NC (151)
	RAPPAHANNOCK, VA (157)
	ROCKDALE, GA (247)
	ROCKINGHAM, NC (157)
	ROWAN, NC (159)
	RUTHERFORD, NC (161)
	SALUDA, SC (81)
	SOMERSET, NJ (35)
	SOUTH BOSTON CITY, VA (780)
	SPALDING, GA (255)
	SPARTANBURG, SC (83)
	SPOTSYLVANIA, VA (177)
	STAFFORD, VA (179)
	STANLY, NC (167)
	STEPHENS, GA (257)
	STOKES, NC (169)
	SURRY, NC (171)

	SWAIN, NC (173)
	TALBOT, GA (263)
	TALIAFERRO, GA (265)
	TALLAPOOSA, AL (123)
	TOWNS, GA (281)
	TRANSYLVANIA, NC (175)
	TROUP, GA (285)
	UNION, GA (291)
	UNION, NC (179)
	UNION, NJ (39)
	UNION, SC (87)
	UPSON, GA (293)
	VANCE, NC (181)
	WAKE, NC (183)
	WALTON, GA (297)
	WARREN, GA (301)
	WARREN, NC (185)
	WATAUGA, NC (189)
	WHITE, GA (311)
	WILKES, GA (317)
	WILKES, NC (193)
	YADKIN, NC (197)
	YANCEY, NC (199)
	YORK, PA (133)
	YORK, SC (91)
160 - Appalachian Basin	ALBANY, NY (1)
	ASHLAND, OH (5)
	BOONE, WV (5)
	BROOME, NY (7)
	ASHTABULA, OH (7)
	BLEDSON, TN (7)
	ATHENS, OH (9)
	CAYUGA, NY (11)
	CABELL, WV (11)
	CLAY, WV (15)
	CHENANGO, NY (17)
	BOYD, KY (19)
	FAYETTE, WV (19)
	CORTLAND, NY (23)

	BREATHITT, KY (25)
	DELAWARE, NY (25)
	ERIE, NY (29)
	COSHOCTON, OH (31)
	CRAWFORD, OH (33)
	CUYAHOGA, OH (35)
	CUMBERLAND, TN (35)
	JACKSON, WV (35)
	GENESEE, NY (37)
	GREENE, NY (39)
	CRAWFORD, PA (39)
	KANAWHA, WV (39)
	DELAWARE, OH (41)
	CARTER, KY (43)
	ERIE, OH (43)
	LINCOLN, WV (43)
	JEFFERSON, NY (45)
	FAIRFIELD, OH (45)
	LOGAN, WV (45)
	FAYETTE, OH (47)
	MC DOWELL, WV (47)
	LEWIS, NY (49)
	FRANKLIN, OH (49)
	ERIE, PA (49)
	FENTRESS, TN (49)
	CLAY, KY (51)
	LIVINGSTON, NY (51)
	FRANKLIN, TN (51)
	MADISON, NY (53)
	GALLIA, OH (53)
	MASON, WV (53)
	MONROE, NY (55)
	GEAUGA, OH (55)
	MONTGOMERY, NY (57)
	GUERNSEY, OH (59)
	MINGO, WV (59)
	GRUNDY, TN (61)
	ELLIOTT, KY (63)
	NIAGARA, NY (63)



	ESTILL, KY (65)
	ONEIDA, NY (65)
	ONONDAGA, NY (67)
	NICHOLAS, WV (67)
	ONTARIO, NY (69)
	FLOYD, KY (71)
	ORLEANS, NY (73)
	HOCKING, OH (73)
	OSWEGO, NY (75)
	HOLMES, OH (75)
	OTSEGO, NY (77)
	HURON, OH (77)
	JACKSON, OH (79)
	PUTNAM, WV (79)
	RALEIGH, WV (81)
	KNOX, OH (83)
	LAKE, OH (85)
	LAWRENCE, OH (87)
	ROANE, WV (87)
	GREENUP, KY (89)
	LICKING, OH (89)
	SARATOGA, NY (91)
	SCHENECTADY, NY (93)
	LORAIN, OH (93)
	SCHOHARIE, NY (95)
	MADISON, OH (97)
	SENECA, NY (99)
	WAYNE, WV (99)
	MARION, OH (101)
	MEDINA, OH (103)
	PIKE, PA (103)
	SULLIVAN, NY (105)
	MEIGS, OH (105)
	WOOD, WV (107)
	JACKSON, KY (109)
	WYOMING, WV (109)
	JOHNSON, KY (115)
	MORGAN, OH (115)
	MARION, TN (115)

	WAYNE, NY (117)
	MORROW, OH (117)
	KNOTT, KY (119)
	MUSKINGUM, OH (119)
	KNOX, KY (121)
	WYOMING, NY (121)
	NOBLE, OH (121)
	LAUREL, KY (125)
	LAWRENCE, KY (127)
	PERRY, OH (127)
	WAYNE, PA (127)
	LEE, KY (129)
	PICKAWAY, OH (129)
	MORGAN, TN (129)
	LESLIE, KY (131)
	PIKE, OH (131)
	PORTAGE, OH (133)
	LEWIS, KY (135)
	RICHLAND, OH (139)
	ROSS, OH (141)
	SCIOTO, OH (145)
	MC CREARY, KY (147)
	STARK, OH (151)
	SCOTT, TN (151)
	MAGOFFIN, KY (153)
	SUMMIT, OH (153)
	SEQUATCHIE, TN (153)
	TRUMBULL, OH (155)
	TUSCARAWAS, OH (157)
	MARTIN, KY (159)
	UNION, OH (159)
	VINTON, OH (163)
	MENIFEE, KY (165)
	WAYNE, OH (169)
	MORGAN, KY (175)
	VAN BUREN, TN (175)
	WHITE, TN (185)
	OWSLEY, KY (189)
	PERRY, KY (193)

	PIKE, KY (195)
	POWELL, KY (197)
	ROCKCASTLE, KY (203)
	ROWAN, KY (205)
	WHITLEY, KY (235)
	WOLFE, KY (237)
	BRISTOL CITY, VA (520)
	BUENA VISTA CITY, VA (530)
	CLIFTON FORGE CITY, VA (560)
	COVINGTON CITY, VA (580)
	HARRISONBURG CITY, VA (660)
	NORTON CITY, VA (720)
	RADFORD CITY, VA (750)
	STAUNTON CITY, VA (790)
	WINCHESTER CITY, VA (840)
160A - Appalachian Basin (Eastern Overthrust Area)	ALLEGANY, MD (1)
	ANDERSON, TN (1)
	BARBOUR, WV (1)
	ALLEGANY, NY (3)
	ALLEGHENY, PA (3)
	BERKELEY, WV (3)
	ARMSTRONG, PA (5)
	ALLEGHANY, VA (5)
	BIBB, AL (7)
	BEAVER, PA (7)
	BRAXTON, WV (7)
	BLOUNT, AL (9)
	CATTARAUGUS, NY (9)
	BEDFORD, PA (9)
	BLOUNT, TN (9)
	BROOKE, WV (9)
	BERKS, PA (11)
	BRADLEY, TN (11)
	BELL, KY (13)
	CHAUTAUQUA, NY (13)
	BELMONT, OH (13)
	BLAIR, PA (13)
	CAMPBELL, TN (13)
	CALHOUN, WV (13)

	CALHOUN, AL (15)
	BARTOW, GA (15)
	CHEMUNG, NY (15)
	BRADFORD, PA (15)
	AUGUSTA, VA (15)
	BATH, VA (17)
	DODDRIDGE, WV (17)
	CHEROKEE, AL (19)
	CARROLL, OH (19)
	BUTLER, PA (19)
	CAMBRIA, PA (21)
	BLAND, VA (21)
	GILMER, WV (21)
	GARRETT, MD (23)
	CAMERON, PA (23)
	BOTETOURT, VA (23)
	GRANT, WV (23)
	CARBON, PA (25)
	CLAIBORNE, TN (25)
	GREENBRIER, WV (25)
	CENTRE, PA (27)
	BUCHANAN, VA (27)
	HAMPSHIRE, WV (27)
	COLUMBIANA, OH (29)
	COCKE, TN (29)
	HANCOCK, WV (29)
	CLARION, PA (31)
	HARDY, WV (31)
	CLEARFIELD, PA (33)
	HARRISON, WV (33)
	CLINTON, PA (35)
	SUSSEX, NJ (37)
	COLUMBIA, PA (37)
	JEFFERSON, WV (37)
	WARREN, NJ (41)
	CUMBERLAND, PA (41)
	LEWIS, WV (41)
	WASHINGTON, MD (43)
	DAUPHIN, PA (43)

	CLARKE, VA (43)
	CRAIG, VA (45)
	CATOOSA, GA (47)
	ELK, PA (47)
	DE KALB, AL (49)
	MARION, WV (49)
	FAYETTE, PA (51)
	DICKENSON, VA (51)
	MARSHALL, WV (51)
	FOREST, PA (53)
	ETOWAH, AL (55)
	CHATTOOGA, GA (55)
	FRANKLIN, PA (55)
	MERCER, WV (55)
	FULTON, PA (57)
	GRAINGER, TN (57)
	MINERAL, WV (57)
	GREENE, PA (59)
	GREENE, TN (59)
	HUNTINGDON, PA (61)
	MONONGALIA, WV (61)
	INDIANA, PA (63)
	HAMBLEN, TN (63)
	MONROE, WV (63)
	JEFFERSON, PA (65)
	HAMILTON, TN (65)
	MORGAN, WV (65)
	HARRISON, OH (67)
	JUNIATA, PA (67)
	HANCOCK, TN (67)
	LACKAWANNA, PA (69)
	FREDERICK, VA (69)
	OHIO, WV (69)
	JACKSON, AL (71)
	ORANGE, NY (71)
	GILES, VA (71)
	PENDLETON, WV (71)
	JEFFERSON, AL (73)
	LAWRENCE, PA (73)

	HAWKINS, TN (73)
	PLEASANTS, WV (73)
	LEBANON, PA (75)
	POCAHONTAS, WV (75)
	LEHIGH, PA (77)
	PRESTON, WV (77)
	LUZERNE, PA (79)
	JEFFERSON, OH (81)
	LYCOMING, PA (81)
	DADE, GA (83)
	MC KEAN, PA (83)
	RANDOLPH, WV (83)
	MERCER, PA (85)
	RITCHIE, WV (85)
	MIFFLIN, PA (87)
	MADISON, AL (89)
	MONROE, PA (89)
	JEFFERSON, TN (89)
	SUMMERS, WV (89)
	HIGHLAND, VA (91)
	TAYLOR, WV (91)
	MONTOUR, PA (93)
	KNOX, TN (93)
	TUCKER, WV (93)
	HARLAN, KY (95)
	MARSHALL, AL (95)
	NORTHAMPTON, PA (95)
	TYLER, WV (95)
	SCHUYLER, NY (97)
	NORTHUMBERLAND, PA (97)
	UPSHUR, WV (97)
	MAHONING, OH (99)
	PERRY, PA (99)
	STEUBEN, NY (101)
	WEBSTER, WV (101)
	WETZEL, WV (103)
	POTTER, PA (105)
	LOUDON, TN (105)
	LEE, VA (105)

	WIRT, WV (105)
	TIOGA, NY (107)
	SCHUYLKILL, PA (107)
	MC MINN, TN (107)
	TOMPKINS, NY (109)
	SNYDER, PA (109)
	ULSTER, NY (111)
	MONROE, OH (111)
	SOMERSET, PA (111)
	SULLIVAN, PA (113)
	ST CLAIR, AL (115)
	FLOYD, GA (115)
	SUSQUEHANNA, PA (115)
	SHELBY, AL (117)
	TIOGA, PA (117)
	UNION, PA (119)
	TALLADEGA, AL (121)
	VENANGO, PA (121)
	MEIGS, TN (121)
	MONTGOMERY, VA (121)
	YATES, NY (123)
	WARREN, PA (123)
	MONROE, TN (123)
	WASHINGTON, PA (125)
	GORDON, GA (129)
	WESTMORELAND, PA (129)
	WYOMING, PA (131)
	LETCHER, KY (133)
	POLK, TN (139)
	PAGE, VA (139)
	RHEA, TN (143)
	ROANE, TN (145)
	SEVIER, TN (155)
	PULASKI, VA (155)
	ROANOKE, VA (161)
	SULLIVAN, TN (163)
	ROCKBRIDGE, VA (163)
	ROCKINGHAM, VA (165)
	WASHINGTON, OH (167)

	RUSSELL, VA (167)
	SCOTT, VA (169)
	UNICOI, TN (171)
	SHENANDOAH, VA (171)
	UNION, TN (173)
	SMYTH, VA (173)
	WASHINGTON, TN (179)
	TAZEWELL, VA (185)
	WARREN, VA (187)
	WASHINGTON, VA (191)
	WISE, VA (195)
	WYTHE, VA (197)
	MURRAY, GA (213)
	POLK, GA (233)
	WALKER, GA (295)
	WHITFIELD, GA (313)
	ROANOKE CITY, VA (770)
200 - Black Warrior Basin	CALHOUN, MS (13)
	CHICKASAW, MS (17)
	CHOCTAW, MS (19)
	CLAY, MS (25)
	COLBERT, AL (33)
	CULLMAN, AL (43)
	FAYETTE, AL (57)
	FRANKLIN, AL (59)
	GREENE, AL (63)
	GRENADA, MS (43)
	ITAWAMBA, MS (57)
	KEMPER, MS (69)
	LAFAYETTE, MS (71)
	LAMAR, AL (75)
	LAWRENCE, AL (79)
	LEE, MS (81)
	LOWNDES, MS (87)
	MARION, AL (93)
	MONROE, MS (95)
	MORGAN, AL (103)
	NOXUBEE, MS (103)
	OKTIBBEHA, MS (105)



	PANOLA, MS (107)
	PICKENS, AL (107)
	PONTOTOC, MS (115)
	PRETISS, MS (117)
	QUITMAN, MS (119)
	SUMTER, AL (119)
	TALLAHATCHIE, MS (135)
	TISHOMINGO, MS (141)
	TUSCALOOSA, AL (125)
	UNION, MS (145)
	WALKER, AL (127)
	WEBSTER, MS (155)
	WINSTON, AL (133)
	WINSTON, MS (159)
	YALOBUSHA, MS (161)
210 - Mid-Gulf Coast Basin	ADAMS, MS (1)
	AMITE, MS (5)
	ATTALA, MS (7)
	AUTAUGA, AL (1)
	BALDWIN, AL (3)
	BULLOCK, AL (11)
	BUTLER, AL (13)
	CARROLL, MS (15)
	CHILTON, AL (21)
	CHOCTAW, AL (23)
	CLAIBORNE, MS (21)
	CLARKE, AL (25)
	CLARKE, MS (23)
	CONECUH, AL (35)
	COPIAH, MS (29)
	COVINGTON, AL (39)
	COVINGTON, MS (31)
	CRENSHAW, AL (41)
	DALLAS, AL (47)
	ELMORE, AL (51)
	ESCAMBIA, AL (53)
	ESCAMBIA, FL (33)
	FORREST, MS (35)
	FRANKLIN, MS (37)

	GEORGE, MS (39)
	GREENE, MS (41)
	HALE, AL (65)
	HANCOCK, MS (45)
	HARRISON, MS (47)
	HINDS, MS (49)
	HOLMES, MS (51)
	HUMPHREYS, MS (53)
	ISSAQUENA, MS (55)
	JACKSON, MS (59)
	JASPER, MS (61)
	JEFFERSON DAVIS, MS (65)
	JEFFERSON, MS (63)
	JONES, MS (67)
	LAMAR, MS (73)
	LAUDERDALE, MS (75)
	LAWRENCE, MS (77)
	LEAKE, MS (79)
	LEFLORE, MS (83)
	LINCOLN, MS (85)
	LOWNDES, AL (85)
	MACON, AL (87)
	MADISON, MS (89)
	MARENGO, AL (91)
	MARION, MS (91)
	MOBILE, AL (97)
	MONROE, AL (99)
	MONTGOMERY, AL (101)
	MONTGOMERY, MS (97)
	NESHOBA, MS (99)
	NEWTON, MS (101)
	OKALOOSA, FL (91)
	PEARL RIVER, MS (109)
	PERRY, AL (105)
	PERRY, MS (111)
	PIKE, MS (113)
	RANKIN, MS (121)
	SANTA ROSA, FL (113)
	SCOTT, MS (123)

	SHARKEY, MS (125)
	SIMPSON, MS (127)
	SMITH, MS (129)
	STONE, MS (131)
	WALTHALL, MS (147)
	WALTON, FL (131)
	WARREN, MS (149)
	WASHINGTON, AL (129)
	WASHINGTON, LA (117)
	WASHINGTON, MS (151)
	WAYNE, MS (153)
	WILCOX, AL (131)
	WILKINSON, MS (157)
	YAZOO, MS (163)
220 - Gulf Coast Basin (LA, TX)	ACADIA, LA (1)
	ALLEN, LA (3)
	ARANSAS, TX (7)
	ASCENSION, LA (5)
	ASSUMPTION, LA (7)
	ATASCOSA, TX (13)
	AUSTIN, TX (15)
	AVOUELLES, LA (9)
	BASTROP, TX (21)
	BEAUREGARD, LA (11)
	BEE, TX (25)
	BRAZORIA, TX (39)
	BRAZOS, TX (41)
	BROOKS, TX (47)
	BURLESON, TX (51)
	CALCASIEU, LA (19)
	CALDWELL, TX (55)
	CALHOUN, TX (57)
	CAMERON, LA (23)
	CAMERON, TX (61)
	CHAMBERS, TX (71)
	COLORADO, TX (89)
	DE WITT, TX (123)
	DIMMIT, TX (127)
	DUVAL, TX (131)

	EAST BATON ROUGE, LA (33)
	EAST FELICIANA, LA (37)
	EVANGELINE, LA (39)
	FAYETTE, TX (149)
	FORT BEND, TX (157)
	FRIO, TX (163)
	GALVESTON, TX (167)
	GOLIAD, TX (175)
	GONZALES, TX (177)
	GRIMES, TX (185)
	GUADALUPE, TX (187)
	HARDIN, TX (199)
	HARRIS, TX (201)
	HIDALGO, TX (215)
	IBERIA, LA (45)
	IBERVILLE, LA (47)
	JACKSON, TX (239)
	JASPER, TX (241)
	JEFFERSON DAVIS, LA (53)
	JEFFERSON, LA (51)
	JEFFERSON, TX (245)
	JIM HOGG, TX (247)
	JIM WELLS, TX (249)
	KARNES, TX (255)
	KENEDY, TX (261)
	KLEBERG, TX (273)
	LA SALLE, TX (283)
	LAFAYETTE, LA (55)
	LAFOURCHE, LA (57)
	LAVACA, TX (285)
	LEE, TX (287)
	LIBERTY, TX (291)
	LIVE OAK, TX (297)
	LIVINGSTON, LA (63)
	MADISON, TX (313)
	MATAGORDA, TX (321)
	MAVERICK, TX (323)
	MC MULLEN, TX (311)
	MILAM, TX (331)

	MONTGOMERY, TX (339)
	NEWTON, TX (351)
	NUECES, TX (355)
	ORANGE, TX (361)
	ORLEANS, LA (71)
	PLAQUEMINES, LA (75)
	POINTE COUPEE, LA (77)
	POLK, TX (373)
	RAPIDES, LA (79)
	REFUGIO, TX (391)
	SAN JACINTO, TX (407)
	SAN PATRICIO, TX (409)
	ST BERNARD, LA (87)
	ST CHARLES, LA (89)
	ST HELENA, LA (91)
	ST JAMES, LA (93)
	ST JOHN THE BAPTIST, LA (95)
	ST LANDRY, LA (97)
	ST MARTIN, LA (99)
	ST MARY, LA (101)
	ST TAMMANY, LA (103)
	STARR, TX (427)
	TANGIPAHOA, LA (105)
	TERREBONNE, LA (109)
	TRINITY, TX (455)
	TYLER, TX (457)
	VERMILION, LA (113)
	VERNON, LA (115)
	VICTORIA, TX (469)
	WALKER, TX (471)
	WALLER, TX (473)
	WASHINGTON, TX (477)
	WEBB, TX (479)
	WEST BATON ROUGE, LA (121)
	WEST FELICIANA, LA (125)
	WHARTON, TX (481)
	WILLACY, TX (489)
	WILSON, TX (493)
	ZAPATA, TX (505)

	ZAVALA, TX (507)
230 - Arkla Basin	ASHLEY, AR (3)
	BIENVILLE, LA (13)
	BOSSIER, LA (15)
	BRADLEY, AR (11)
	CADDO, LA (17)
	CALDWELL, LA (21)
	CALHOUN, AR (13)
	CATAHOULA, LA (25)
	CHICOT, AR (17)
	CLAIBORNE, LA (27)
	COLUMBIA, AR (27)
	CONCORDIA, LA (29)
	DE SOTO, LA (31)
	EAST CARROLL, LA (35)
	FRANKLIN, LA (41)
	GRANT, LA (43)
	HEMPSTEAD, AR (57)
	JACKSON, LA (49)
	LA SALLE, LA (59)
	LAFAYETTE, AR (73)
	LINCOLN, LA (61)
	LITTLE RIVER, AR (81)
	MADISON, LA (65)
	MILLER, AR (91)
	MOREHOUSE, LA (67)
	NATCHITOCHEs, LA (69)
	NEVADA, AR (99)
	OUACHITA, AR (103)
	OUACHITA, LA (73)
	RED RIVER, LA (81)
	RICHLAND, LA (83)
	SABINE, LA (85)
	TENSAS, LA (107)
	UNION, AR (139)
	UNION, LA (111)
	WEBSTER, LA (119)
	WEST CARROLL, LA (123)
	WINN, LA (127)

240 - Desha Basin	ARKANSAS, AR (1)
	BOLIVAR, MS (11)
	CLEVELAND, AR (25)
	COAHOMA, MS (27)
	DESHA, AR (41)
	DREW, AR (43)
	JEFFERSON, AR (69)
	LINCOLN, AR (79)
	SUNFLOWER, MS (133)
250 - Upper Mississippi Embaymnt	ALCORN, MS (3)
	BALLARD, KY (7)
	BENTON, MS (9)
	CALLOWAY, KY (35)
	CARLISLE, KY (39)
	CARROLL, TN (17)
	CHESTER, TN (23)
	CLAY, AR (21)
	CRAIGHEAD, AR (31)
	CRITTENDEN, AR (35)
	CROCKETT, TN (33)
	CROSS, AR (37)
	DE SOTO, MS (33)
	DUNKLIN, MO (69)
	DYER, TN (45)
	FAYETTE, TN (47)
	FULTON, KY (75)
	GIBSON, TN (53)
	GRAVES, KY (83)
	GREENE, AR (55)
	HARDEMAN, TN (69)
	HARDIN, TN (71)
	HAYWOOD, TN (75)
	HENDERSON, TN (77)
	HENRY, TN (79)
	HICKMAN, KY (105)
	JACKSON, AR (67)
	LAKE, TN (95)
	LAUDERDALE, TN (97)
	LEE, AR (77)

	MADISON, TN (113)
	MARSHALL, KY (157)
	MARSHALL, MS (93)
	MC CRACKEN, KY (145)
	MC NAIRY, TN (109)
	MISSISSIPPI, AR (93)
	MISSISSIPPI, MO (133)
	MONROE, AR (95)
	NEW MADRID, MO (143)
	OBION, TN (131)
	PEMISCOT, MO (155)
	PHILLIPS, AR (107)
	POINSETT, AR (111)
	PRAIRIE, AR (117)
	SCOTT, MO (201)
	SHELBY, TN (157)
	ST FRANCIS, AR (123)
	STODDARD, MO (207)
	TATE, MS (137)
	TIPPAH, MS (139)
	TIPTON, TN (167)
	TUNICA, MS (143)
	WEAKLEY, TN (183)
	WOODRUFF, AR (147)
260 - East Texas Basin	ANDERSON, TX (1)
	ANGELINA, TX (5)
	BOWIE, TX (37)
	CAMP, TX (63)
	CASS, TX (67)
	CHEROKEE, TX (73)
	DELTA, TX (119)
	FALLS, TX (145)
	FRANKLIN, TX (159)
	FREESTONE, TX (161)
	GREGG, TX (183)
	HARRISON, TX (203)
	HENDERSON, TX (213)
	HOPKINS, TX (223)
	HOUSTON, TX (225)



	HUNT, TX (231)
	KAUFMAN, TX (257)
	LEON, TX (289)
	LIMESTONE, TX (293)
	MARION, TX (315)
	MORRIS, TX (343)
	NACOGDOCHES, TX (347)
	NAVARRO, TX (349)
	PANOLA, TX (365)
	RAINS, TX (379)
	ROBERTSON, TX (395)
	ROCKWALL, TX (397)
	RUSK, TX (401)
	SABINE, TX (403)
	SAN AUGUSTINE, TX (405)
	SHELBY, TX (419)
	SMITH, TX (423)
	TITUS, TX (449)
	UPSHUR, TX (459)
	VAN ZANDT, TX (467)
	WOOD, TX (499)
300 - Cincinnati Arch	ADAIR, KY (1)
	ADAMS, IN (1)
	ADAMS, OH (1)
	ALLEN, KY (3)
	ALLEN, OH (3)
	ANDERSON, KY (5)
	AUGLAIZE, OH (11)
	BARREN, KY (9)
	BATH, KY (11)
	BEDFORD, TN (3)
	BENTON, TN (5)
	BLACKFORD, IN (9)
	BOONE, IN (11)
	BOONE, KY (15)
	BOURBON, KY (17)
	BOYLE, KY (21)
	BRACKEN, KY (23)
	BROWN, OH (15)

	BULLITT, KY (29)
	BUTLER, OH (17)
	CAMPBELL, KY (37)
	CANNON, TN (15)
	CARROLL, IN (15)
	CARROLL, KY (41)
	CASEY, KY (45)
	CASS, IN (17)
	CHAMPAIGN, OH (21)
	CHEATHAM, TN (21)
	CLARK, IN (19)
	CLARK, KY (49)
	CLARK, OH (23)
	CLAY, TN (27)
	CLERMONT, OH (25)
	CLINTON, IN (23)
	CLINTON, KY (53)
	CLINTON, OH (27)
	COFFEE, TN (31)
	CUMBERLAND, KY (57)
	DARKE, OH (37)
	DAVIDSON, TN (37)
	DE KALB, TN (41)
	DEARBORN, IN (29)
	DECATUR, IN (31)
	DECATUR, TN (39)
	DELAWARE, IN (35)
	DICKSON, TN (43)
	EDMONSON, KY (61)
	FAYETTE, IN (41)
	FAYETTE, KY (67)
	FLEMING, KY (69)
	FLOYD, IN (43)
	FRANKLIN, IN (47)
	FRANKLIN, KY (73)
	FULTON, IN (49)
	GALLATIN, KY (77)
	GARRARD, KY (79)
	GILES, TN (55)

	GRANT, IN (53)
	GRANT, KY (81)
	GREEN, KY (87)
	GREENE, OH (57)
	HAMILTON, IN (57)
	HAMILTON, OH (61)
	HANCOCK, IN (59)
	HANCOCK, OH (63)
	HARDIN, KY (93)
	HARDIN, OH (65)
	HARRISON, KY (97)
	HART, KY (99)
	HENRY, IN (65)
	HENRY, KY (103)
	HICKMAN, TN (81)
	HIGHLAND, OH (71)
	HOUSTON, TN (83)
	HOWARD, IN (67)
	HUMPHREYS, TN (85)
	HUNTINGTON, IN (69)
	JACKSON, TN (87)
	JASPER, IN (73)
	JAY, IN (75)
	JEFFERSON, IN (77)
	JEFFERSON, KY (111)
	JENNINGS, IN (79)
	JESSAMINE, KY (113)
	KENTON, KY (117)
	LAKE, IN (89)
	LARUE, KY (123)
	LAUDERDALE, AL (77)
	LAWRENCE, TN (99)
	LEWIS, TN (101)
	LIMESTONE, AL (83)
	LINCOLN, KY (137)
	LINCOLN, TN (103)
	LOGAN, OH (91)
	MACON, TN (111)
	MADISON, IN (95)

	MADISON, KY (151)
	MARION, IN (97)
	MARION, KY (155)
	MARSHALL, TN (117)
	MASON, KY (161)
	MAURY, TN (119)
	MEADE, KY (163)
	MERCER, KY (167)
	MERCER, OH (107)
	METCALFE, KY (169)
	MIAMI, IN (103)
	MIAMI, OH (109)
	MONROE, KY (171)
	MONTGOMERY, KY (173)
	MONTGOMERY, OH (113)
	MONTGOMERY, TN (125)
	MOORE, TN (127)
	NELSON, KY (179)
	NEWTON, IN (111)
	NICHOLAS, KY (181)
	OHIO, IN (115)
	OLDHAM, KY (185)
	OTTAWA, OH (123)
	OVERTON, TN (133)
	OWEN, KY (187)
	PENDLETON, KY (191)
	PERRY, TN (135)
	PICKETT, TN (137)
	PORTER, IN (127)
	PREBLE, OH (135)
	PULASKI, IN (131)
	PULASKI, KY (199)
	PUTNAM, OH (137)
	PUTNAM, TN (141)
	RANDOLPH, IN (135)
	RIPLEY, IN (137)
	ROBERTSON, KY (201)
	ROBERTSON, TN (147)
	RUSH, IN (139)

	RUSSELL, KY (207)
	RUTHERFORD, TN (149)
	SANDUSKY, OH (143)
	SCOTT, IN (143)
	SCOTT, KY (209)
	SENECA, OH (147)
	SHELBY, IN (145)
	SHELBY, KY (211)
	SHELBY, OH (149)
	SIMPSON, KY (213)
	SMITH, TN (159)
	SPENCER, KY (215)
	STEWART, TN (161)
	SUMNER, TN (165)
	SWITZERLAND, IN (155)
	TAYLOR, KY (217)
	TIPTON, IN (159)
	TRIMBLE, KY (223)
	TROUSDALE, TN (169)
	UNION, IN (161)
	VAN WERT, OH (161)
	WABASH, IN (169)
	WARREN, KY (227)
	WARREN, OH (165)
	WARREN, TN (177)
	WASHINGTON, KY (229)
	WAYNE, IN (177)
	WAYNE, KY (231)
	WAYNE, TN (181)
	WELLS, IN (179)
	WHITE, IN (181)
	WILLIAMSON, TN (187)
	WILSON, TN (189)
	WOOD, OH (173)
	WOODFORD, KY (239)
	WYANDOT, OH (175)
305 - Michigan Basin	ALCONA, MI (1)
	ALGER, MI (3)
	ALLEGAN, MI (5)

	ALLEN, IN (3)
	ALPENA, MI (7)
	ANTRIM, MI (9)
	ARENAC, MI (11)
	BARRY, MI (15)
	BAY, MI (17)
	BENZIE, MI (19)
	BERRIEN, MI (21)
	BRANCH, MI (23)
	CALHOUN, MI (25)
	CASS, MI (27)
	CHARLEVOIX, MI (29)
	CHEBOYGAN, MI (31)
	CHIPPEWA, MI (33)
	CLARE, MI (35)
	CLINTON, MI (37)
	COOK, IL (31)
	CRAWFORD, MI (39)
	DE KALB, IN (33)
	DEFIANCE, OH (39)
	DELTA, MI (41)
	DOOR, WI (29)
	EATON, MI (45)
	ELKHART, IN (39)
	EMMET, MI (47)
	FULTON, OH (51)
	GENESEE, MI (49)
	GLADWIN, MI (51)
	GRAND TRAVERSE, MI (55)
	GRATIOT, MI (57)
	HENRY, OH (69)
	HILLSDALE, MI (59)
	HURON, MI (63)
	INGHAM, MI (65)
	IONIA, MI (67)
	IOSCO, MI (69)
	ISABELLA, MI (73)
	JACKSON, MI (75)
	KALAMAZOO, MI (77)

	KALKASKA, MI (79)
	KENOSHA, WI (59)
	KENT, MI (81)
	KEWAUNEE, WI (61)
	KOSCIUSKO, IN (85)
	LA PORTE, IN (91)
	LAGRANGE, IN (87)
	LAKE, IL (97)
	LAKE, MI (85)
	LAPEER, MI (87)
	LEELANAU, MI (89)
	LENAWEE, MI (91)
	LIVINGSTON, MI (93)
	LUCAS, OH (95)
	LUCE, MI (95)
	MACKINAC, MI (97)
	MACOMB, MI (99)
	MANISTEE, MI (101)
	MANITOWOC, WI (71)
	MARSHALL, IN (99)
	MASON, MI (105)
	MECOSTA, MI (107)
	MIDLAND, MI (111)
	MILWAUKEE, WI (79)
	MISSAUKEE, MI (113)
	MONROE, MI (115)
	MONTCALM, MI (117)
	MONTMORENCY, MI (119)
	MUSKEGON, MI (121)
	NEWAYGO, MI (123)
	NOBLE, IN (113)
	OAKLAND, MI (125)
	OCEANA, MI (127)
	OGEMAW, MI (129)
	OSCEOLA, MI (133)
	OSCODA, MI (135)
	OTSEGO, MI (137)
	OTTAWA, MI (139)
	OZAUKEE, WI (89)

	PAULDING, OH (125)
	PRESQUE ISLE, MI (141)
	RACINE, WI (101)
	ROSCOMMON, MI (143)
	SAGINAW, MI (145)
	SANILAC, MI (151)
	SCHOOLCRAFT, MI (153)
	SHEBOYGAN, WI (117)
	SHIAWASSEE, MI (155)
	ST CLAIR, MI (147)
	ST JOSEPH, IN (141)
	ST JOSEPH, MI (149)
	STARKE, IN (149)
	STEUBEN, IN (151)
	TUSCOLA, MI (157)
	VAN BUREN, MI (159)
	WASHTENAW, MI (161)
	WAYNE, MI (163)
	WEXFORD, MI (165)
	WHITLEY, IN (183)
	WILLIAMS, OH (171)
310 - Wisconsin Arch	ADAMS, WI (1)
	ASHLAND, WI (3)
	BARAGA, MI (13)
	BARRON, WI (5)
	BAYFIELD, WI (7)
	BOONE, IL (7)
	BROWN, WI (9)
	BUFFALO, WI (11)
	BURNETT, WI (13)
	CALUMET, WI (15)
	CARROLL, IL (15)
	CHIPPEWA, WI (17)
	CLARK, WI (19)
	COLUMBIA, WI (21)
	CRAWFORD, WI (23)
	DANE, WI (25)
	DE KALB, IL (37)
	DICKINSON, MI (43)



	DODGE, WI (27)
	DOUGLAS, WI (31)
	DU PAGE, IL (43)
	DUNN, WI (33)
	EAU CLAIRE, WI (35)
	FLORENCE, WI (37)
	FOND DU LAC, WI (39)
	FOREST, WI (41)
	GOGEBIC, MI (53)
	GRANT, WI (43)
	GREEN LAKE, WI (47)
	GREEN, WI (45)
	GRUNDY, IL (63)
	HOUGHTON, MI (61)
	IOWA, WI (49)
	IRON, MI (71)
	IRON, WI (51)
	JACKSON, WI (53)
	JEFFERSON, WI (55)
	JO DAVIESS, IL (85)
	JUNEAU, WI (57)
	KANE, IL (89)
	KANKAKEE, IL (91)
	KENDALL, IL (93)
	KEWEENAW, MI (83)
	LA CROSSE, WI (63)
	LA SALLE, IL (99)
	LAFAYETTE, WI (65)
	LANGLADE, WI (67)
	LEE, IL (103)
	LINCOLN, WI (69)
	MARATHON, WI (73)
	MARINETTE, WI (75)
	MARQUETTE, MI (103)
	MARQUETTE, WI (77)
	MC HENRY, IL (111)
	MENOMINEE, MI (109)
	MENOMINEE, WI (78)
	MONROE, WI (81)

	OCONTO, WI (83)
	OGLE, IL (141)
	ONEIDA, WI (85)
	ONTONAGON, MI (131)
	OUTAGAMIE, WI (87)
	PEPIN, WI (91)
	PIERCE, WI (93)
	POLK, WI (95)
	PORTAGE, WI (97)
	PRICE, WI (99)
	RICHLAND, WI (103)
	ROCK ISLAND, IL (161)
	ROCK, WI (105)
	RUSK, WI (107)
	SAUK, WI (111)
	SAWYER, WI (113)
	SHAWANO, WI (115)
	ST CROIX, WI (109)
	STEPHENSON, IL (177)
	TAYLOR, WI (119)
	TREMPEALEAU, WI (121)
	VERNON, WI (123)
	VILAS, WI (125)
	WALWORTH, WI (127)
	WASHBURN, WI (129)
	WASHINGTON, WI (131)
	WAUKESHA, WI (133)
	WAUPACA, WI (135)
	WAUSHARA, WI (137)
	WHITESIDE, IL (195)
	WILL, IL (197)
	WINNEBAGO, IL (201)
	WINNEBAGO, WI (139)
	WOOD, WI (141)
315 - Illinois Basin	ADAMS, IL (1)
	ALEXANDER, IL (3)
	BARTHOLOMEW, IN (5)
	BENTON, IN (7)
	BOND, IL (5)

	BRECKINRIDGE, KY (27)
	BROWN, IL (9)
	BROWN, IN (13)
	BUREAU, IL (11)
	BUTLER, KY (31)
	CALDWELL, KY (33)
	CALHOUN, IL (13)
	CASS, IL (17)
	CHAMPAIGN, IL (19)
	CHRISTIAN, IL (21)
	CHRISTIAN, KY (47)
	CLARK, IL (23)
	CLAY, IL (25)
	CLAY, IN (21)
	CLINTON, IL (27)
	COLES, IL (29)
	CRAWFORD, IL (33)
	CRAWFORD, IN (25)
	CRITTENDEN, KY (55)
	CUMBERLAND, IL (35)
	DAVIESS, IN (27)
	DAVIESS, KY (59)
	DE WITT, IL (39)
	DOUGLAS, IL (41)
	DUBOIS, IN (37)
	EDGAR, IL (45)
	EDWARDS, IL (47)
	EFFINGHAM, IL (49)
	FAYETTE, IL (51)
	FORD, IL (53)
	FOUNTAIN, IN (45)
	FRANKLIN, IL (55)
	FULTON, IL (57)
	GALLATIN, IL (59)
	GIBSON, IN (51)
	GRAYSON, KY (85)
	GREENE, IL (61)
	GREENE, IN (55)
	HAMILTON, IL (65)

	HANCOCK, IL (67)
	HANCOCK, KY (91)
	HARDIN, IL (69)
	HARRISON, IN (61)
	HENDERSON, IL (71)
	HENDERSON, KY (101)
	HENDRICKS, IN (63)
	HENRY, IL (73)
	HOPKINS, KY (107)
	IROQUOIS, IL (75)
	JACKSON, IL (77)
	JACKSON, IN (71)
	JASPER, IL (79)
	JEFFERSON, IL (81)
	JEFFERSON, MO (99)
	JERSEY, IL (83)
	JOHNSON, IL (87)
	JOHNSON, IN (81)
	KNOX, IL (95)
	KNOX, IN (83)
	LAWRENCE, IL (101)
	LAWRENCE, IN (93)
	LIVINGSTON, IL (105)
	LIVINGSTON, KY (139)
	LOGAN, IL (107)
	LOGAN, KY (141)
	LYON, KY (143)
	MACON, IL (115)
	MACOUPIN, IL (117)
	MADISON, IL (119)
	MARION, IL (121)
	MARSHALL, IL (123)
	MARTIN, IN (101)
	MASON, IL (125)
	MASSAC, IL (127)
	MC DONOUGH, IL (109)
	MC LEAN, IL (113)
	MC LEAN, KY (149)
	MENARD, IL (129)

	MERCER, IL (131)
	MONROE, IL (133)
	MONROE, IN (105)
	MONTGOMERY, IL (135)
	MONTGOMERY, IN (107)
	MORGAN, IL (137)
	MORGAN, IN (109)
	MOULTRIE, IL (139)
	MUHLENBERG, KY (177)
	OHIO, KY (183)
	ORANGE, IN (117)
	OWEN, IN (119)
	PARKE, IN (121)
	PEORIA, IL (143)
	PERRY, IL (145)
	PERRY, IN (123)
	PIATT, IL (147)
	PIKE, IL (149)
	PIKE, IN (125)
	POPE, IL (151)
	POSEY, IN (129)
	PULASKI, IL (153)
	PUTNAM, IL (155)
	PUTNAM, IN (133)
	RANDOLPH, IL (157)
	RICHLAND, IL (159)
	SALINE, IL (165)
	SANGAMON, IL (167)
	SCHUYLER, IL (169)
	SCOTT, IL (171)
	SHELBY, IL (173)
	SPENCER, IN (147)
	ST CHARLES, MO (183)
	ST CLAIR, IL (163)
	ST LOUIS, MO (189)
	STARK, IL (175)
	SULLIVAN, IN (153)
	TAZEWELL, IL (179)
	TIPPECANOE, IN (157)

	TODD, KY (219)
	TRIGG, KY (221)
	UNION, IL (181)
	UNION, KY (225)
	VANDEBURGH, IN (163)
	VERMILION, IL (183)
	VERMILLION, IN (165)
	VIGO, IN (167)
	WABASH, IL (185)
	WARREN, IL (187)
	WARREN, IN (171)
	WARRICK, IN (173)
	WASHINGTON, IL (189)
	WASHINGTON, IN (175)
	WAYNE, IL (191)
	WEBSTER, KY (233)
	WHITE, IL (193)
	WILLIAMSON, IL (199)
	WOODFORD, IL (203)
320 - Sioux Uplift	AITKIN, MN (1)
	ANOKA, MN (3)
	AURORA, SD (3)
	BEADLE, SD (5)
	BECKER, MN (5)
	BELTRAMI, MN (7)
	BENNETT, SD (7)
	BENTON, MN (9)
	BIG STONE, MN (11)
	BLUE EARTH, MN (13)
	BON HOMME, SD (9)
	BROOKINGS, SD (11)
	BROWN, MN (15)
	BROWN, SD (13)
	BRULE, SD (15)
	BUFFALO, SD (17)
	CARLTON, MN (17)
	CARVER, MN (19)
	CASS, MN (21)
	CHARLES MIX, SD (23)

	CHIPPEWA, MN (23)
	CHISAGO, MN (25)
	CLARK, SD (25)
	CLAY, MN (27)
	CLAY, SD (27)
	CLEARWATER, MN (29)
	CODINGTON, SD (29)
	COOK, MN (31)
	COTTONWOOD, MN (33)
	CROW WING, MN (35)
	DAKOTA, MN (37)
	DAVISON, SD (35)
	DAY, SD (37)
	DEUEL, SD (39)
	DOUGLAS, MN (41)
	DOUGLAS, SD (43)
	FAULK, SD (49)
	GRANT, MN (51)
	GRANT, SD (51)
	GREGORY, SD (53)
	HAMLIN, SD (57)
	HAND, SD (59)
	HANSON, SD (61)
	HENNEPIN, MN (53)
	HUBBARD, MN (57)
	HUTCHINSON, SD (67)
	HYDE, SD (69)
	ISANTI, MN (59)
	ITASCA, MN (61)
	JACKSON, MN (63)
	JACKSON, SD (71)
	JERAULD, SD (73)
	KANABEC, MN (65)
	KANDIYOHI, MN (67)
	KINGSBURY, SD (77)
	KITTSO, MN (69)
	KOOCHICHING, MN (71)
	LAC QUI PARLE, MN (73)
	LAKE OF THE WOODS, MN (77)

	LAKE, MN (75)
	LAKE, SD (79)
	LE SUEUR, MN (79)
	LINCOLN, MN (81)
	LINCOLN, SD (83)
	LYMAN, SD (85)
	LYON, MN (83)
	MAHNOMEN, MN (87)
	MARSHALL, MN (89)
	MARSHALL, SD (91)
	MC COOK, SD (87)
	MC LEOD, MN (85)
	MEEKER, MN (93)
	MELLETTTE, SD (95)
	MILLE LACS, MN (95)
	MINER, SD (97)
	MINNEHAHA, SD (99)
	MOODY, SD (101)
	MORRISON, MN (97)
	MURRAY, MN (101)
	NICOLLET, MN (103)
	NOBLES, MN (105)
	NORMAN, MN (107)
	OTTER TAIL, MN (111)
	PENNINGTON, MN (113)
	PINE, MN (115)
	PIPESTONE, MN (117)
	POLK, MN (119)
	POPE, MN (121)
	RAMSEY, MN (123)
	RED LAKE, MN (125)
	REDWOOD, MN (127)
	RENVILLE, MN (129)
	ROBERTS, SD (109)
	ROCK, MN (133)
	ROSEAU, MN (135)
	SANBORN, SD (111)
	SCOTT, MN (139)
	SHERBURNE, MN (141)



	SIBLEY, MN (143)
	SPINK, SD (115)
	ST LOUIS, MN (137)
	STEARNS, MN (145)
	STEVENS, MN (149)
	SWIFT, MN (151)
	TODD, MN (153)
	TODD, SD (121)
	TRAVERSE, MN (155)
	TRIPP, SD (123)
	TURNER, SD (125)
	UNION, SD (127)
	WADENA, MN (159)
	WASHINGTON, MN (163)
	WATONWAN, MN (165)
	WILKIN, MN (167)
	WRIGHT, MN (171)
	YANKTON, SD (135)
	YELLOW MEDICINE, MN (173)
325 - Iowa Shelf	ALLAMAKEE, IA (5)
	APPANOOSE, IA (7)
	AUDUBON, IA (9)
	BENTON, IA (11)
	BLACK HAWK, IA (13)
	BOONE, IA (15)
	BREMER, IA (17)
	BUCHANAN, IA (19)
	BUENA VISTA, IA (21)
	BUTLER, IA (23)
	CALHOUN, IA (25)
	CARROLL, IA (27)
	CEDAR, IA (31)
	CERRO GORDO, IA (33)
	CHEROKEE, IA (35)
	CHICKASAW, IA (37)
	CLARKE, IA (39)
	CLAY, IA (41)
	CLAYTON, IA (43)
	CLINTON, IA (45)

	CRAWFORD, IA (47)
	DALLAS, IA (49)
	DAVIS, IA (51)
	DECATUR, IA (53)
	DELAWARE, IA (55)
	DES MOINES, IA (57)
	DICKINSON, IA (59)
	DODGE, MN (39)
	DUBUQUE, IA (61)
	EMMET, IA (63)
	FARIBAULT, MN (43)
	FAYETTE, IA (65)
	FILLMORE, MN (45)
	FLOYD, IA (67)
	FRANKLIN, IA (69)
	FREEBORN, MN (47)
	GOODHUE, MN (49)
	GREENE, IA (73)
	GRUNDY, IA (75)
	GUTHRIE, IA (77)
	HAMILTON, IA (79)
	HANCOCK, IA (81)
	HARDIN, IA (83)
	HARRISON, IA (85)
	HENRY, IA (87)
	HOUSTON, MN (55)
	HOWARD, IA (89)
	HUMBOLDT, IA (91)
	IDA, IA (93)
	IOWA, IA (95)
	JACKSON, IA (97)
	JASPER, IA (99)
	JEFFERSON, IA (101)
	JOHNSON, IA (103)
	JONES, IA (105)
	KEOKUK, IA (107)
	KOSSUTH, IA (109)
	LEE, IA (111)
	LINN, IA (113)

	LOUISA, IA (115)
	LUCAS, IA (117)
	LYON, IA (119)
	MADISON, IA (121)
	MAHASKA, IA (123)
	MARION, IA (125)
	MARSHALL, IA (127)
	MARTIN, MN (91)
	MITCHELL, IA (131)
	MONONA, IA (133)
	MONROE, IA (135)
	MOWER, MN (99)
	MUSCATINE, IA (139)
	O BRIEN, IA (141)
	OLMSTED, MN (109)
	OSCEOLA, IA (143)
	PALO ALTO, IA (147)
	PLYMOUTH, IA (149)
	POCAHONTAS, IA (151)
	POLK, IA (153)
	POWESHIEK, IA (157)
	RICE, MN (131)
	SAC, IA (161)
	SCOTT, IA (163)
	SHELBY, IA (165)
	SIoux, IA (167)
	STEELE, MN (147)
	STORY, IA (169)
	TAMA, IA (171)
	VAN BUREN, IA (177)
	WABASHA, MN (157)
	WAPELLO, IA (179)
	WARREN, IA (181)
	WASECA, MN (161)
	WASHINGTON, IA (183)
	WAYNE, IA (185)
	WEBSTER, IA (187)
	WINNEBAGO, IA (189)
	WINNESHIEK, IA (191)

	WINONA, MN (169)
	WOODBURY, IA (193)
	WORTH, IA (195)
	WRIGHT, IA (197)
330 - Lincoln Anticline	ADAIR, MO (1)
	AUDRAIN, MO (7)
	CLARK, MO (45)
	KNOX, MO (103)
	LEWIS, MO (111)
	LINCOLN, MO (113)
	MACON, MO (121)
	MARION, MO (127)
	MONROE, MO (137)
	MONTGOMERY, MO (139)
	PIKE, MO (163)
	RALLS, MO (173)
	SCHUYLER, MO (197)
	SCOTLAND, MO (199)
	SHELBY, MO (205)
335 - Forest City Basin	ADAIR, IA (1)
	ADAMS, IA (3)
	ANDERSON, KS (3)
	ANDREW, MO (3)
	ATCHISON, KS (5)
	ATCHISON, MO (5)
	BATES, MO (13)
	BROWN, KS (13)
	BUCHANAN, MO (21)
	CALDWELL, MO (25)
	CARROLL, MO (33)
	CASS, IA (29)
	CASS, MO (37)
	CLAY, MO (47)
	CLINTON, MO (49)
	COFFEY, KS (31)
	DAVISS, MO (61)
	DE KALB, MO (63)
	DONIPHAN, KS (43)
	DOUGLAS, KS (45)

	FRANKLIN, KS (59)
	FREMONT, IA (71)
	GENTRY, MO (75)
	GRUNDY, MO (79)
	HARRISON, MO (81)
	HENRY, MO (83)
	HOLT, MO (87)
	JACKSON, KS (85)
	JACKSON, MO (95)
	JEFFERSON, KS (87)
	JOHNSON, KS (91)
	JOHNSON, MO (101)
	LAFAYETTE, MO (107)
	LEAVENWORTH, KS (103)
	LINN, KS (107)
	LINN, MO (115)
	LIVINGSTON, MO (117)
	LYON, KS (111)
	MERCER, MO (129)
	MIAMI, KS (121)
	MILLS, IA (129)
	MONTGOMERY, IA (137)
	NEMAHA, NE (127)
	NODAWAY, MO (147)
	OSAGE, KS (139)
	PAGE, IA (145)
	PLATTE, MO (165)
	POTTAWATTAMIE, IA (155)
	PUTNAM, MO (171)
	RAY, MO (177)
	RICHARDSON, NE (147)
	RINGGOLD, IA (159)
	SHAWNEE, KS (177)
	SULLIVAN, MO (211)
	TAYLOR, IA (173)
	UNION, IA (175)
	WABAUNSEE, KS (197)
	WORTH, MO (227)
	WYANDOTTE, KS (209)

340 - Ozark Uplift	BARRY, MO (9)
	BAXTER, AR (5)
	BENTON, AR (7)
	BENTON, MO (15)
	BOLLINGER, MO (17)
	BOONE, AR (9)
	BOONE, MO (19)
	BUTLER, MO (23)
	CALLAWAY, MO (27)
	CAMDEN, MO (29)
	CAPE GIRARDEAU, MO (31)
	CARROLL, AR (15)
	CARTER, MO (35)
	CHARITON, MO (41)
	CHRISTIAN, MO (43)
	COLE, MO (51)
	COOPER, MO (53)
	CRAWFORD, MO (55)
	DADE, MO (57)
	DALLAS, MO (59)
	DENT, MO (65)
	DOUGLAS, MO (67)
	FRANKLIN, MO (71)
	FULTON, AR (49)
	GASCONADE, MO (73)
	GREENE, MO (77)
	HICKORY, MO (85)
	HOWARD, MO (89)
	HOWELL, MO (91)
	IRON, MO (93)
	IZARD, AR (65)
	JASPER, MO (97)
	LACLEDE, MO (105)
	LAWRENCE, AR (75)
	LAWRENCE, MO (109)
	MADISON, MO (123)
	MARIES, MO (125)
	MARION, AR (89)
	MC DONALD, MO (119)

	MILLER, MO (131)
	MONITEAU, MO (135)
	MORGAN, MO (141)
	NEWTON, MO (145)
	OREGON, MO (149)
	OSAGE, MO (151)
	OZARK, MO (153)
	PERRY, MO (157)
	PETTIS, MO (159)
	PHELPS, MO (161)
	POLK, MO (167)
	PULASKI, MO (169)
	RANDOLPH, AR (121)
	RANDOLPH, MO (175)
	REYNOLDS, MO (179)
	RIPLEY, MO (181)
	SALINE, MO (195)
	SHANNON, MO (203)
	SHARP, AR (135)
	ST FRANCOIS, MO (187)
	ST GENEVIEVE, MO (193)
	ST LOUIS CITY, MO (510)
	STONE, MO (209)
	TANEY, MO (213)
	TEXAS, MO (215)
	WARREN, MO (219)
	WASHINGTON, MO (221)
	WAYNE, MO (223)
	WEBSTER, MO (225)
	WRIGHT, MO (229)
345 - Arkoma Basin	ADAIR, OK (1)
	CLEBURNE, AR (23)
	COAL, OK (29)
	CONWAY, AR (29)
	CRAWFORD, AR (33)
	FAULKNER, AR (45)
	FRANKLIN, AR (47)
	HASKELL, OK (61)
	INDEPENDENCE, AR (63)

	JOHNSON, AR (71)
	LATIMER, OK (77)
	LE FLORE, OK (79)
	LOGAN, AR (83)
	MADISON, AR (87)
	NEWTON, AR (101)
	PERRY, AR (105)
	PITTSBURG, OK (121)
	PONTOTOC, OK (123)
	POPE, AR (115)
	SCOTT, AR (127)
	SEARCY, AR (129)
	SEBASTIAN, AR (131)
	SEQUOYAH, OK (135)
	STONE, AR (137)
	VAN BUREN, AR (141)
	WASHINGTON, AR (143)
	WHITE, AR (145)
	YELL, AR (149)
350 - South Oklahoma Folded Belt	CARTER, OK (19)
	COMANCHE, OK (31)
	COOKE, TX (97)
	COTTON, OK (33)
	GARVIN, OK (49)
	GRAYSON, TX (181)
	GREER, OK (55)
	JEFFERSON, OK (67)
	JOHNSTON, OK (69)
	KIOWA, OK (75)
	LOVE, OK (85)
	MARSHALL, OK (95)
	MURRAY, OK (99)
	STEPHENS, OK (137)
355 - Chautauqua Platform	CHEROKEE, OK (21)
	CLEVELAND, OK (27)
	CRAIG, OK (35)
	CREEK, OK (37)
	DELAWARE, OK (41)
	HUGHES, OK (63)



	KAY, OK (71)
	LINCOLN, OK (81)
	LOGAN, OK (83)
	MAYES, OK (97)
	MC CLAIN, OK (87)
	MC INTOSH, OK (91)
	MUSKOGEE, OK (101)
	NOBLE, OK (103)
	NOWATA, OK (105)
	OKFUSKEE, OK (107)
	OKLAHOMA, OK (109)
	OKMULGEE, OK (111)
	OSAGE, OK (113)
	OTTAWA, OK (115)
	PAWNEE, OK (117)
	PAYNE, OK (119)
	POTTAWATOMIE, OK (125)
	ROGERS, OK (131)
	SEMINOLE, OK (133)
	TULSA, OK (143)
	WAGONER, OK (145)
	WASHINGTON, OK (147)
360 - Anadarko Basin	ALFALFA, OK (3)
	BACA, CO (9)
	BEAVER, OK (7)
	BECKHAM, OK (9)
	BLAINE, OK (11)
	CADDO, OK (15)
	CANADIAN, OK (17)
	CARSON, TX (65)
	CLARK, KS (25)
	COMANCHE, KS (33)
	CUSTER, OK (39)
	DEWEY, OK (43)
	EDWARDS, KS (47)
	ELLIS, OK (45)
	FINNEY, KS (55)
	FORD, KS (57)
	GARFIELD, OK (47)

	GOVE, KS (63)
	GRADY, OK (51)
	GRANT, KS (67)
	GRANT, OK (53)
	GRAY, KS (69)
	GRAY, TX (179)
	GREELEY, KS (71)
	HAMILTON, KS (75)
	HANSFORD, TX (195)
	HARPER, OK (59)
	HASKELL, KS (81)
	HEMPHILL, TX (211)
	HODGEMAN, KS (83)
	HUTCHINSON, TX (233)
	KEARNY, KS (93)
	KINGFISHER, OK (73)
	KIOWA, KS (97)
	LANE, KS (101)
	LIPSCOMB, TX (295)
	LOGAN, KS (109)
	MAJOR, OK (93)
	MEADE, KS (119)
	MOORE, TX (341)
	MORTON, KS (129)
	NESS, KS (135)
	OCHILTREE, TX (357)
	POTTER, TX (375)
	PROWERS, CO (99)
	ROBERTS, TX (393)
	ROGER MILLS, OK (129)
	SCOTT, KS (171)
	SEWARD, KS (175)
	SHERMAN, TX (421)
	STANTON, KS (187)
	STEVENS, KS (189)
	TEXAS, OK (139)
	WALLACE, KS (199)
	WASHITA, OK (149)
	WHEELER, TX (483)

	WICHITA, KS (203)
	WOODS, OK (151)
	WOODWARD, OK (153)
365 - Cherokee Basin	ALLEN, KS (1)
	BARTON, MO (11)
	BOURBON, KS (11)
	CEDAR, MO (39)
	CHAUTAUQUA, KS (19)
	CHEROKEE, KS (21)
	CRAWFORD, KS (37)
	ELK, KS (49)
	GREENWOOD, KS (73)
	LABETTE, KS (99)
	MONTGOMERY, KS (125)
	NEOSHO, KS (133)
	ST CLAIR, MO (185)
	VERNON, MO (217)
	WILSON, KS (205)
	WOODSON, KS (207)
370 - Nemaha Anticline	BUTLER, KS (15)
	CASS, NE (25)
	CHASE, KS (17)
	COWLEY, KS (35)
	DOUGLAS, NE (55)
	GAGE, NE (67)
	GEARY, KS (61)
	JOHNSON, NE (97)
	MARSHALL, KS (117)
	MORRIS, KS (127)
	NEMAHA, KS (131)
	OTOE, NE (131)
	PAWNEE, NE (133)
	POTTAWATOMIE, KS (149)
	RILEY, KS (161)
	SARPY, NE (153)
375 - Sedgwick Basin	BARBER, KS (7)
	HARPER, KS (77)
	HARVEY, KS (79)
	KINGMAN, KS (95)

	MARION, KS (115)
	MC PHERSON, KS (113)
	RENO, KS (155)
	SEDGWICK, KS (173)
	SUMNER, KS (191)
380 - Salina Basin	ADAMS, NE (1)
	ANTELOPE, NE (3)
	BLAINE, NE (9)
	BOONE, NE (11)
	BOYD, NE (15)
	BROWN, NE (17)
	BUFFALO, NE (19)
	BURT, NE (21)
	BUTLER, NE (23)
	CEDAR, NE (27)
	CLAY, KS (27)
	CLAY, NE (35)
	CLOUD, KS (29)
	COLFAX, NE (37)
	CUMING, NE (39)
	CUSTER, NE (41)
	DAKOTA, NE (43)
	DICKINSON, KS (41)
	DIXON, NE (51)
	DODGE, NE (53)
	FILLMORE, NE (59)
	FRANKLIN, NE (61)
	GARFIELD, NE (71)
	GREELEY, NE (77)
	HALL, NE (79)
	HAMILTON, NE (81)
	HARLAN, NE (83)
	HOLT, NE (89)
	HOWARD, NE (93)
	JEFFERSON, NE (95)
	JEWELL, KS (89)
	KEARNEY, NE (99)
	KEYA PAHA, NE (103)
	KNOX, NE (107)

	LANCASTER, NE (109)
	LINCOLN, KS (105)
	LOUP, NE (115)
	MADISON, NE (119)
	MERRICK, NE (121)
	MITCHELL, KS (123)
	NANCE, NE (125)
	NUCKOLLS, NE (129)
	OSBORNE, KS (141)
	OTTAWA, KS (143)
	PHELPS, NE (137)
	PIERCE, NE (139)
	PLATTE, NE (141)
	POLK, NE (143)
	REPUBLIC, KS (157)
	ROCK, NE (149)
	SALINE, KS (169)
	SALINE, NE (151)
	SAUNDERS, NE (155)
	SEWARD, NE (159)
	SHERMAN, NE (163)
	SMITH, KS (183)
	STANTON, NE (167)
	THAYER, NE (169)
	THURSTON, NE (173)
	VALLEY, NE (175)
	WASHINGTON, KS (201)
	WASHINGTON, NE (177)
	WAYNE, NE (179)
	WEBSTER, NE (181)
	WHEELER, NE (183)
	YORK, NE (185)
385 - Central Kansas Uplift	BARTON, KS (9)
	DECATUR, KS (39)
	ELLIS, KS (51)
	ELLSWORTH, KS (53)
	GRAHAM, KS (65)
	NORTON, KS (137)
	PAWNEE, KS (145)

	PHILLIPS, KS (147)
	PRATT, KS (151)
	RICE, KS (159)
	ROOKS, KS (163)
	RUSH, KS (165)
	RUSSELL, KS (167)
	SHERIDAN, KS (179)
	STAFFORD, KS (185)
	TREGO, KS (195)
390 - Chadron Arch	ARTHUR, NE (5)
	BOX BUTTE, NE (13)
	CHASE, NE (29)
	CHERRY, NE (31)
	DAWES, NE (45)
	DAWSON, NE (47)
	DUNDY, NE (57)
	FRONTIER, NE (63)
	FURNAS, NE (65)
	GOSPER, NE (73)
	GRANT, NE (75)
	HAYES, NE (85)
	HITCHCOCK, NE (87)
	HOOKER, NE (91)
	KEITH, NE (101)
	LINCOLN, NE (111)
	LOGAN, NE (113)
	MC PHERSON, NE (117)
	PERKINS, NE (135)
	RED WILLOW, NE (145)
	SHANNON, SD (113)
	SHERIDAN, NE (161)
	THOMAS, NE (171)
395 - Williston Basin	ADAMS, ND (1)
	BARNES, ND (3)
	BENSON, ND (5)
	BILLINGS, ND (7)
	BOTTINEAU, ND (9)
	BOWMAN, ND (11)
	BURKE, ND (13)

	BURLEIGH, ND (15)
	BUTTE, SD (19)
	CAMPBELL, SD (21)
	CASS, ND (17)
	CAVALIER, ND (19)
	CORSON, SD (31)
	DANIELS, MT (19)
	DAWSON, MT (21)
	DEWEY, SD (41)
	DICKEY, ND (21)
	DIVIDE, ND (23)
	DUNN, ND (25)
	EDDY, ND (27)
	EDMUNDS, SD (45)
	EMMONS, ND (29)
	FALLON, MT (25)
	FOSTER, ND (31)
	GARFIELD, MT (33)
	GOLDEN VALLEY, ND (33)
	GRAND FORKS, ND (35)
	GRANT, ND (37)
	GRIGGS, ND (39)
	HAAKON, SD (55)
	HARDING, SD (63)
	HETTINGER, ND (41)
	HUGHES, SD (65)
	JONES, SD (75)
	KIDDER, ND (43)
	LA MOURE, ND (45)
	LAWRENCE, SD (81)
	LOGAN, ND (47)
	MC CONE, MT (55)
	MC HENRY, ND (49)
	MC INTOSH, ND (51)
	MC KENZIE, ND (53)
	MC LEAN, ND (55)
	MC PHERSON, SD (89)
	MEADE, SD (93)
	MERCER, ND (57)

	MORTON, ND (59)
	MOUNTRAIL, ND (61)
	NELSON, ND (63)
	OLIVER, ND (65)
	PEMBINA, ND (67)
	PENNINGTON, SD (103)
	PERKINS, SD (105)
	PHILLIPS, MT (71)
	PIERCE, ND (69)
	POTTER, SD (107)
	PRAIRIE, MT (79)
	RAMSEY, ND (71)
	RANSOM, ND (73)
	RENVILLE, ND (75)
	RICHLAND, MT (83)
	RICHLAND, ND (77)
	ROLETTE, ND (79)
	ROOSEVELT, MT (85)
	SARGENT, ND (81)
	SHERIDAN, MT (91)
	SHERIDAN, ND (83)
	SIoux, ND (85)
	SLOPE, ND (87)
	STANLEY, SD (117)
	STARK, ND (89)
	STEELE, ND (91)
	STUTSMAN, ND (93)
	SULLY, SD (119)
	TOWNER, ND (95)
	TRAILL, ND (97)
	VALLEY, MT (105)
	WALSH, ND (99)
	WALWORTH, SD (129)
	WARD, ND (101)
	WELLS, ND (103)
	WIBAUX, MT (109)
	WILLIAMS, ND (105)
	ZIEBACH, SD (137)
400 - Ouachita Folded Belt	ATOKA, OK (5)



	BELL, TX (27)
	BEXAR, TX (29)
	BRYAN, OK (13)
	CHOCTAW, OK (23)
	CLARK, AR (19)
	COLLIN, TX (85)
	COMAL, TX (91)
	DALLAS, AR (39)
	DALLAS, TX (113)
	ELLIS, TX (139)
	FANNIN, TX (147)
	GARLAND, AR (51)
	GRANT, AR (53)
	HAYS, TX (209)
	HILL, TX (217)
	HOT SPRING, AR (59)
	HOWARD, AR (61)
	KINNEY, TX (271)
	LAMAR, TX (277)
	LONOKE, AR (85)
	MC CURTAIN, OK (89)
	MC LENNAN, TX (309)
	MEDINA, TX (325)
	MONTGOMERY, AR (97)
	PIKE, AR (109)
	POLK, AR (113)
	PULASKI, AR (119)
	PUSHMATAHA, OK (127)
	RED RIVER, TX (387)
	SALINE, AR (125)
	SEVIER, AR (133)
	TRAVIS, TX (453)
	UVALDE, TX (463)
	WILLIAMSON, TX (491)
405 - Kerr Basin	BANDERA, TX (19)
	KENDALL, TX (259)
	KERR, TX (265)
	REAL, TX (385)
410 - Llano Uplift	BLANCO, TX (31)

	BURNET, TX (53)
	GILLESPIE, TX (171)
	LLANO, TX (299)
	MASON, TX (319)
	MC CULLOCH, TX (307)
	SAN SABA, TX (411)
415 - Strawn Basin	BOSQUE, TX (35)
	CORYELL, TX (99)
	ERATH, TX (143)
	HAMILTON, TX (193)
	HOOD, TX (221)
	JOHNSON, TX (251)
	SOMERVELL, TX (425)
	TARRANT, TX (439)
420 - Fort Worth Syncline	CLAY, TX (77)
	DENTON, TX (121)
	JACK, TX (237)
	MONTAGUE, TX (337)
	PARKER, TX (367)
	WISE, TX (497)
425 - Bend Arch	ARCHER, TX (9)
	BAYLOR, TX (23)
	BROWN, TX (49)
	CALLAHAN, TX (59)
	COLEMAN, TX (83)
	COMANCHE, TX (93)
	EASTLAND, TX (133)
	LAMPASAS, TX (281)
	MILLS, TX (333)
	PALO PINTO, TX (363)
	SHACKELFORD, TX (417)
	STEPHENS, TX (429)
	THROCKMORTON, TX (447)
	YOUNG, TX (503)
430 - Permian Basin	ANDREWS, TX (3)
	BAILEY, TX (17)
	BORDEN, TX (33)
	BREWSTER, TX (43)
	CHAVES, NM (5)

	COCHRAN, TX (79)
	COKE, TX (81)
	CONCHO, TX (95)
	COTTLE, TX (101)
	CRANE, TX (103)
	CROCKETT, TX (105)
	CROSBY, TX (107)
	CULBERSON, TX (109)
	DAWSON, TX (115)
	DICKENS, TX (125)
	ECTOR, TX (135)
	EDDY, NM (15)
	EDWARDS, TX (137)
	FISHER, TX (151)
	FLOYD, TX (153)
	GAINES, TX (165)
	GARZA, TX (169)
	GLASSCOCK, TX (173)
	HALE, TX (189)
	HASKELL, TX (207)
	HOCKLEY, TX (219)
	HOWARD, TX (227)
	HUDSPETH, TX (229)
	IRION, TX (235)
	JEFF DAVIS, TX (243)
	JONES, TX (253)
	KENT, TX (263)
	KIMBLE, TX (267)
	KING, TX (269)
	KNOX, TX (275)
	LAMB, TX (279)
	LEA, NM (25)
	LOVING, TX (301)
	LUBBOCK, TX (303)
	LYNN, TX (305)
	MARTIN, TX (317)
	MENARD, TX (327)
	MIDLAND, TX (329)
	MITCHELL, TX (335)

	MOTLEY, TX (345)
	NOLAN, TX (353)
	PECOS, TX (371)
	PRESIDIO, TX (377)
	REAGAN, TX (383)
	REEVES, TX (389)
	ROOSEVELT, NM (41)
	RUNNELS, TX (399)
	SCHLEICHER, TX (413)
	SCURRY, TX (415)
	STERLING, TX (431)
	STONEWALL, TX (433)
	SUTTON, TX (435)
	TAYLOR, TX (441)
	TERRELL, TX (443)
	TERRY, TX (445)
	TOM GREEN, TX (451)
	UPTON, TX (461)
	VAL VERDE, TX (465)
	WARD, TX (475)
	WINKLER, TX (495)
	YOAKUM, TX (501)
435 - Palo Duro Basin	ARMSTRONG, TX (11)
	BRISCOE, TX (45)
	CASTRO, TX (69)
	CHILDRESS, TX (75)
	CIMARRON, OK (25)
	COLLINGSWORTH, TX (87)
	CURRY, NM (9)
	DALLAM, TX (111)
	DE BACA, NM (11)
	DEAF SMITH, TX (117)
	DONLEY, TX (129)
	FOARD, TX (155)
	GUADALUPE, NM (19)
	HALL, TX (191)
	HARDEMAN, TX (197)
	HARMON, OK (57)
	HARTLEY, TX (205)

	JACKSON, OK (65)
	OLDHAM, TX (359)
	PARMER, TX (369)
	QUAY, NM (37)
	RANDALL, TX (381)
	SAN MIGUEL, NM (47)
	SWISHER, TX (437)
	TILLMAN, OK (141)
	WICHITA, TX (485)
	WILBARGER, TX (487)
445 - Sierra Grande Uplift	HARDING, NM (21)
	UNION, NM (59)
450 - Las Animas Arch	BENT, CO (11)
	CHEYENNE, CO (17)
	CHEYENNE, KS (23)
	KIOWA, CO (61)
	KIT CARSON, CO (63)
	OTERO, CO (89)
	RAWLINS, KS (153)
	SHERMAN, KS (181)
	THOMAS, KS (193)
455 - Las Vegas-Raton Basin	COLFAX, NM (7)
	CUSTER, CO (27)
	HUERFANO, CO (55)
	LAS ANIMAS, CO (71)
	MORA, NM (33)
460 - Estancia Basin	BERNALILLO, NM (1)
	SANTA FE, NM (49)
	TORRANCE, NM (57)
465 - Orogrande Basin	DONA ANA, NM (13)
	EL PASO, TX (141)
	LINCOLN, NM (27)
	OTERO, NM (35)
	SIERRA, NM (51)
	SOCORRO, NM (53)
470 - Pedregosa Basin	COCHISE, AZ (3)
	HIDALGO, NM (23)
475 - Basin-And-Range Province	CATRON, NM (3)
	GILA, AZ (7)

	GRAHAM, AZ (9)
	GRANT, NM (17)
	GREENLEE, AZ (11)
	LA PAZ, AZ (12)
	LUNA, NM (29)
	MARICOPA, AZ (13)
	PIMA, AZ (19)
	PINAL, AZ (21)
	SANTA CRUZ, AZ (23)
	YAVAPAI, AZ (25)
	YUMA, AZ (27)
500 - Sweetgrass Arch	CASCADE, MT (13)
	CHOUTEAU, MT (15)
	GLACIER, MT (35)
	HILL, MT (41)
	JUDITH BASIN, MT (45)
	LIBERTY, MT (51)
	PONDERA, MT (73)
	TETON, MT (99)
	TOOLE, MT (101)
503 - North Western Overthrust	FLATHEAD, MT (29)
	LEWIS AND CLARK, MT (49)
505 - Montana Folded Belt	BEAVERHEAD, MT (1)
	BROADWATER, MT (7)
	DEER LODGE, MT (23)
	GALLATIN, MT (31)
	GRANITE, MT (39)
	JEFFERSON, MT (43)
	LAKE, MT (47)
	LINCOLN, MT (53)
	MADISON, MT (57)
	MEAGHER, MT (59)
	MINERAL, MT (61)
	MISSOULA, MT (63)
	PARK, MT (67)
	POWELL, MT (77)
	RAVALLI, MT (81)
	SANDERS, MT (89)
	SILVER BOW, MT (93)

	YELLOWSTONE NATIONAL PARK, MT (113)
507 - Central Western Overthrust	BEAR LAKE, ID (7)
	BONNEVILLE, ID (19)
	CARIBOU, ID (29)
	CLARK, ID (33)
	FREMONT, ID (43)
	JEFFERSON, ID (51)
	LINCOLN, WY (23)
	MADISON, ID (65)
	MORGAN, UT (29)
	RICH, UT (33)
	SUMMIT, UT (43)
	TETON, ID (81)
	UINTA, WY (41)
509 - South Western Overthrust	BEAVER, UT (1)
	CLARK, NV (3)
	IRON, UT (21)
	JUAB, UT (23)
	LINCOLN, NV (17)
	MILLARD, UT (27)
	UTAH, UT (49)
	WASHINGTON, UT (53)
510 - Central Montana Uplift	BLAINE, MT (5)
	FERGUS, MT (27)
	GOLDEN VALLEY, MT (37)
	MUSSELSHELL, MT (65)
	PETROLEUM, MT (69)
	ROSEBUD, MT (87)
	STILLWATER, MT (95)
	SWEET GRASS, MT (97)
	TREASURE, MT (103)
	WHEATLAND, MT (107)
	YELLOWSTONE, MT (111)
515 - Powder River Basin	BIG HORN, MT (3)
	CAMPBELL, WY (5)
	CARTER, MT (11)
	CONVERSE, WY (9)
	CROOK, WY (11)
	CUSTER, MT (17)

	CUSTER, SD (33)
	FALL RIVER, SD (47)
	JOHNSON, WY (19)
	NIOBRARA, WY (27)
	POWDER RIVER, MT (75)
	SHERIDAN, WY (33)
	WESTON, WY (45)
520 - Big Horn Basin	BIG HORN, WY (3)
	CARBON, MT (9)
	HOT SPRINGS, WY (17)
	PARK, WY (29)
	WASHAKIE, WY (43)
525 - Yellowstone Province	TETON, WY (39)
	YELLOWSTONE NATIONAL PARK, ID (89)
	YELLOWSTONE NATIONAL PARK, WY (47)
530 - Wind River Basin	FREMONT, WY (13)
	NATRONA, WY (25)
535 - Green River Basin	ALBANY, WY (1)
	CARBON, WY (7)
	MOFFAT, CO (81)
	ROUTT, CO (107)
	SUBLETTE, WY (35)
	SWEETWATER, WY (37)
540 - Denver Basin	ADAMS, CO (1)
	ARAPAHOE, CO (5)
	BANNER, NE (7)
	BOULDER, CO (13)
	CHEYENNE, NE (33)
	CROWLEY, CO (25)
	DENVER, CO (31)
	DEUEL, NE (49)
	DOUGLAS, CO (35)
	EL PASO, CO (41)
	ELBERT, CO (39)
	FREMONT, CO (43)
	GILPIN, CO (47)
	GARDEN, NE (69)
	GOSHEN, WY (15)
	JEFFERSON, CO (59)



	KIMBALL, NE (105)
	LARAMIE, WY (21)
	LARIMER, CO (69)
	LINCOLN, CO (73)
	LOGAN, CO (75)
	MORGAN, CO (87)
	MORRILL, NE (123)
	PHILLIPS, CO (95)
	PLATTE, WY (31)
	PUEBLO, CO (101)
	SCOTTS BLUFF, NE (157)
	SEDGWICK, CO (115)
	SIOUX, NE (165)
	TELLER, CO (119)
	WASHINGTON, CO (121)
	WELD, CO (123)
	YUMA, CO (125)
545 - North Park Basin	GRAND, CO (49)
	JACKSON, CO (57)
550 - South Park Basin	PARK, CO (93)
555 - Eagle Basin	CHAFFEE, CO (15)
	CLEAR CREEK, CO (19)
	EAGLE, CO (37)
	LAKE, CO (65)
	SUMMIT, CO (117)
560 - San Luis Basin	ALAMOSA, CO (3)
	CONEJOS, CO (21)
	COSTILLA, CO (23)
	RIO GRANDE, CO (105)
	SAGUACHE, CO (109)
	TAOS, NM (55)
565 - San Juan Mountains Prov	HINSDALE, CO (53)
	MINERAL, CO (79)
	OURAY, CO (91)
	SAN JUAN, CO (111)
575 - Uinta Basin	CARBON, UT (7)
	DAGGETT, UT (9)
	DUCHESNE, UT (13)
	UINTAH, UT (47)

	WASATCH, UT (51)
580 - San Juan Basin	ARCHULETA, CO (7)
	CIBOLA, NM (6)
	LA PLATA, CO (67)
	LOS ALAMOS, NM (28)
	MC KINLEY, NM (31)
	RIO ARRIBA, NM (39)
	SAN JUAN, NM (45)
	SANDOVAL, NM (43)
	VALENCIA, NM (61)
585 - Paradox Basin	DOLORES, CO (33)
	EMERY, UT (15)
	GARFIELD, UT (17)
	GRAND, UT (19)
	MONTEZUMA, CO (83)
	MONTROSE, CO (85)
	SAN JUAN, UT (37)
	SAN MIGUEL, CO (113)
	WAYNE, UT (55)
590 - Black Mesa Basin	APACHE, AZ (1)
	NAVAJO, AZ (17)
595 - Piceance Basin	DELTA, CO (29)
	GARFIELD, CO (45)
	GUNNISON, CO (51)
	MESA, CO (77)
	PITKIN, CO (97)
	RIO BLANCO, CO (103)
600 - N. Cascades-Okanagan Prov	CHELAN, WA (7)
	FERRY, WA (19)
	OKANOGAN, WA (47)
	PEND OREILLE, WA (51)
	SAN JUAN, WA (55)
	SKAGIT, WA (57)
	STEVENS, WA (65)
605 - Eastern Columbia Basin	ADAMS, WA (1)
	ASOTIN, WA (3)
	BENTON, WA (5)
	COLUMBIA, WA (13)
	CROOK, OR (13)

	DOUGLAS, WA (17)
	FRANKLIN, WA (21)
	GARFIELD, WA (23)
	GILLIAM, OR (21)
	GRANT, WA (25)
	HOOD RIVER, OR (27)
	JEFFERSON, OR (31)
	KITTITAS, WA (37)
	KLICKITAT, WA (39)
	LATAH, ID (57)
	LEWIS, ID (61)
	LINCOLN, WA (43)
	MORROW, OR (49)
	NEZ PERCE, ID (69)
	SHERMAN, OR (55)
	SKAMANIA, WA (59)
	SPOKANE, WA (63)
	UMATILLA, OR (59)
	UNION, OR (61)
	WALLA WALLA, WA (71)
	WALLOWA, OR (63)
	WASCO, OR (65)
	WHEELER, OR (69)
	WHITMAN, WA (75)
	YAKIMA, WA (77)
610 - Idaho Mountains Province	BENEWAH, ID (9)
	BOISE, ID (15)
	BONNER, ID (17)
	BOUNDARY, ID (21)
	CLEARWATER, ID (35)
	CUSTER, ID (37)
	IDAHO, ID (49)
	KOOTENAI, ID (55)
	LEMHI, ID (59)
	SHOSHONE, ID (79)
	VALLEY, ID (85)
615 - Snake River Basin	ADA, ID (1)
	ADAMS, ID (3)
	BAKER, OR (1)

	BANNOCK, ID (5)
	BINGHAM, ID (11)
	BLAINE, ID (13)
	BUTTE, ID (23)
	CAMAS, ID (25)
	CANYON, ID (27)
	ELMORE, ID (39)
	GEM, ID (45)
	GOODING, ID (47)
	GRANT, OR (23)
	JEROME, ID (53)
	LINCOLN, ID (63)
	MALHEUR, OR (45)
	MINIDOKA, ID (67)
	OWYHEE, ID (73)
	PAYETTE, ID (75)
	POWER, ID (77)
	TWIN FALLS, ID (83)
	WASHINGTON, ID (87)
620 - Southern Oregon Basin	DESCHUTES, OR (17)
	HARNEY, OR (25)
	KLAMATH, OR (35)
	LAKE, OR (37)
	LASSEN, CA (35)
	MODOC, CA (49)
	WASHOE, NV (31)
625 - Great Basin Province	BOX ELDER, UT (3)
	CARSON CITY, NV (510)
	CASSIA, ID (31)
	CHURCHILL, NV (1)
	DOUGLAS, NV (5)
	ELKO, NV (7)
	ESMERALDA, NV (9)
	EUREKA, NV (11)
	FRANKLIN, ID (41)
	HUMBOLDT, NV (13)
	INYO, CA (27)
	LANDER, NV (15)
	LYON, NV (19)

	MINERAL, NV (21)
	MONO, CA (51)
	NYE, NV (23)
	ONEIDA, ID (71)
	PERSHING, NV (27)
	STOREY, NV (29)
	TOOELE, UT (45)
	WHITE PINE, NV (33)
630 - Overthrust&Wasatch Uplift	CACHE, UT (5)
	DAVIS, UT (11)
	PIUTE, UT (31)
	SALT LAKE, UT (35)
	SANPETE, UT (39)
	SEVIER, UT (41)
	WEBER, UT (57)
635 - Plateau Sedimentary Prov	COCONINO, AZ (5)
	KANE, UT (25)
	MOHAVE, AZ (15)
640 - Mojave Basin	SAN BERNARDINO, CA (71)
645 - Salton Basin	IMPERIAL, CA (25)
	RIVERSIDE, CA (65)
650 - Sierra Nevada Province	ALPINE, CA (3)
	AMADOR, CA (5)
	CALAVERAS, CA (9)
	EL DORADO, CA (17)
	MARIPOSA, CA (43)
	NEVADA, CA (57)
	PLACER, CA (61)
	PLUMAS, CA (63)
	SIERRA, CA (91)
	TUOLUMNE, CA (109)
	YUBA, CA (115)
700 - Bellingham Basin	WHATCOM, WA (73)
705 - Puget Sound Province	ISLAND, WA (29)
	KING, WA (33)
	KITSAP, WA (35)
	MASON, WA (45)
	PIERCE, WA (53)
	SNOHOMISH, WA (61)

710 - Western Columbia Basin	BENTON, OR (3)
	CLACKAMAS, OR (5)
	CLALLAM, WA (9)
	CLARK, WA (11)
	CLATSOP, OR (7)
	COLUMBIA, OR (9)
	COOS, OR (11)
	COWLITZ, WA (15)
	CURRY, OR (15)
	DOUGLAS, OR (19)
	GRAYS HARBOR, WA (27)
	JEFFERSON, WA (31)
	LANE, OR (39)
	LEWIS, WA (41)
	LINCOLN, OR (41)
	LINN, OR (43)
	MARION, OR (47)
	MULTNOMAH, OR (51)
	PACIFIC, WA (49)
	POLK, OR (53)
	THURSTON, WA (67)
	TILLAMOOK, OR (57)
	WAHIAKUM, WA (69)
	WASHINGTON, OR (67)
	YAMHILL, OR (71)
715 - Klamath Mountains Province	DEL NORTE, CA (15)
	JACKSON, OR (29)
	JOSEPHINE, OR (33)
	SHASTA, CA (89)
	SISKIYOU, CA (93)
	TRINITY, CA (105)
720 - Eel River Basin	HUMBOLDT, CA (23)
725 - Northern Coast Range Prov	ALAMEDA, CA (1)
	LAKE, CA (33)
	MENDOCINO, CA (45)
	NAPA, CA (55)
	SANTA CLARA, CA (85)
	SONOMA, CA (97)
730 - Sacramento Basin	BUTTE, CA (7)

	COLUSA, CA (11)
	CONTRA COSTA, CA (13)
	GLENN, CA (21)
	SACRAMENTO, CA (67)
	SAN JOAQUIN, CA (77)
	SOLANO, CA (95)
	SUTTER, CA (101)
	TEHAMA, CA (103)
	YOLO, CA (113)
735 - Santa Cruz Basin	MARIN, CA (41)
	SAN FRANCISCO, CA (75)
	SAN MATEO, CA (81)
	SANTA CRUZ, CA (87)
740 - Coastal Basins	MONTEREY, CA (53)
	SAN LUIS OBISPO, CA (79)
745 - San Joaquin Basin	
	FRESNO, CA (19)
	KERN, CA (29)
	KINGS, CA (31)
	MADERA, CA (39)
	MERCED, CA (47)
	SAN BENITO, CA (69)
	STANISLAUS, CA (99)
	TULARE, CA (107)
750 - Santa Maria Basin	SANTA BARBARA, CA (83)
755 - Ventura Basin	
	VENTURA, CA (111)
760 - Los Angeles Basin	
	LOS ANGELES, CA (37)
	ORANGE, CA (59)
765 - Capistrano Basin	SAN DIEGO, CA (73)
800 - Southeastern Alaska Provinces	ATLIN, AK (15)
	BRADFIELD CANAL, AK (47)
	CRAIG, AK (71)
	DIXON ENTRANCE, AK (79)
	FAIRWEATHER, AK (85)
	JUNEAU, AK (123)
	KETCHIKAN, AK (135)
	PETERSBURG, AK (201)

	PORT ALEXANDER, AK (209)
	PRINCE RUPERT, AK (215)
	SITKA, AK (241)
	SKAGWAY, AK (243)
	SUMDUM, AK (257)
	TAKU RIVER, AK (265)
810 - Gulf of Alaska Basin	BERING GLACIER, AK (33)
	CORDOVA, AK (69)
	ICY BAY, AK (115)
	MT. ST. ELIAS, AK (181)
	YAKUTAT, AK (305)
815 - Copper River Basin	GULKANA, AK (99)
	MCCARTHY, AK (159)
	SEWARD, AK (233)
	TALKEETNA MTS., AK (269)
	VALDEZ, AK (299)
820 - AK Cook Inlet Basin	AFOGNAK, AK (3)
	ANCHORAGE, AK (9)
	BLYING SOUND, AK (45)
	ILIAMNA, AK (121)
	KENAI PENINSULA, AK (609)
	KENAI PENINSULA, AK (721)
	KENAI PENINSULA, AK (733)
	KENAI PENINSULA, AK (831)
	KENAI PENINSULA, AK (883)
	KENAI, AK (133)
	LAKE CLARK, AK (149)
	LIME HILLS, AK (151)
	SELDOVIA, AK (231)
	TALKEETNA, AK (267)
	TYONEK, AK (283)
825 - Alaska Peninsula Province	
	CHIGNIK, AK (61)
	KARLUK, AK (129)
	MT. KATMAI, AK (175)
	STEPOVAK BAY, AK (251)
	SUTWIK ISLAND, AK (261)
	UGASHIK, AK (285)
830 - Yukon-Porcupine Province	BEAVER, AK (27)



	BETTLES, AK (37)
	BLACK RIVER, AK (43)
	CHARLEY RIVER, AK (59)
	CHRISTIAN, AK (63)
	CIRCLE, AK (65)
	COLEEN, AK (67)
	FORT YUKON, AK (91)
840 - Yukon-Koyukuk Province	BAIRD INLET, AK (19)
	BENDELEBEN, AK (31)
	BETHEL, AK (35)
	BLACK, AK (41)
	CANDLE, AK (51)
	DILLINGHAM, AK (77)
	GOODNEWS BAY, AK (97)
	HAGEMEISTER ISLAND, AK (101)
	HOLY CROSS, AK (107)
	HOOPER BAY, AK (109)
	HUGHES, AK (113)
	IDITAROD, AK (117)
	KATEEL RIVER, AK (131)
	KUSKOKWIM BAY, AK (145)
	KWIGUK, AK (147)
	MARSHALL, AK (157)
	MELOZITNA, AK (167)
	NOME, AK (189)
	NORTON BAY, AK (191)
	NULATO, AK (193)
	NUNIVAK ISLAND, AK (195)
	OPHIR, AK (199)
	RUSSIAN MISSION, AK (221)
	SHUNGNAK, AK (237)
	SLEETMUTE, AK (245)
	SOLOMON, AK (247)
	ST. MICHAEL, AK (255)
	TELLER, AK (277)
	UNALAKLEET, AK (291)
845 - Bristol Bay Basin	BRISTOL BAY, AK (49)
	COLD BAY, AK (93)
	NAKNEK, AK (185)

	NUSHAGAK BAY, AK (197)
	PORT MOLLER, AK (211)
860 - Selawik Lowland Basins	KOTZEBUE, AK (143)
	SELAWIK, AK (229)
	SHISHMAREF, AK (235)
880 - Interior Lowlands Basin	BIG DELTA, AK (39)
	EAGLE, AK (81)
	FAIRBANKS, AK (83)
	HEALY, AK (105)
	KANTIAHNA RVR., AK (127)
	LIVENGOOD, AK (153)
	MCGRATH, AK (161)
	MEDFRA, AK (165)
	MT. HAYES, AK (173)
	MT. MCKINLEY, AK (177)
	NABESNA, AK (183)
	RUBY, AK (219)
	TANACROSS, AK (271)
	TANANA, AK (273)
	TAYLOR MTS., AK (275)
884 - Brooks Range Province	AMBLER RIVER, AK (5)
	ARCTIC, AK (11)
	BAIRD MOUNTAINS, AK (21)
	CHANDALAR, AK (55)
	PHIL. SMITH MT., AK (203)
	SURVEY PASS, AK (259)
	TABLE MTN., AK (263)
	WISEMAN, AK (303)
885 - Southern Foothills Province	CHANDLER LAKE, AK (57)
	DE LONG MOUNTAINS, AK (73)
	HOWARD PASS, AK (111)
	KILLIK RIVER, AK (137)
	MISHEGUK MTN., AK (171)
	NOATAK, AK (187)
	POINT HOPE, AK (205)
886 - Northern Foothills Province	POINT LAY, AK (207)
	UTUKOK RIVER, AK (297)
890 - Arctic Coastal Plains Province	BARROW, AK (23)
	BARTER ISLAND, AK (25)

	BEECHEY POINT, AK (29)
	DEMARICATION POINT, AK (75)
	FLAXMAN ISLAND, AK (89)
	HARRISON BAY, AK (103)
	IKPIKPUK RVR., AK (119)
	LOOKOUT RIDGE, AK (155)
	MEADE RIVER, AK (163)
	MT. MICHELSON, AK (179)
	SAGAVANIRKTOK, AK (223)
	TESHEKPUK, AK (279)
	UMIAT, AK (287)
	WAINWRIGHT, AK (301)
984 - Kodiak State	KODIAK ISLAND, AK (150)

## Best Available Monitoring Methods and Missing Data Reporting

### Best Available Monitoring Methods and Missing Data Reporting



Please note that when using BAMM, reporters are still required to use the calculation equations in the rule but may use alternative means to determine the inputs to those equations.

*"EPA will allow owners or operators to use BAMM for parameters in 98.233 Calculating GHG Emissions as specified in paragraphs (f)(2), (f)(3), and (f)(4) of this section."*

Please refer to 40 CFR 98.234 (f) for further details.

All facilities are required to report the use of Best Available Monitoring Methods (BAMM) and Missing Data for each applicable source using the three data cells pictured below which appear near the top of the page for each source in Subpart W.

#### Best Available Monitoring Methods (BAMM) and Missing Data:

Were BAMM used for any parameters to calculate GHG emissions? [98.3(c)(7)]	Provide a brief description of the BAMM used, parameter measured, and time period. [98.3(c)(7)]	Were missing data procedures used for any parameters to calculate GHG emissions? [98.235]
Yes	Description, Parameter, Date	No

The two data element associated with BAMM are:

1. Were BAMM used for any parameters to calculate GHG emissions? (Yes or No) 98.236(c)(7) - As noted this is a "Yes" or "No" question. Please note that "Y" or "N" and "yes" or "no" are **not** valid answers to this question because these answers are not accepted in the XML reporting schema. This question must be answered.
2. Provide a brief description of the BAMM used, parameter measured, and time period BAMM was used during the year.

If a facility or supplier used BAMM for all or part of the reporting year, both in the case where BAMM was automatically granted under the rule and where the use of BAMM required EPA approval, you must answer "Yes" to the first question. If you answer "Yes", you are also required to report the following information per §98.3(c)(7):

- a brief description of each best available monitoring method used,
- the parameter measured using the method, and

- the time period during which the best available monitoring method.

These data must be provided for each parameter for which BMM was used to support reporting under this source category.

highlighted invisible to public - For additional guidance on the intended use of the BMM reporting features in Subpart A, in Subpart W associated with source categories, and in Subpart W where BMM information of collected at the unit or compressor level please refer to [FAQ 668 insert production link](#)

If missing data procedures were used to support the reporting of any data withing this source category, you must answer Yes to the third question pictured above. Again the response this question must be either Yes or No. Use of "Y" or "N " or lower case "yes" or "no" are not valid. The question must be answered either the word "Yes" or the word "No"

## Roll-Ups

### Total Emissions

The total emissions roll-up reflects the sum of the CO2 equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Natural Gas Pneumatic Devices

This page provides an overview of the Subpart W natural gas pneumatic devices source category e-GGRT reporting requirements.

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

The natural gas pneumatic devices source category is applicable to Onshore Petroleum and Natural Gas Production, Onshore Natural Gas Transmission Compression, and Underground Natural Gas Storage.

### Indicate if the facility has the source type via the radio buttons.

- If the source type is present you must report required emissions.

Does the Facility have any continuous high-bleed pneumatic devices subject to reporting under 98.232?

Yes  No

Does the Facility have any intermittent bleed pneumatic devices subject to reporting under 98.232?

Yes  No

Does the Facility have any continuous low-bleed pneumatic devices subject to reporting under 98.232?

Yes  No

### If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Report Total CO2 and Total CH4 Emissions.

- Required emissions for each type of pneumatic device at the facility:
  - Total CO2 Emissions (mt CO2)
  - Total CH4 Emissions (mt CO2e)

Type of Pneumatic Device	Total CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) [98.236(c)(1)(iv)]	Total CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e) [98.236(c)(1)(iv)]
High-bleed Pneumatic Devices	200.0	20,000.0
Intermittent Bleed Pneumatic Devices		
Low-Bleed Pneumatic Devices		

### Total Emissions

The total emissions roll-up reflects the sum of the CO<sub>2</sub> equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Natural Gas Driven Pneumatic Pumps

This page provides an overview of the Subpart W natural gas driven pneumatic pumps source category e-GGRT reporting requirements.

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

The natural gas driven pneumatic pumps source category is applicable to Onshore Petroleum and Natural Gas Production.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Does the Facility have any natural gas driven pneumatic pumps subject to reporting under 98.232?

 Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

**Report Total CO<sub>2</sub> and Total CH<sub>4</sub> Emissions.**

- Required emissions:
  - Total CO<sub>2</sub> Emissions (mt CO<sub>2</sub>)
  - Total CH<sub>4</sub> Emissions (mt CO<sub>2</sub>e)

Type of Pneumatic Pump	Total CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) [98.236(c)(2)(ii)]	Total CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e) [98.236(c)(2)(ii)]
Natural Gas Driven Pneumatic Pumps	200.0	200.0

### Total Emissions

The total emissions roll-up reflects the sum of the CO2 equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Acid Gas Removal Units

This page provides an overview of the Subpart W acid gas removal units source category e-GGRT reporting requirements.

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

The acid gas removal units source category is applicable to Onshore Petroleum and Natural Gas Production and Onshore Natural Gas Processing.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required elements.

Does the Facility have any acid gas removal units subject to reporting under 98.232?

Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Reporting Requirements

- Unit ID or Name is required for Onshore Natural Gas Processing facilities only
- Calculation Methodology Used (98.236(c)(3)(vii)), choose one:
  - Calculation Methodology 1 ((98.233(d)(1))
  - Calculation Methodology 2 ((98.233(d)(2))
  - Calculation Methodology 3 ((98.233(d)(3))
  - Calculation Methodology 4 ((98.233(d)(4))
- Total CO2 Emissions (98.236(c)(3)(v))
- If Calculation Methodology 1 was used, report Annual average fraction of CO2 content in the vent from the acid gas removal unit (98.236(c)(3)(ii))

DO NOT COMPLETE THIS  
COLUMN  
Applies to Onshore Natural  
Gas Processing only

Unique ID	Unit ID or Name [98.236(c)(3)(vi)]	Calculation Methodology Used (Select from list) [98.236(c)(3)(vii)]	Total CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) [98.236(c)(3)(v)]	Complete Only if Using Calculation Methodology 1
				Annual average fraction of CO <sub>2</sub> content in the vent from the acid gas removal unit (volumetric fraction) [98.236(c)(3)(ii)]
001		Calculation Methodology 1 (98.233(d)(1))	500.0	0.300
002		Calculation Methodology 3 (98.233(d)(3))	600.0	

### Total Emissions

The total emissions roll-up reflects the sum of the CO2 equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Dehydrators

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W dehydrators source category e-GGRT reporting requirements.

The dehydrators source category is applicable to Onshore Petroleum and Natural Gas Production and Onshore Natural Gas Processing.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Does the Facility have any dehydrators subject to reporting under 98.232?

Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Reporting Requirements

**For all glycol dehydrators with an annual average daily throughput less than 0.4 MMscfd, the facility is required to report:**

- What vent gas controls are used? ((98.236(c)(4)(ii)(B))
  - Vapor Recovery
  - Dehydrator Vents to Flares
  - Regenerator fire-box/fire-tubes
  - No vent controls
  - Other or Multiple Vent Gas controls. For this row also provide description in "Describe "Other" gas vent controls" column.
- Annual total CO<sub>2</sub> emissions at the facility level that resulted from venting gas directly to the atmosphere combined for all glycol dehydrators for each vent control category with annual average daily throughput less than 0.4MMscfd (98.236(c)(4)(ii)(C)). Do not include those amounts which have been captured or recovered and are not vented to the atmosphere.
- Annual total CH<sub>4</sub> emissions at the facility level that resulted from venting gas directly to the atmosphere combined for all glycol dehydrators for each vent control category with annual average daily throughput less than 0.4MMscfd (98.236(c)(4)(ii)(C)). Do not include those amounts which have been captured or recovered and are not vented to the atmosphere.
- Annual total CO<sub>2</sub> emissions at the facility level that resulted from the flaring of process gas combined for all glycol dehydrators for each vent control category with annual average daily throughput less than 0.4MMscfd (98.236(c)(4)(ii)(D))
- Annual total CH<sub>4</sub> emissions at the facility level that resulted from the flaring of process gas combined for all glycol dehydrators for each vent control category with annual average daily throughput less than 0.4MMscfd (98.236(c)(4)(ii)(D))
- Annual total N<sub>2</sub>O emissions at the facility level that resulted from the flaring of process gas combined for all glycol dehydrators for each vent control category with annual average daily throughput less than 0.4MMscfd (98.236(c)(4)(ii)(D))

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

What vent gas controls used	Describe "Other/Multiple" vent gas controls	Total CO <sub>2</sub> Emissions from Venting (mtCO <sub>2</sub> )	Total CH <sub>4</sub> Emissions from Venting (mt CO <sub>2</sub> e)	Total CO <sub>2</sub> Emissions from Flaring (mt CO <sub>2</sub> )	Total CH <sub>4</sub> Emissions from Flaring (mt CO <sub>2</sub> e)	Total N <sub>2</sub> O Emissions from Flaring (mt CO <sub>2</sub> e)
[98.236(c)(4)(ii)(B)]	[98.236(c)(4)(ii)(B)]	[98.236(c)(4)(ii)(C)]	[98.236(c)(4)(ii)(C)]	[98.236(c)(4)(ii)(D)]	[98.236(c)(4)(ii)(D)]	[98.236(c)(4)(ii)(D)]
Vapor Recovery						
Dehydrator Vents to Flares						
Regenerator fire-box/fire tubes						
No Vent Controls						
Other / Multiple Vent Gas Controls						

**For all absorbent desiccant dehydrators, the facility is required to report:**

- Total Count of Absorbent Desiccant Dehydrators (98.236(c)(4)(iii)(A))
- Annual total CO<sub>2</sub> emissions at the facility level for all absorbent desiccant dehydrators combined (98.236(c)(4)(iii)(B))
- Annual total CH<sub>4</sub> emissions at the facility level for all absorbent desiccant dehydrators combined (98.236(c)(4)(iii)(B))

If the facility has any absorbent desiccant dehydrators, complete following table:

Type of Device [98.236(c)(4)(iii)]	Total Count of Absorbent Desiccant Dehydrators [98.236(c)(4)(iii)(A)]	Total CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) [98.236(c)(4)(iii)(B)]	Total CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e) [98.236(c)(4)(iii)(B)]
Absorbent Desiccant dehydrators	500.0	50.0	50.0

For each glycol dehydrator with a throughput greater than or equal to 0.4 MMscfd, the facility is required to report:

- Unit ID or Name, this is only required if the facility is reporting under the Onshore Natural Gas Processing industry segment
- What vent gas controls are used? (98.236(c)(4)(i)(I))
  - Vapor Recovery
  - Dehydrator Vents to Flares
  - Regenerator fire-box/fire-tubes
  - Other - Report other if control type is not listed or multiple control types are used. Provide description in "Describe "Other" gas vent controls" column.
  - No vent controls
- Annual CO<sub>2</sub> emissions that resulted from venting gas directly to the atmosphere (98.236(c)(4)(i)(J)). Do not include those amounts which have been captured or recovered and are not vented to the atmosphere.
- Annual CH<sub>4</sub> emissions that resulted from venting gas directly to the atmosphere (98.236(c)(4)(i)(J)). Do not include those amounts which have been captured or recovered and are not vented to the atmosphere.
- Annual CO<sub>2</sub> emissions that resulted from flaring process gas from the dehydrator (98.236(c)(4)(i)(K))
- Annual CH<sub>4</sub> emissions that resulted from flaring process gas from the dehydrator (98.236(c)(4)(i)(K))
- Annual N<sub>2</sub>O emissions that resulted from flaring process gas from the dehydrator (98.236(c)(4)(i)(K))

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

DO NOT COMPLETE THIS  
COLUMN  
Applies to Onshore Natural Gas  
Processing only

Unique ID	Unit ID or Name [98.236(c)(4)(i)(L)]	What vent gas controls are used? (Select from list) [98.236(c)(4)(i)(I)]	Describe "Other" gas vent controls [98.236(c)(4)(i)(I)]	CO <sub>2</sub> Emissions from Venting (mt CO <sub>2</sub> ) [98.236(c)(4)(i)(J)]	CH <sub>4</sub> Emissions from Venting (mt CO <sub>2</sub> e) [98.236(c)(4)(i)(J)]	CO <sub>2</sub> Emissions from Flaring (mt CO <sub>2</sub> ) [98.236(c)(4)(i)(K)]	CH <sub>4</sub> Emissions from Flaring (mt CO <sub>2</sub> e) [98.236(c)(4)(i)(K)]	N <sub>2</sub> O Emissions from Flaring (mt CO <sub>2</sub> e) [98.236(c)(4)(i)(K)]
001		Dehydrator Vents to Flares		300.0	300.0	300.0	300.0	5.0
002		Other	Describe	300.0	300.0	300.0	300.0	5.0

### Total Emissions

The total emissions roll-up reflects the sum of the CO<sub>2</sub> equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Well Venting for Liquids Unloading

This page provides an overview of the Subpart W well venting for liquids unloading source category e-GGRT reporting requirements.

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

The well venting for liquids unloading source category is applicable to Onshore Petroleum and Natural Gas Production.

Indicate if the facility has the source type via the radio buttons.

- If the source type is present you must report required emissions.

Did the facility have any well venting for liquids unloading?

Yes  No



If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Worksheet Navigation

To navigate between tables use the navigational buttons provided at the top of the page and between tables or use the scroll bars.

<b>For Sub-basins using Calculation Method 1:</b>	<a href="#">CLICK HERE</a>
<b>For Sub-basins using Calculation Method 2 (without plunger lifts):</b>	<a href="#">CLICK HERE</a>
<b>For Sub-basins using Calculation Method 3 (with plunger lifts):</b>	<a href="#">CLICK HERE</a>

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[GO BACK](#)

<b>Emissions</b>	<b>Total CH<sub>4</sub> Emissions</b>
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### Reporting Requirements

For Sub-basins using Calculation Method 1, the facility is required to report the following for each tubing diameter and pressure group combination within each Sub-basin category:

- Sub-basin ID - the pick list for this data element is populated based on the Sub-Basin Selection Tab. Be sure a valid Sub-basin ID is used.
- Tubing diameter group/pressure group (98.236(c)(5)(i))
  - <1 inch, <25 psig
  - <1 inch, >25 psig and <60 psig
  - <1 inch, >60 psig and <110 psig
  - <1 inch, >110 psig and <200 psig
  - <1 inch, >200 psig
  - >1 inch and <2.375 inches, <25 psig
  - >1 inch and <2.375 inches, >25 psig and <60 psig
  - >1 inch and <2.375 inches, >60 psig and <110 psig
  - >1 inch and <2.375 inches, >110 psig and <200 psig
  - >1 inch and <2.375 inches, >200 psig
  - >2.375 inches, <25 psig
  - >2.375 inches, >25 psig and <60 psig
  - >2.375 inches, >60 psig and <110 psig
  - >2.375 inches, >110 psig and <200 psig
  - >2.375 inches, >200 psig
- Number of wells vented for liquids unloading (98.236(c)(5)(i))
- Number of plunger lifts (98.236(c)(5)(i)(B))
- Cumulative number of unloadings vented within tubing diameter group/pressure group
- Annual total CO<sub>2</sub> emissions (98.236(c)(5)(i)(H))
- Annual total CH<sub>4</sub> emissions (98.236(c)(5)(i)(H))
- For the single representative well in the sub-basin, the facility is required to report the following for each tubing diameter group and pressure group combination in the sub-basin category:
  - Did well selected from the tubing diameter and pressure group have a plunger lift? (Yes or No) (98.236(c)(5)(i)(B))
    - If Yes, the facility is required to report:
      - Tubing pressure (98.236(c)(5)(i)(G))
      - Internal tubing diameter (98.236(c)(5)(i)(E))
    - If No, the facility is required to report:
      - Casing Pressure (98.236(c)(5)(i)(F))
      - Internal Casing Diameter (98.236(c)(5)(i)(E))
  - Depth of the Well (98.236(c)(5)(i)(E))

For Sub-basins using Calculation Method 1, complete following table:

Sub-Basin ID	Tubing Diameter Group/Pressure Group (98.236(c)(5)(i))	Number of Wells vented for liquids unloading (98.236(c)(5)(i)(A))	Number of Plunger Lifts (98.236(c)(5)(i)(B))	Cumulative Number of Unloadings Vented (98.236(c)(5)(i)(C))	Data in these columns are for the single representative well in the sub-basin							Total CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) (98.236(c)(5)(i)(H))	Total CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e) (98.236(c)(5)(i)(H))
					Did well selected from the tubing diameter and pressure group have a plunger lift? (98.236(c)(5)(i)(B))	(If yes) Tubing pressure (psig) (98.236(c)(5)(i)(G))	(If no) Casing pressure (psig) (98.236(c)(5)(i)(F))	(If yes) Internal tubing diameter (inches) (98.236(c)(5)(i)(E))	(If no) Internal casing diameter (inches) (98.236(c)(5)(i)(E))	Depth of the Well (ft) (98.236(c)(5)(i)(E))	Total CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) (98.236(c)(5)(i)(H))		
360 - BACA, CO (9) - High permeability gas	<1 inch, >25 psig and <60 psig	600	600	600						0.5	40,000.0	300.0	
360 - CADDON, OK (15) - Coal seam	>1 inch and <2.375 inches, <25 psig	602	536	560	Yes	50.0	150.0	1.5			40,000.0	333.0	

**For Sub-basins using Calculation Method 2, the facility is required to report:**

- Sub-basin ID - the pick list for this data element is populated based on the Sub-Basin Selection Tab. Be sure a valid Sub-basin ID is used.
- Number of wells vented for liquids unloading (without plunger lifts) (98.236(c)(5)(ii)(A))
- Average internal casing diameter (98.236(c)(5)(ii)(D))
- Total CO<sub>2</sub> emissions (98.236(c)(5)(ii)(E))
- Total CH<sub>4</sub> emissions (98.236(c)(5)(ii)(E))

For Sub-basins using Calculation Method 2 (without plunger lifts), complete following table:

GO BACK

Sub-Basin ID	Number of Wells vented for liquids unloading (without plunger lifts) [98.236(c)(5)(ii)(A)]	Average internal casing diameter (inches) [98.236(c)(5)(ii)(D)]	Total CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) [98.236(c)(5)(ii)(E)]	Total CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e) [98.236(c)(5)(ii)(E)]
360 - BECKHAM, OK (9) - Oil	600	5.0	620.0	600.0

**For Sub-basins using Calculation Method 3, the facility is required to report:**

- Sub-basin ID - the pick list for this data element is populated based on the Sub-Basin Selection Tab. Be sure a valid Sub-basin ID is used.
- Number of wells vented for liquids unloading (with plunger lifts) (98.236(c)(5)(ii)(A))
- Number of plunger lifts (98.236(c)(5)(ii)(B))
- Average internal tubing diameter (98.236(c)(5)(ii)(D))
- Total CO<sub>2</sub> emissions (98.236(c)(5)(ii)(E))
- Total CH<sub>4</sub> emissions (98.236(c)(5)(ii)(E))

For Sub-basins using Calculation Method 3 (with plunger lifts), complete following table:

GO BACK

Sub-Basin ID	Number of Wells vented for liquids unloading (with plunger lifts) [98.236(c)(5)(ii)(A)]	Number of Plunger Lifts [98.236(c)(5)(ii)(B)]	Average internal tubing diameter (inches) [98.236(c)(5)(ii)(D)]	Total CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) [98.236(c)(5)(ii)(E)]	Total CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e) [98.236(c)(5)(ii)(E)]

**Total Emissions**

The total emissions roll-up reflects the sum of the CO<sub>2</sub> equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Gas Well Completions and Workovers

This page provides an overview of the Subpart W gas well completions and workovers source category e-GGRT reporting requirements. Reporting is required for gas well completions with and without hydraulic fracturing, as applicable.

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

The well completions and workovers source category is applicable to Onshore Petroleum and Natural Gas Production.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Did the facility have any gas well completions or workovers WITH hydraulic fracturing?

Yes  No

Did the facility have any gas well completions or workovers WITHOUT hydraulic fracturing?

Yes  No

If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.

- For further information, see Best Available Monitoring Methods and Missing Data Reporting.

**Worksheet Navigation**

To navigate between tables use the navigational buttons provided at the top of the page and between tables or use the scroll bars.

For gas well completions and workovers WITH hydraulic fracturing:

CLICK HERE

For gas well completions and workovers WITHOUT hydraulic fracturing:

CLICK HERE

GO BACK

from CO<sub>2</sub> Emissions from CH<sub>4</sub>

**Reporting Requirements**

For gas well completions and workovers with hydraulic fracturing, the facility must report the following for each sub-basin:

- Sub-basin ID - the pick list for this data element is populated based on the Sub-Basin Selection Tab. Be sure a valid Sub-basin ID is used.
- Well type (Horizontal or Vertical) (98.236(c)(6)(i))
- Select the equation used to calculate emissions from gas well completions with hydraulic fracturing (Eq. W-10A and Estimated Flow Rates (based Eq. W-11A or Eq. W-11B), Eq. W-10A and Measured Flow Rates, Eq. W-10A and Both Estimated and Measured Flow Rates, or Equation W-10B) (98.236(c)(6)(i))
- Select the equation used to calculate emissions from gas well workovers with hydraulic fracturing (Eq. W-10A and Estimated Flow Rates (based Eq. W-11A or Eq. W-11B), Eq. W-10A and Measured Flow Rates, Eq. W-10A and Both Estimated and Measured Flow Rates, or Equation W-10B) (98.236(c)(6)(i))
- Total count of all type of Completions Combined in the calendar year(98.236(c)(6)(i)(A))
- Total count of workovers in the calendar year that flare gas (98.236(c)(6)(i)(C))
- Total count of workovers in the calendar year that vent gas to the atmosphere (98.236(c)(6)(i)(C))
- Annual total CO<sub>2</sub> emissions that resulted from venting gas directly to the atmosphere for completions (98.236(c)(6)(i)(I))
- Annual total CH<sub>4</sub> emissions that resulted from venting gas directly to the atmosphere for completions (98.236(c)(6)(i)(I))
- Annual total CO<sub>2</sub> emissions that resulted from flaring for completions (98.236(c)(6)(i)(J))
- Annual total CH<sub>4</sub> emissions that resulted from flaring for completions (98.236(c)(6)(i)(J))
- Annual total N<sub>2</sub>O emissions that resulted from flaring for completions (98.236(c)(6)(i)(J))
- Annual total CO<sub>2</sub> emissions that resulted from venting gas directly to the atmosphere for workovers (98.236(c)(6)(i)(I))
- Annual total CH<sub>4</sub> emissions that resulted from venting gas directly to the atmosphere for workovers (98.236(c)(6)(i)(I))
- Annual total CO<sub>2</sub> emissions that resulted from flaring for workovers (98.236(c)(6)(i)(J))
- Annual total CH<sub>4</sub> emissions that resulted from flaring for workovers (98.236(c)(6)(i)(J))
- Annual total N<sub>2</sub>O emissions that resulted from flaring for workovers (98.236(c)(6)(i)(J))
- Number of well completions that employed purposely designed equipment that separates natural gas from the backflow (98.236(c)(6)(i)(G))
- Number of well workovers that employed purposely designed equipment that separates natural gas from the backflow (98.236(c)(6)(i)(H))

Complete the following table for gas well completions and workovers WITH hydraulic fracturing

GO BACK

Sub-Basin ID	Well Type (Select from list)	Select the Equation Used to Calculate Emissions From Gas Well Completions With Hydraulic Fracturing (98.236(c)(6)(i))	Select the Equation Used to Calculate Emissions From Gas Well Workovers With Hydraulic Fracturing (98.236(c)(6)(i))	Total Count of All Types of Completions Combined (98.236(c)(6)(i)(A))	Total Count of Workovers that Flare Gas (98.236(c)(6)(i)(C))	Total Count of Workovers that Vent Gas to the Atmosphere (98.236(c)(6)(i)(C))	CO <sub>2</sub> Emissions from Venting for Completions (mt CO <sub>2</sub> ) (98.236(c)(6)(i)(I))	CH <sub>4</sub> Emissions from Venting for Completions (mt CO <sub>2</sub> e) (98.236(c)(6)(i)(I))	CO <sub>2</sub> Emissions from Flaring for Completions (mt CO <sub>2</sub> ) (98.236(c)(6)(i)(J))	CH <sub>4</sub> Emissions from Flaring for Completions (mt CO <sub>2</sub> e) (98.236(c)(6)(i)(J))	N <sub>2</sub> O Emissions from Flaring for Completions (mt CO <sub>2</sub> e) (98.236(c)(6)(i)(J))	CO <sub>2</sub> Emissions from Venting for Workovers (mt CO <sub>2</sub> ) (98.236(c)(6)(i)(I))	CH <sub>4</sub> Emissions from Venting for Workovers (mt CO <sub>2</sub> e) (98.236(c)(6)(i)(I))	CO <sub>2</sub> Emissions from Flaring for Workovers (mt CO <sub>2</sub> ) (98.236(c)(6)(i)(J))	CH <sub>4</sub> Emissions from Flaring for Workovers (mt CO <sub>2</sub> e) (98.236(c)(6)(i)(J))	N <sub>2</sub> O Emissions from Flaring for Workovers (mt CO <sub>2</sub> e) (98.236(c)(6)(i)(J))	Number of well completions that employed purposely designed equipment that separates natural gas from the backflow (98.236(c)(6)(i)(G))	Number of well workovers that employed purposely designed equipment that separates natural gas from the backflow (98.236(c)(6)(i)(H))
001	Vertical	Equation W-10B	Equation W-10B	10	10	10	200	200	300	300	25	30	30	300	300	4	1	1
002	Horizontal	Equation W-10B	Equation W-10B	10	10	10	200	200	300	300	25	30	30	300	300	4	1	1

For gas well completions and workovers without hydraulic fracturing, the facility must report the following for each sub-basin:

- Sub-basin ID - the pick list for this data element is populated based on the Sub-Basin Selection Tab. Be sure a valid Sub-basin ID is used.
- Total number of days of gas venting during backflow for completion (98.236(c)(6)(ii)(C)) - this data element should be reported in well days.
- Annual total CO<sub>2</sub> emissions that resulted from venting gas directly to the atmosphere for completions and workovers (98.236(c)(6)(ii)(D))
- Annual total CH<sub>4</sub> emissions that resulted from venting gas directly to the atmosphere for completions and workovers (98.236(c)(6)(ii)(D))
- Annual total CO<sub>2</sub> emissions that resulted from flaring for completions and workovers (98.236(c)(6)(ii)(E))

- Annual total CH4 emissions that resulted from flaring for completions and workovers (98.236(c)(6)(ii)(E))
- Annual total N2O emissions that resulted from flaring for completions and workovers (98.236(c)(6)(ii)(E))

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

GO BACK

Sub-Basin ID	Total Number of days of gas venting during backflow for completion	CO <sub>2</sub> Emissions from Venting for Completions and Workovers (mt CO <sub>2</sub> )	CH <sub>4</sub> Emissions from Venting for Completions and Workovers (mt CO <sub>2</sub> e)	CO <sub>2</sub> Emissions from Flaring for Completions and Workovers (mt CO <sub>2</sub> )	CH <sub>4</sub> Emissions from Flaring for Completions and Workovers (mt CO <sub>2</sub> e)	N <sub>2</sub> O Emissions from Flaring for Completions and Workovers (mt CO <sub>2</sub> e)
[98.236(c)(6)]	[98.236(c)(6)(iii)(C)]	[98.236(c)(6)(iii)(D)]	[98.236(c)(6)(ii)(D)]	[98.236(c)(6)(iii)(E)]	[98.236(c)(6)(ii)(E)]	[98.236(c)(6)(iii)(E)]

### Total Emissions

The total emissions roll-up reflects the sum of the CO2 equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Blowdown Vent Stacks

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W blowdown vent stacks source category e-GGRT reporting requirements.

The blowdown vent stacks source category is applicable to Onshore Natural Gas Processing, Onshore Natural Gas Transmission Compression, and LNG Import and Export Equipment.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Does the facility have any blowdown vent stacks?

Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Reporting Requirements

**For all unique volumes that are blown down once during the year, the facility must report:**

- Total number of blowdowns for all unique physical volumes (98.236(c)(7)(ii)(A))
- Annual total CO<sub>2</sub> emissions from all unique physical volumes as an aggregate per facility (98.236(c)(7)(ii)(B))
- Annual total CH<sub>4</sub> emissions from all unique physical volumes as an aggregate per facility (98.236(c)(7)(ii)(B))

For *all* unique volumes that are blown down once during the year, complete the following table:

Total number of blowdowns [98.236(c)(7)(ii)(A)]	Total CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) [98.236(c)(7)(ii)(B)]	Total CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e) [98.236(c)(7)(ii)(B)]

For each unique physical volume that is blown down more than once during the calendar year, the facility must report:

- Unique name or ID for the unique physical volume (98.236(c)(7)(i)(C))
- Which equation was used to calculate natural gas venting emissions? (W-14A or W-14B)
  - If facility is using W-14B, the facility must report:
    - Total number of blowdowns for each unique physical volume in the calendar year (98.236(c)(7)(i)(A))
- Annual total CO<sub>2</sub> emission for each unique physical blowdown volume (98.236(c)(7)(i)(B))
- Annual total CH<sub>4</sub> emission for each unique physical blowdown volume (98.236(c)(7)(i)(B))

For *each* unique physical volume that is blown down more than once during the calendar year, complete the following table:

		Report Only if Using Eq. W-14B		
Unique name or ID for unique physical volume [98.236(c)(7)(i)(C)]	Which equation was used to calculate natural gas venting emissions? (Select from list)	Total number of blowdowns for each unique physical volume in the calendar year [98.236(c)(7)(i)(A)]	Total CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) [98.236(c)(7)(i)(B)]	Total CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e) [98.236(c)(7)(i)(B)]

### Total Emissions

The total emissions roll-up reflects the sum of the CO<sub>2</sub> equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Gas from Produced Oil Sent to Atmospheric Tanks

### Guidance Regarding Tanks Associated with Multiple Wellpads

Generally, equipment associated with more than a single well pad does not report under the onshore petroleum and natural gas production industry segment of Subpart W. Note that onshore production storage tank calculations contemplate several distinct scenarios. First, emissions from atmospheric pressure fixed roof storage tanks receiving hydrocarbon produced liquids must calculate annual CH<sub>4</sub> and CO<sub>2</sub> emissions based on any applicable method listed under 40 CFR § 98.233(j).

Where separators with annual average throughput of oil greater than equal to 10 barrels per day, please refer to Calculation Methodology 1 or 2 at 40 CFR § 98.233(j)(1) and (2). If there well produces greater than or equal to 10 barrels per day, but does not pass through a wellhead separator before flowing to atmospheric storage tanks, please refer to Calculation Methodology 3 at 40 CFR § 98.233(j)(3). For wells with annual average daily oil production greater than or equal to 10 barrels per day that flow to a separator not at the well pad, please refer to the methods at 40 CFR § 98.233(j)(4). For wells flowing off a well pad without passing through a gas-liquid separator with throughput less than 10 barrels per day, please refer to the equation W-15 at 40 CFR § 98.233(j)(5).

### Reporting Form Help

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W gas from produced oil sent to atmospheric tanks source category e-GGRT reporting requirements. The facility should report emissions collectively. Reporters are not restricted to using only one calculation methodology per sub-basin, and may use the requisite methods to report collective emissions, by sub-basin, for their facility.

The gas from produced oil sent to atmospheric tanks source category is applicable to Onshore Petroleum and Natural Gas Production.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Did the facility have any gas from produced oil sent to atmospheric tanks?

Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

**Worksheet Navigation**

To navigate between tables use the navigational buttons provided at the top of the page and between tables or use the scroll bars.

For wellhead gas-liquid separator with oil throughput >10 barrels/day using Calculation Methodologies 1 or 2:	CLICK HERE
For wellhead gas-liquid separator with oil throughput >10 barrels/day using Calculation Methodologies 3 or 4:	CLICK HERE
For wellhead gas-liquid separators and wells with oil throughput <10 barrels/day using Calculation Methodology 5:	CLICK HERE
If wellhead separator dump valve is functioning improperly during the calendar year:	CLICK HERE

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GO BACK

Count of	
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**Reporting Requirements**

**For wellhead gas-liquid separator with oil throughput greater than or equal to 10 barrels per day, using Calculation Method 1 and 2, the facility is required to report:**

- Sub-basin ID - the pick list for this data element is populated based on the Sub-Basin Selection Tab. Be sure a valid Sub-basin ID is used.
- Select calculation methodology used (Calculation Methodology 1 or Calculation Methodology 2) (98.236(c)(8)(i))
- Number of wellhead separators sending oil to atmospheric tanks (98.236(c)(8)(i)(A))
- Estimated average separator temperature (98.236(c)(8)(i)(A))
- Estimated average pressure (98.236(c)(8)(i)(B))
- Estimated average sales oil stabilized API gravity (98.236(c)(8)(i)(C))
- Count of hydrocarbon tanks at well pads (98.236(c)(8)(i)(D))
- Best estimate of count of stock tanks not at well pads receiving facility's oil (98.236(c)(8)(i)(E))
- Count of tanks with vapor recovery system emissions control measures at well pads (98.236(c)(8)(i)(G))
- Count of tanks with flaring emissions control measures at well pads (98.236(c)(8)(i)(G))
- Best estimate of count of stock tanks assumed to have emissions control measures, not at well pads, receiving facility's oil (98.236(c)(8)(i)(H))
- Minimum concentration of flash gas, CH4 (98.236(c)(8)(i)(I)) - this is a volumetric concentration, reported as a fraction
- Maximum concentration of flash gas, CH4 (98.236(c)(8)(i)(I)) - this is a volumetric concentration, reported as a fraction
- Minimum concentration of flash gas, CO2 (98.236(c)(8)(i)(I)) - this is a volumetric concentration, reported as a fraction
- Maximum concentration of flash gas, CO2 (98.236(c)(8)(i)(I)) - this is a volumetric concentration, reported as a fraction
- Annual CO2 emissions that resulted from venting gas to the atmosphere (98.236(c)(8)(i)(J))
- Annual CH4 emissions that resulted from venting gas to the atmosphere (98.236(c)(8)(i)(J))
- Annual CO2 emissions that resulted from flaring gas (98.236(c)(8)(i)(L))
- Annual CH4 emissions that resulted from flaring gas (98.236(c)(8)(i)(L))
- Annual N2O emissions that resulted from flaring gas (98.236(c)(8)(i)(L))

If wellhead separator dump valve is functioning improperly during the calendar year: [CLICK HERE](#)

For wellhead gas-liquid separator with oil throughput >10 barrels/day using Calculation Methodologies 1 or 2, complete the following table for each sub-basin:

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Sub-Basin ID	Select Calculation Methodology Used (Select from list)	Number of wellhead separators sending oil to separator tanks	Estimated average separator pressure (degrees Fahrenheit)	Estimated average separator pressure (PSIG)	Estimated average sales oil API Gravity (degrees)	Count of hydrocarbon tanks on well pads	Best estimate of count of such tanks assumed to have vapor recovery system emissions control measures at well pads	Count of tanks with assumed to have vapor recovery system emissions control measures at well pads	Count of tanks with assumed to have flaring of tank vapors emissions control measures at well pads	Best estimate of count of such tanks assumed to have vapor recovery system emissions control measures at well pads	Range of concentration of flash gas, CH <sub>4</sub> , CO <sub>2</sub>		Minimum concentration of flash gas, CO <sub>2</sub> (vol% or mole fraction)	Maximum concentration of flash gas, CH <sub>4</sub> , CO <sub>2</sub> (vol% or mole fraction)	Minimum concentration of flash gas, CH <sub>4</sub> , CO <sub>2</sub> (vol% or mole fraction)	Maximum concentration of flash gas, CH <sub>4</sub> , CO <sub>2</sub> (vol% or mole fraction)	CO <sub>2</sub> Emissions from Venting (mt CO <sub>2</sub> )	CH <sub>4</sub> Emissions from Venting (mt CO <sub>2</sub> e)	CO <sub>2</sub> Emissions from Flaring (mt CO <sub>2</sub> )	CH <sub>4</sub> Emissions from Flaring (mt CO <sub>2</sub> e)	N <sub>2</sub> O Emissions from Flaring (mt CO <sub>2</sub> e)	
											Minimum	Maximum										
98.236(c)(8)(i)	Calculation Methodology 1	0	0.0	0.0	0.0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**For wellhead gas-liquid separator with oil throughput greater than or equal to 10 barrels per day, using Calculation Method 3 and 4, the facility is required to report:**

- Sub-basin ID - the pick list for this data element is populated based on the Sub-Basin Selection Tab. Be sure a valid Sub-basin ID is used.
- Select calculation methodology used (Calculation Methodology 3 or Calculation Methodology 4) (98.236(c)(8)(ii))
- Total number of wells sending oil directly to tanks. (98.236(c)(8)(ii)(B))
- Total number of wells sending oil to separators off the well pads. (98.236(c)(8)(ii)(C))
- Minimum sales oil API gravity for wells in 98.236(c)(8)(ii)(B) and 98.236(c)(8)(ii)(C) (98.236(c)(8)(ii)(D))
- Maximum sales oil API gravity for wells in 98.236(c)(8)(ii)(B) and 98.236(c)(8)(ii)(C) (98.236(c)(8)(ii)(D))
- Count of hydrocarbon tanks on well pads (98.236(c)(8)(ii)(E))
- Count of hydrocarbon tanks, on well pads, assumed to have vapor recovery system emissions control measures (98.236(c)(8)(ii)(F))
- Count of hydrocarbon tanks, on well pads, assumed to have flaring of tank vapors emissions control measures (98.236(c)(8)(ii)(F))
- Count of hydrocarbon tanks, off well pads, assumed to have vapor recovery system emissions control measures (98.236(c)(8)(ii)(F))
- Count of hydrocarbon tanks, off well pads, assumed to have flaring of tank vapors emissions control measures (98.236(c)(8)(ii)(F))
- Annual CO<sub>2</sub> emissions that resulted from venting gas to the atmosphere, at the sub-basin level for Calculation Method 3 or 4 (98.236(c)(8)(ii)(G))
- Annual CH<sub>4</sub> emissions that resulted from venting gas to the atmosphere, at the sub-basin level for Calculation Method 3 or 4 (98.236(c)(8)(ii)(G))
- Annual CO<sub>2</sub> emissions that resulted from flaring gas, at the sub-basin level for Calculation Method 3 or 4 (98.236(c)(8)(ii)(I))
- Annual CH<sub>4</sub> emissions that resulted from flaring gas, at the sub-basin level for Calculation Method 3 or 4 (98.236(c)(8)(ii)(I))
- Annual N<sub>2</sub>O emissions that resulted from flaring gas, at the sub-basin level for Calculation Method 3 or 4 (98.236(c)(8)(ii)(I))

For wellhead gas-liquid separator with oil throughput >10 barrels/day using Calculation Methodologies 3 or 4, complete the following table for each sub-basin:

[GO BACK](#)

Sub-Basin ID	Select Calculation Methodology Used (Select from list)	Total number of wells sending oil directly to tanks	Total number of wells sending oil to separators off the well pads	Sales oil API Gravity range		Count of hydrocarbon tanks, on well pads, assumed to have vapor recovery system emissions control measures	Count of hydrocarbon tanks, on well pads, assumed to have flaring of tank vapors emissions control measures	Count of hydrocarbon tanks, off well pads, assumed to have vapor recovery system emissions control measures	Count of hydrocarbon tanks, off well pads, assumed to have flaring of tank vapors emissions control measures	CO <sub>2</sub> Emissions from Venting (mt CO <sub>2</sub> )	CH <sub>4</sub> Emissions from Venting (mt CO <sub>2</sub> e)	CO <sub>2</sub> Emissions from Flaring (mt CO <sub>2</sub> )	CH <sub>4</sub> Emissions from Flaring (mt CO <sub>2</sub> e)	N <sub>2</sub> O Emissions from Flaring (mt CO <sub>2</sub> e)
				Minimum sales oil API Gravity for wells in 98.236(c)(8)(iii)(C) (degrees)	Maximum sales oil API Gravity for wells in 98.236(c)(8)(iii)(C) (degrees)									
98.236(c)(8)(iii)	Calculation Methodology 3	0	0	50.0	60.0	1,000	0	0	0	0.0	0.0	0.0	0.0	0.0

**For wellhead gas-liquid separator with oil throughput less than 10 barrels per day, using Calculation Method 5, the facility is required to report:**

- Sub-basin ID - the pick list for this data element is populated based on the Sub-Basin Selection Tab. Be sure a valid Sub-basin ID is used.
- Total volume of oil production (98.236(c)(8)(iii)(C))
- Best estimate of fraction of production sent to tanks with assumed vapor recovery system control measures (98.236(c)(8)(iii)(D))
- Best estimate of fraction of production sent to tanks with assumed flaring of tank vapors control measures (98.236(c)(8)(iii)(D))
- Count of hydrocarbon tanks on well pads (98.236(c)(8)(iii)(E))
- Annual CO<sub>2</sub> emissions that resulted from venting gas to the atmosphere, at the sub-basin level for Calculation Method 5 (98.236(c)(8)(iii)(F))
- Annual CH<sub>4</sub> emissions that resulted from venting gas to the atmosphere, at the sub-basin level for Calculation Method 5 (98.236(c)(8)(iii)(F))
- Annual CO<sub>2</sub> emissions that resulted from flaring gas, at the sub-basin level for Calculation Method 5 (98.236(c)(8)(iii)(H))
- Annual CH<sub>4</sub> emissions that resulted from flaring gas, at the sub-basin level for Calculation Method 5 (98.236(c)(8)(iii)(H))
- Annual N<sub>2</sub>O emissions that resulted from flaring gas, at the sub-basin level for Calculation Method 5 (98.236(c)(8)(iii)(H))

For wellhead gas-liquid separators and wells with oil throughput <10 barrels/day using Calculation Methodology 5, complete the following table:

[GO BACK](#)

Total volume of oil production (barrels per year)	Fraction of production sent to tanks with assumed vapor recovery system control measures	Fraction of production sent to tanks with assumed flaring of tank vapors control measures	Count of hydrocarbon tanks on well pads
[98.236(c)(8)(iii)(C)]	[98.236(c)(8)(iii)(D)]	[98.236(c)(8)(iii)(D)]	[98.236(c)(8)(iii)(E)]

For wellhead gas-liquid separators and wells with oil throughput <10 barrels/day using Calculation Methodology 5, complete the following table for each sub-basin:

Sub-Basin ID	CO <sub>2</sub> Emissions from Venting (mt CO <sub>2</sub> )	CH <sub>4</sub> Emissions from Venting (mt CO <sub>2</sub> e)	CO <sub>2</sub> Emissions from Flaring (mt CO <sub>2</sub> )	CH <sub>4</sub> Emissions from Flaring (mt CO <sub>2</sub> e)	N <sub>2</sub> O Emissions from Flaring (mt CO <sub>2</sub> e)
[98.236(c)(8)(iii)]	[98.236(c)(8)(iii)(F)]	[98.236(c)(8)(iii)(F)]	[98.236(c)(8)(iii)(H)]	[98.236(c)(8)(iii)(H)]	[98.236(c)(8)(iii)(H)]

**If wellhead separator dump valve is functioning improperly during the calendar year, the facility is required to report:**

- Sub-basin ID - the pick list for this data element is populated based on the Sub-Basin Selection Tab. Be sure a valid Sub-basin ID is used.
- Count of wellhead separators that dump valve is applied (98.236(c)(8)(iv)(A))

- CO2 emissions from improperly functioning dump valves (98.236(c)(8)(iv)(B))
- CH4 emissions from improperly functioning dump valves (98.236(c)(8)(iv)(B))

If wellhead separator dump valve is functioning improperly during the calendar year, complete the following table:

GO BACK

Count of wellhead separators that dump valve factor is applied
[98.236(c)(8)(iv)(A)]

If wellhead separator dump valve is functioning improperly during the calendar year, complete the following table for each sub-basin:

	NOTE: If reporting for separator, don't report amounts reported under Methods 1, 2 or 4 for that separator.	
Sub-Basin ID	CO <sub>2</sub> Emissions from Improperly Functioning Dump Valves (mt CO <sub>2</sub> )	CH <sub>4</sub> Emissions from Improperly Functioning Dump Valves (mt CO <sub>2</sub> e)
[98.236(c)(8)(iv)]	[98.236(c)(8)(iv)(B)]	[98.236(c)(8)(iv)(B)]

**Total Emissions**

The total emissions roll-up reflects the sum of the CO2 equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Transmission Tanks

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W transmission tanks source category e-GGRT reporting requirements.

The transmission tanks source category is applicable to Onshore Natural Gas Transmission Compression.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Did the facility have any vent stack emissions from compressor scrubber dump valve leakage that were quantified per 98.233(k)?  Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

**Report Requirements**

For each vent stack, the facility is required to report:

- A unique name or ID number for the vent stack (98.236(c)(9)(iii))
- Annual CO2 emissions from venting gas directly to the atmosphere (98.236(c)(9)(i))
- Annual CH4 emissions from venting gas directly to the atmosphere (98.236(c)(9)(i))
- Annual CO2 emissions from flaring process gas (98.236(c)(9)(ii))
- Annual CH4 emissions from flaring process gas (98.236(c)(9)(ii))
- Annual N2O emissions from flaring process gas (98.236(c)(9)(ii))



Fill out the following table for each vent stack:

Unique ID	A unique name or ID number for the vent stack [98.236(c)(9)(iii)]	CO <sub>2</sub> emissions from venting gas directly to the atmosphere (mt CO <sub>2</sub> ) [98.236(c)(9)(i)]	CH <sub>4</sub> emissions from venting gas directly to the atmosphere (mt CO <sub>2</sub> e) [98.236(c)(9)(i)]	CO <sub>2</sub> emissions from flaring process gas (mt CO <sub>2</sub> ) [98.236(c)(9)(ii)]	CH <sub>4</sub> emissions from flaring process gas (mt CO <sub>2</sub> e) [98.236(c)(9)(ii)]	N <sub>2</sub> O emissions from flaring process gas (mt CO <sub>2</sub> e) [98.236(c)(9)(ii)]

### Total Emissions

The total emissions roll-up reflects the sum of the CO<sub>2</sub> equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Well Testing

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W well testing source category e-GGRT reporting requirements.

The well testing source category is applicable to Onshore Petroleum and Natural Gas Production.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Did the facility perform well testing that resulted in venting or flaring?

Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Reporting Requirements

For well testing venting and flaring, the facility is required to report:

- The unique identity of the basin (98.236(c)(10)) - this data element is automatically populated using data from the Sub-Basin Selection tab. Please verify that the basin ID is correct.
- Number of wells tested in calendar year (98.236(c)(10)(i))
- Average gas to oil ratio (98.236(c)(10)(ii))
- Average number of days the wells were tested (98.236(c)(10)(iii))
- Total annual CO<sub>2</sub> emissions for the entire facility, from well testing venting (98.236(c)(10)(iv))
- Total annual CH<sub>4</sub> emissions for the entire facility, from well testing venting (98.236(c)(10)(iv))
- Total annual CO<sub>2</sub> emissions for the entire facility, from well testing flaring (98.236(c)(10)(v))
- Total annual CH<sub>4</sub> emissions for the entire facility, from well testing flaring (98.236(c)(10)(v))
- Total annual N<sub>2</sub>O emissions for the entire facility, from well testing flaring (98.236(c)(10)(v))

Complete the following table for well testing:

Basin ID [98.236(c)(10)]	Number of wells tested in calendar year [98.236(c)(10)(i)]	Average gas to oil ratio (cubic feet of gas per barrel oil) [98.236(c)(10)(ii)]	Average number of days wells were tested [98.236(c)(10)(iii)]	Total CO <sub>2</sub> Emissions from Venting (mt CO <sub>2</sub> ) [98.236(c)(10)(iv)]	Total CH <sub>4</sub> Emissions from Venting (mt CO <sub>2</sub> e) [98.236(c)(10)(iv)]	Total CO <sub>2</sub> Emissions from Flaring (mt CO <sub>2</sub> ) [98.236(c)(10)(v)]	Total CH <sub>4</sub> Emissions from Flaring (mt CO <sub>2</sub> e) [98.236(c)(10)(v)]	Total N <sub>2</sub> O Emissions from Flaring (mt CO <sub>2</sub> e) [98.236(c)(10)(v)]
360 - Anadarko Basin	6	4.0	4.0	6.0	7.0	5.0	4.0	6.0

### Total Emissions

The total emissions roll-up reflects the sum of the CO<sub>2</sub> equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Associated Gas Venting and Flaring

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W associated gas venting and flaring source category e-GGRT reporting requirements.

The associated gas venting and flaring source category is applicable to Onshore Petroleum and Natural Gas Production.

### Indicate if the facility has the source type via the radio buttons.

- If the source type is present you must report required emissions.

Did the facility have any associated gas venting or flaring?

 Yes  No

### If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Reporting Requirements

For associated gas venting and flaring, the facility is required to report:

- The unique identity of the basin (98.236(c)(11)) - this data element is automatically populated using data from the Sub-Basin Selection tab. Please verify that the basin ID is correct.
- Number of wells venting associated gas in a calendar year (98.236(c)(11)(i))
- Number of well flaring associated gas in a calendar year (98.236(c)(11)(i))
- Average gas to oil ratio for the basin (98.236(c)(11)(ii))
- Total annual CO<sub>2</sub> emissions for the entire facility from associated gas venting (98.236(c)(11)(iii))
- Total annual CH<sub>4</sub> emissions for the entire facility from associated gas venting (98.236(c)(11)(iii))
- Total annual CO<sub>2</sub> emissions for the entire facility from associated gas flaring (98.236(c)(11)(iv))
- Total annual CH<sub>4</sub> emissions for the entire facility from associated gas flaring (98.236(c)(11)(iv))
- Total annual N<sub>2</sub>O emissions for the entire facility from associated gas flaring (98.236(c)(11)(iv))

Basin ID [98.236(c)(11)]	Number of wells venting associated gas [98.236(c)(11)(i)]	Number of wells flaring associated gas [98.236(c)(11)(i)]	Average gas to oil ratio for the Basin (cubic feet of gas per barrel of oil) [98.236(c)(11)(ii)]	CO <sub>2</sub> Emissions from Venting (mt CO <sub>2</sub> ) [98.236(c)(11)(iii)]	CH <sub>4</sub> Emissions from Venting (mt CO <sub>2</sub> e) [98.236(c)(11)(iii)]	CO <sub>2</sub> Emissions from Flaring (mt CO <sub>2</sub> ) [98.236(c)(11)(iv)]	CH <sub>4</sub> Emissions from Flaring (mt CO <sub>2</sub> e) [98.236(c)(11)(iv)]	N <sub>2</sub> O Emissions from Flaring (mt CO <sub>2</sub> e) [98.236(c)(11)(iv)]
360 - Anadarko Basin	20	10	40,000.0	10.0	10.0	10.0	7.0	7.0

### Total Emissions

The total emissions roll-up reflects the sum of the CO<sub>2</sub> equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Subpart W Flares and Flare Stacks

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W e-GGRT reporting requirements for the flare stacks source category and emissions from flares.

The flare stack emissions category is applicable to Onshore Petroleum and Natural Gas Production and Onshore Natural Gas Processing segments.

Emissions from flares at subpart W facilities are reportable under one of three authorities within part 98, including:

- Flare stack emissions, as calculated under §98.233(n), are a reportable source for Onshore Petroleum and Natural Gas Production facilities and Natural Gas Processing facilities, per §98.232(c)(9) and §98.232(d)(6), respectively
- Source-specific “vented to flare” emissions reporting; as specified in §98.236 for dehydrators, gas well completions and workovers, gas from produced oil sent to atmospheric tanks, transmission tanks, well testing, associated gas venting and flaring, centrifugal compressors, and reciprocating compressors; and
- For Offshore Petroleum and Natural Gas Production facilities, per §98.236(b) emissions from flares are reported separately on the Offshore Emission Source tab.

Because flare stack emission at Subpart W facilities are potentially reported in a number of places, the EPA has offered the following simple hierarchy among the reporting categories to ensure that emissions from flares are not double counted per 98.233(n)(10):

1. If emissions are reported under a source-specific “vented to flare” reporting category, as list above, those specific emissions should be reported under that source and not reported elsewhere in the facility’s annual GHG reporting.
2. Flare stack emission at Onshore Petroleum and Natural Gas Production facilities and Natural Gas Processing facilities that are not captured under (1) should be reported under the flare stack emission per §98.233(n). To the extent that monitoring information includes amounts associated with reported emission under (1), those emissions should be deducted from the total emissions reported according to the methods in §98.233(n).



Flares that are not associated with onshore petroleum and natural gas production, onshore natural gas processing or offshore petroleum and natural gas production facilities and not associated specific source types are exempt under Subpart C (§98.30(a)(4)) and not required to be reported

Please refer to [FAQ 667](#) for further information on the applicability of combustion emissions at Subpart W facilities.

The reporting of flare stack emissions on the Flare Stacks tab in the Subpart W Reporting Form is composed of several elements as follows:

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Does the facility have flare stacks?

 Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Reporting Requirements

For each flare, the facility is required to report:

- Unique name or ID number for the flare stack (98.236(c)(12)(x)) - this data element is only required for Onshore Natural Gas Processing facilities
- Does the flare have a continuous flow monitor? (Yes or No) (98.236(c)(12)(i))
- Percent of gas sent to un-lit flare determine by engineering estimate and process knowledge based on best available data and operating

- records (98.236(c)(12)(iii))
- Does the flare have a continuous gas analyzer? (Yes or No) (98.236(c)(12)(iv))
- Were CEMS used to measure CO2 emissions for the flare stack? (Yes or No) (98.236(c)(12)(xi))
  - If Yes, the facility must report:
    - If CEMS were used, combusted and uncombusted CO2 (98.236(c)(12)(iii))
    - Do not report data for the remaining fields
  - If No, the facility must report:
    - Uncombusted CO2 emissions (98.236(c)(12)(vii))
    - Uncombusted CH4 emissions (98.236(c)(12)(vi))
    - Combusted CO2 emissions (98.236(c)(12)(viii))
    - N2O emissions (98.236(c)(12)(ix))
    - Do not report data for "If CEMS were used, combusted and uncombusted CO2"

Complete the following table for each flare:  
DO NOT COMPLETE THIS COLUMN Applies to Onshore Natural Gas Processing only

Unique ID	Unique Name or ID Number for the Flare Stack [98.236(c)(12)(xi)]	Does the flare have a continuous flow monitor? [98.236(c)(12)(i)]	Percent of gas sent to un-lit flare [98.236(c)(12)(iii)]	Does the flare have a continuous gas analyzer? [98.236(c)(12)(iv)]	Were CEMS used to measure CO2 emissions for the flare stack? [98.236(c)(12)(xi)]	If CEMS were used, combusted and uncombusted CO2 (mt CO2) [98.236(c)(12)(xii)]	Uncombusted CO2 emissions (mt CO2) [98.236(c)(12)(vii)]	Uncombusted CH4 emissions (mt CO2e) [98.236(c)(12)(vi)]	Combusted CO2 Emissions (mt CO2) [98.236(c)(12)(viii)]	N2O emissions (mt CO2e) [98.236(c)(12)(ix)]
001		Yes	30.000	No	No		20.0	7.8	30.0	0.2
002		No	20.000	No	Yes	300.0				

### Total Emissions

The total emissions roll-up reflects the sum of the CO2 equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO2	mt CH4 (mt CO2e)	mt N2O (mt CO2e)	Total Emissions (mt CO2e)
1,250	1,250	10	2,510

## Centrifugal Compressors

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W centrifugal compressor source category e-GGRT reporting requirements.

The centrifugal compressor source category is applicable to Onshore Petroleum Natural Gas Production, Onshore Natural Gas Processing, Onshore Natural Gas Transmission Compression, Underground Natural Gas Storage, Liquefied Natural Gas (LNG) Storage, and LNG Import and Export Equipment.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Does the facility have any centrifugal compressors with wet or dry seals subject to reporting under 98.232?

Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Centrifugal Compressor Reporting (Onshore Petroleum and Natural Gas Production)

The reporting requirements for Onshore Petroleum and Natural Gas Production differ from the rest of the industry segments for this subpart. For Onshore Petroleum and Natural Gas Production, only the following two emission values are required to be reported:

- The total annual CO2 emissions from all compressors combined, in metric tons CO2 [98.236(c)(13)(v)(B)]
- The total annual CH4 emissions from all compressors combined, in metric tons CO2e [98.236(c)(13)(v)(B)]

### Centrifugal Compressor Reporting (Onshore Natural Gas Processing, Onshore Natural Gas Transmission Compression, Underground Natural Gas Storage, Liquefied Natural Gas (LNG) Storage, and LNG Import and Export Equipment)

All applicable industry segments other than Onshore Petroleum and Natural Gas Production must report emissions individually for each centrifugal compressor.

For each compressor, emissions will be reported by mode of operation and by specific source type. Two modes of operation that require emission monitoring are the *operating mode*, and the *not operating, depressurized mode*. Compressors that were in operating mode and have wet seal vents must report emissions from the wet seal vents. Compressors that were in operating mode with wet or dry seal vents must report emissions from blowdown vents. Compressors with wet or dry seal vents that were in the not operating, depressurized mode must report emissions from unit isolation valve leakage. Emissions from each mode of operation must be reported if the compressor was ever in that mode at anytime during the year.

For each emission source, there are separate reporting fields for if the emission source was measured during the year (Equation W-22) or if the emission source was not measured and a default emission factor was applied (Equations W-23 and W-24). If one or more sources for a compressor were measured during the year, the emissions should be filled in for the respective *measured* fields. For any sources that emissions were not directly measured, the *not measured* field should be reported in place of the *measured* fields. If Bamm was used and no emission sources were measured, the compressor specific Bamm field should be reported as "yes", and only the *not measured* emission fields should be reported. If Bamm was not used in place of direct measurement of at least one mode, then "no" should be entered for the Bamm field. In no occurrence should the *measured* and *not measured* fields both be populated for a given compressor and source type.

The exact reporting requirements are described below:

<p align="center"><b>Operating Mode</b> (required if compressor was ever in that operating mode at any time during the year)</p>	<p align="center"><b>Required Data Elements</b></p>																
<p><b>All Compressors</b></p> <table border="1" data-bbox="138 783 537 961"> <tr> <td>Compressor ID</td> <td>Were Bamm Used for This Compressor?</td> <td>Seal Type (wet or dry)</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table> <table border="1" data-bbox="138 968 537 1157"> <tr> <th colspan="3">For Centrifugal Compressors in ALL OPERATING MODES</th> </tr> <tr> <td>Total annual CO<sub>2</sub> emissions from all modes of operation combined (mt CO<sub>2</sub>)</td> <td>Total annual CH<sub>4</sub> emissions from all modes of operation combined (mt CO<sub>2</sub>e)</td> <td>Total annual N<sub>2</sub>O emissions from all modes of operation combined (mt CO<sub>2</sub>e)</td> </tr> <tr> <td>(98.236(c)(13)(iv))</td> <td>(98.236(c)(13)(iv))</td> <td>(98.236(c))</td> </tr> </table>	Compressor ID	Were Bamm Used for This Compressor?	Seal Type (wet or dry)				For Centrifugal Compressors in ALL OPERATING MODES			Total annual CO <sub>2</sub> emissions from all modes of operation combined (mt CO <sub>2</sub> )	Total annual CH <sub>4</sub> emissions from all modes of operation combined (mt CO <sub>2</sub> e)	Total annual N <sub>2</sub> O emissions from all modes of operation combined (mt CO <sub>2</sub> e)	(98.236(c)(13)(iv))	(98.236(c)(13)(iv))	(98.236(c))	<ul style="list-style-type: none"> <li>Compressor ID</li> <li>Were Bamm Used for This Compressor? (Yes or No)</li> <li>Total annual CO<sub>2</sub> emissions from all modes of operation combined in metric tons CO<sub>2</sub> (98.236(c)(13)(iv))</li> <li>Total annual CH<sub>4</sub> emissions from all modes of operation combined in metric tons CO<sub>2</sub>e (98.236(c)(13)(iv))</li> <li>Total annual N<sub>2</sub>O emissions from all modes of operation combined (mt CO<sub>2</sub>e) (98.236(c))</li> </ul>	
Compressor ID	Were Bamm Used for This Compressor?	Seal Type (wet or dry)															
For Centrifugal Compressors in ALL OPERATING MODES																	
Total annual CO <sub>2</sub> emissions from all modes of operation combined (mt CO <sub>2</sub> )	Total annual CH <sub>4</sub> emissions from all modes of operation combined (mt CO <sub>2</sub> e)	Total annual N <sub>2</sub> O emissions from all modes of operation combined (mt CO <sub>2</sub> e)															
(98.236(c)(13)(iv))	(98.236(c)(13)(iv))	(98.236(c))															
<p><b>Operating Mode with Wet Seals</b></p> <table border="1" data-bbox="138 1207 537 1444"> <tr> <th colspan="4">For Centrifugal Compressors with WET or DRY Seals</th> </tr> <tr> <th colspan="2">Measured</th> <th colspan="2">Not Measured</th> </tr> <tr> <td>Blowdown Vent CO<sub>2</sub> emissions (mt CO<sub>2</sub>)</td> <td>Blowdown Vent CH<sub>4</sub> emissions (mt CO<sub>2</sub>e)</td> <td>Blowdown Vent CO<sub>2</sub> emissions (mt CO<sub>2</sub>)</td> <td>Blowdown Vent CH<sub>4</sub> emissions (mt CO<sub>2</sub>e)</td> </tr> <tr> <td>(98.236(c)(13)(ii)(C))</td> <td>(98.236(c)(13)(ii)(C))</td> <td>(98.236(c)(13)(ii)(C))</td> <td>(98.236(c)(13)(ii)(C))</td> </tr> </table>	For Centrifugal Compressors with WET or DRY Seals				Measured		Not Measured		Blowdown Vent CO <sub>2</sub> emissions (mt CO <sub>2</sub> )	Blowdown Vent CH <sub>4</sub> emissions (mt CO <sub>2</sub> e)	Blowdown Vent CO <sub>2</sub> emissions (mt CO <sub>2</sub> )	Blowdown Vent CH <sub>4</sub> emissions (mt CO <sub>2</sub> e)	(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))	<ul style="list-style-type: none"> <li>Annual throughput using an engineering calculation based on best available data (MMscf)(98.236(c)(13)(i)(C))</li> <li>Seal Type (wet or dry)</li> <li>Number of wet seals connected to the degassing vent (98.236(c)(13)(i)(A))</li> <li>Type of meter used for making measurements (98.236(c)(13)(i)(D))</li> <li>Fraction of vent gas recovered for fuel (98.236(c)(13)(i)(B))</li> <li>Fraction of vent gas recovered for sales (98.236(c)(13)(i)(B))</li> <li>Fraction of vent gas recovered and flared (98.236(c)(13)(i)(B))</li> <li>Measured <b>OR</b> Not Measured seal vent CO<sub>2</sub> emissions in metric tons CO<sub>2</sub> (98.236(c)(13)(i)(G))</li> <li>Measured <b>OR</b> Not Measured seal vent CH<sub>4</sub> emissions in metric tons CO<sub>2</sub>e (98.236(c)(13)(i)(G))</li> <li>Measured <b>OR</b> Not Measured blowdown vent CO<sub>2</sub> emissions in metric tons CO<sub>2</sub> (98.236(c)(13)(ii)(C))</li> <li>Measured <b>OR</b> Not Measured blowdown vent CH<sub>4</sub> emissions in metric tons CO<sub>2</sub>e (98.236(c)(13)(ii)(C))</li> </ul>
For Centrifugal Compressors with WET or DRY Seals																	
Measured		Not Measured															
Blowdown Vent CO <sub>2</sub> emissions (mt CO <sub>2</sub> )	Blowdown Vent CH <sub>4</sub> emissions (mt CO <sub>2</sub> e)	Blowdown Vent CO <sub>2</sub> emissions (mt CO <sub>2</sub> )	Blowdown Vent CH <sub>4</sub> emissions (mt CO <sub>2</sub> e)														
(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))														
<p><b>Operating Mode with Dry Seals</b></p> <table border="1" data-bbox="138 1701 537 1864"> <tr> <th colspan="4">For Centrifugal Compressors with WET or DRY Seals</th> </tr> <tr> <th colspan="2">Measured</th> <th colspan="2">Not Measured</th> </tr> <tr> <td>Blowdown Vent CO<sub>2</sub> emissions (mt CO<sub>2</sub>)</td> <td>Blowdown Vent CH<sub>4</sub> emissions (mt CO<sub>2</sub>e)</td> <td>Blowdown Vent CO<sub>2</sub> emissions (mt CO<sub>2</sub>)</td> <td>Blowdown Vent CH<sub>4</sub> emissions (mt CO<sub>2</sub>e)</td> </tr> <tr> <td>(98.236(c)(13)(ii)(C))</td> <td>(98.236(c)(13)(ii)(C))</td> <td>(98.236(c)(13)(ii)(C))</td> <td>(98.236(c)(13)(ii)(C))</td> </tr> </table>	For Centrifugal Compressors with WET or DRY Seals				Measured		Not Measured		Blowdown Vent CO <sub>2</sub> emissions (mt CO <sub>2</sub> )	Blowdown Vent CH <sub>4</sub> emissions (mt CO <sub>2</sub> e)	Blowdown Vent CO <sub>2</sub> emissions (mt CO <sub>2</sub> )	Blowdown Vent CH <sub>4</sub> emissions (mt CO <sub>2</sub> e)	(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))	<ul style="list-style-type: none"> <li>Annual throughput using an engineering calculation based on best available data (MMscf)(98.236(c)(13)(i)(C))</li> <li>Seal Type (wet or dry)</li> <li>Measured <b>OR</b> Not Measured blowdown vent CO<sub>2</sub> emissions in metric tons CO<sub>2</sub> (98.236(c)(13)(ii)(C))</li> <li>Measured <b>OR</b> Not Measured blowdown vent CH<sub>4</sub> emissions in metric tons CO<sub>2</sub>e (98.236(c)(13)(ii)(C))</li> </ul>
For Centrifugal Compressors with WET or DRY Seals																	
Measured		Not Measured															
Blowdown Vent CO <sub>2</sub> emissions (mt CO <sub>2</sub> )	Blowdown Vent CH <sub>4</sub> emissions (mt CO <sub>2</sub> e)	Blowdown Vent CO <sub>2</sub> emissions (mt CO <sub>2</sub> )	Blowdown Vent CH <sub>4</sub> emissions (mt CO <sub>2</sub> e)														
(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))	(98.236(c)(13)(ii)(C))														

**Not Operating, Depressurized Mode with Wet or Dry Seals**

For Centrifugal Compressors in NOT OPERATING, DEPRESSURIZED MODE			
For Centrifugal Compressors with WET or DRY SEALS			
Measured		Not Measured	
Isolation valve leakage CO <sub>2</sub> emissions (mt CO <sub>2</sub> )	Isolation valve leakage CH <sub>4</sub> emissions (mt CO <sub>2</sub> e)	Isolation valve leakage CO <sub>2</sub> emissions (mt CO <sub>2</sub> )	Isolation valve leakage CH <sub>4</sub> emissions (mt CO <sub>2</sub> e)
EM236C13A1	EM236C13A2	EM236C13B1	EM236C13B2

- Measured **OR** Not Measured isolation valve leakage CO<sub>2</sub> emissions in metric tons CO<sub>2</sub> (98.236(c)(13)(ii)(C))
- Measured **OR** Not Measured isolation valve leakage CH<sub>4</sub> emissions in metric tons CO<sub>2</sub>e (98.236(c)(13)(ii)(C))

**For Centrifugal Compressors Venting Emissions to FLARES**

For Centrifugal Compressors Venting Emissions to FLARES			
Does this compressor vent to a flare?	Total annual CO <sub>2</sub> emissions from flaring for all modes of operation combined (mt CO <sub>2</sub> )	Total annual CH <sub>4</sub> emissions from flaring for all modes of operation combined (mt CO <sub>2</sub> e)	Total annual N <sub>2</sub> O emissions from flaring for all modes of operation combined (mt CO <sub>2</sub> e)
EM236C13C1	EM236C13C2	EM236C13C3	EM236C13C4

- Did this compressor vent emissions to a flare? (98.236(c))
- Total annual CO<sub>2</sub> emissions from flaring for all modes of operation combined (mt CO<sub>2</sub>) (98.236(c))
- Total annual CH<sub>4</sub> emissions from flaring for all modes of operation combined (mt CO<sub>2</sub>e) (98.236(c))
- Total annual N<sub>2</sub>O emissions from flaring for all modes of operation combined (mt CO<sub>2</sub>e) (98.236(c))

**Total Emissions**

The total emissions roll-up reflects the sum of the CO<sub>2</sub> equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

**Reciprocating Compressors**

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W reciprocating compressors source category e-GGRT reporting requirements.

The reciprocating compressors source category is applicable to Onshore Petroleum and Natural Gas Production, Onshore Natural Gas Processing, Onshore Natural Gas Transmission Compression, Underground Natural Gas Storage, Liquefied Natural Gas (LNG) Storage, and LNG Import and Export Equipment.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Does the facility have any reciprocating compressors subject to reporting under 98.232?

Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

**Reciprocating Compressor Reporting (Onshore Petroleum and Natural Gas Production)**

The reporting requirements for Onshore Petroleum and Natural Gas Production differ from the rest of the industry segments for this source type. For Onshore Petroleum and Natural Gas Production, only the following two emission values are required to be reported:

- The total annual CO<sub>2</sub> emissions from all compressors combined, in metric tons CO<sub>2</sub> [98.236(c)(14)(v)(B)]
- The total annual CH<sub>4</sub> emissions from all compressors combined, in metric tons CO<sub>2</sub>e [98.236(c)(14)(v)(B)]

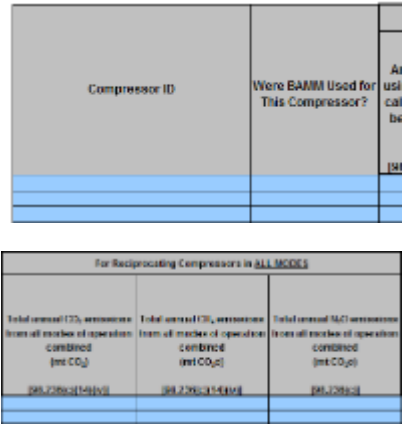

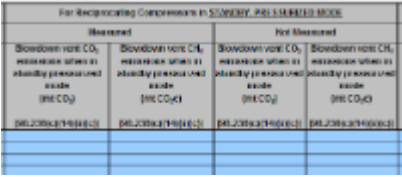
**Reciprocating Compressor Reporting (Onshore Natural Gas Processing, Onshore Natural Gas Transmission Compression, Underground Natural Gas Storage, Liquefied Natural Gas (LNG) Storage, and LNG Import and Export Equipment)**

All applicable industry segments other than Onshore Petroleum and Natural Gas Production must report emissions individually for each reciprocating compressor.

For each compressor, emissions will be reported by mode of operation. Three modes of operation that require emission monitoring are the *operating mode*, *standby*, *pressurized mode*, and the *not operating, depressurized mode*. Emissions from each mode of operation must be reported if the compressor was ever in that mode at anytime during the year.

For each emission source, there are separate reporting fields for if the emission source was measured during the year or if the emission source was not measured and a default emission factor was applied. If one or more sources for a compressor were measured during the year, the emissions should be filled in for the respective *measured* fields. For any sources that emissions were not directly measured, the *not measured* field should be reported in place of the *measured* fields. If Bamm was used and no emission sources were measured, the compressor specific Bamm field should be reported as “yes”, and only the *not measured* emission fields should be reported. If Bamm was not used in place of direct measurement of at least one mode, then “no” should be entered for the Bamm field. In no occurrence should the *measured* and *not measured* fields both be populated for a given compressor and source type.

The exact reporting requirements are described below:

<p><b>Operating Mode</b> (required if compressor was ever in that operating mode at any time during the year)</p>	<p><b>Required Data Elements</b></p>
<p><b>All Compressors</b></p> 	<ul style="list-style-type: none"> <li>Compressor ID</li> <li>Were Bamm Used for This Compressor? (Yes or No)</li> <li>Total annual CO<sub>2</sub> emissions from all modes of operation combined in metric tons CO<sub>2</sub> (98.236(c)(14)(iv))</li> <li>Total annual CH<sub>4</sub> emissions from all modes of operation combined in metric tons CO<sub>2</sub>e (98.236(c)(14)(iv))</li> <li>Total annual N<sub>2</sub>O emissions from all modes of operation combined (mt CO<sub>2</sub>e) (98.236(c))</li> </ul>
<p><b>Operating Mode</b></p> 	<ul style="list-style-type: none"> <li>Annual throughput using an engineering calculation based on best available data (98.236(c)(14)(i)(A))</li> <li>Were blowdown vents manifolded to rod packing vents for this compressor? (98.236(c)(14)(ii))</li> <li>Measured <b>OR</b> Not Measured Rod packing CO<sub>2</sub>emissions when in operating mode (98.236(c)(14)(i)(C))</li> <li>Measured <b>OR</b> Not Measured Rod packing CH<sub>4</sub>emissions when in operating mode (98.236(c)(14)(i)(C))</li> <li>Measured <b>OR</b> Not Measured Blowdown vent CO<sub>2</sub>emissions when in operating mode (98.236(c)(14)(ii)(c))</li> <li>Measured <b>OR</b> Not Measured Blowdown vent CH<sub>4</sub>emissions when in operating mode (98.236(c)(14)(ii)(c))</li> </ul>
<p><b>Standby, Pressurized Mode</b></p> 	<ul style="list-style-type: none"> <li>Measured <b>OR</b> Not Measured Blowdown vent CO<sub>2</sub>emissions when in standby pressurized mode (98.236(c)(14)(ii)(c))</li> <li>Measured <b>OR</b> Not Measured Blowdown vent CH<sub>4</sub>emissions when in standby pressurized mode (98.236(c)(14)(ii)(c))</li> </ul>

**Not Operating, Depressurized Mode**

For Reciprocating Compressors Venting Emissions to FLARES			
Measured		Not Measured	
Isolation valve leakage CO <sub>2</sub> emissions in not operating, depressurized mode (mt CO <sub>2</sub> )	Isolation valve leakage CH <sub>4</sub> emissions in not operating, depressurized mode (mt CO <sub>2</sub> e)	Isolation valve leakage CO <sub>2</sub> emissions in not operating, depressurized mode (mt CO <sub>2</sub> )	Isolation valve leakage CH <sub>4</sub> emissions in not operating, depressurized mode (mt CO <sub>2</sub> e)
[98.236(c)(14)(iii)(C)]	[98.236(c)(14)(iii)(C)]	[98.236(c)(14)(iii)(C)]	[98.236(c)(14)(iii)(C)]

- Measured **OR** Not Measured isolation valve leakage CO<sub>2</sub> emissions in not operating, depressurized mode (98.236(c)(14)(iii)(C))
- Measured **OR** Not Measured isolation valve leakage CH<sub>4</sub> emissions in not operating, depressurized mode (98.236(c)(14)(iii)(C))

**For Reciprocating Compressors Venting Emissions to FLARES**

For Reciprocating Compressors Venting Emissions to FLARES			
Total annual CO <sub>2</sub> emissions from flaring for all modes of operation combined (mt CO <sub>2</sub> )	Total annual CH <sub>4</sub> emissions from flaring for all modes of operation combined (mt CO <sub>2</sub> e)	Total annual N <sub>2</sub> O emissions from flaring for all modes of operation combined (mt CO <sub>2</sub> e)	Total annual H <sub>2</sub> O emissions from flaring for all modes of operation combined (mt CO <sub>2</sub> e)
[98.236(c)]	[98.236(c)]	[98.236(c)]	[98.236(c)]

- Did this compressor vent emissions to a flare? (98.236(c))
- Total annual CO<sub>2</sub> emissions from flaring for all modes of operation combined (mt CO<sub>2</sub>) (98.236(c))
- Total annual CH<sub>4</sub> emissions from flaring for all modes of operation combined (mt CO<sub>2</sub>e) (98.236(c))
- Total annual N<sub>2</sub>O emissions from flaring for all modes of operation combined (mt CO<sub>2</sub>e) (98.236(c))

**Total Emissions**

The total emissions roll-up reflects the sum of the CO2 equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

**Other Emissions from Equipment Leaks Estimated Using Emission Factors**

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W other emissions from equipment leaks estimated using emission factors source category e-GGRT reporting requirements.

The other emissions from equipment leaks estimated using emission factors source category is applicable to Onshore Petroleum and Natural Gas Production, Onshore Natural Gas Processing, Onshore Natural Gas Transmission Compression, Underground Natural Gas Storage, Liquefied Natural Gas (LNG) Storage, LNG Import and Export Equipment, and Natural Gas Distribution.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Does the facility have any equipment leaks subject to reporting under 98.232?

Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

**Reporting Requirements**

For each component type that uses emission factors for estimating emissions for equipment leaks found in each leak survey, the facility must report:

- Component Type (98.236(c)(15))



- 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
- Storage Station, Gas Service - Valve
- Storage Station, Gas Service - Connector
- Storage Station, Gas Service - Open-Ended Line
- Storage Station, Gas Service - Pressure Relief Valve
- Storage Station, Gas Service - Meter
- LNG Storage, LNG Service - Valve
- LNG Storage, LNG Service - Pump Seal
- LNG Storage, LNG Service - Connector
- LNG Storage, LNG Service - Other
- LNG Storage, LNG Terminal - Valve
- LNG Storage, LNG Terminal - Pump Seal
- LNG Storage, LNG Terminal - Connector
- LNG Storage, LNG Terminal - Other
- LDC, T-D Stations - Connector
- LDC, T-D Stations - Block Valve
- LDC, T-D Stations - Control Valve
- LDC, T-D Stations - Pressure Relief Valve
- LDC, T-D Stations - Orifice Meter
- LDC, T-D Stations - Regulator
- LDC, T-D Stations - Open-ended Line
- Date of first complete survey (98.236(c)(15)(i)(A))
- Total count of leaks in the first survey (98.236(c)(15)(i)(A))
- Dates of further complete surveys (98.236(c)(15)(i)(A))
- Total count of leaks in further surveys (98.236(c)(15)(i)(A))
- For Onshore Natural Gas Processing facilities only
  - Minimum concentration of CO2 (98.236(c)(15)(i)(B)) - this is a volumetric concentration expressed as a fraction.
  - Maximum concentration of CO2 (98.236(c)(15)(i)(B)) - this is a volumetric concentration expressed as a fraction.
  - Minimum concentration of CH4 (98.236(c)(15)(i)(B)) - this is a volumetric concentration expressed as a fraction.
  - Maximum concentration of CH4 (98.236(c)(15)(i)(B)) - this is a volumetric concentration expressed as a fraction.
  - If only one concentration observation is available it is acceptable to use that concentration as both the minimum and maximum.
- Annual CO2 emissions (98.236(c)(15)(i)(C))
- Annual CH4 emissions (98.236(c)(15)(i)(C))

Complete the following table for each component type that uses emission factors for estimating emissions for equipment leaks found in each leak survey:										Complete ONLY for Onshore Natural Gas Processing				DO NOT complete these columns if you selected Natural Gas Distribution as your industry segment. LDCs should report emissions on tab 16 - Local Distribution Companies.	
Component Type (Select from list) (98.236(c)(15))	Date of first complete survey (98.236(c)(15)(i)(A))	Total count of leaks found in the first survey (98.236(c)(15)(i)(A))	Date of second complete survey (if applicable) (98.236(c)(15)(i)(A))	Total count of leaks found in the second survey (if applicable) (98.236(c)(15)(i)(A))	Date of third complete survey (if applicable) (98.236(c)(15)(i)(A))	Total count of leaks found in the third survey (if applicable) (98.236(c)(15)(i)(A))	Date of fourth complete survey (if applicable) (98.236(c)(15)(i)(A))	Total count of leaks found in the fourth survey (if applicable) (98.236(c)(15)(i)(A))	Range of Concentrations of CO <sub>2</sub> (volumetric fraction)		Range of Concentrations of CH <sub>4</sub> (volumetric fraction)		CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) (98.236(c)(15)(i)(C))	CH <sub>4</sub> Emissions (mt CH <sub>4</sub> ) (98.236(c)(15)(i)(C))	
									Minimum concentration of CO <sub>2</sub> (volumetric fraction) (98.236(c)(15)(i)(B))	Maximum concentration of CO <sub>2</sub> (volumetric fraction) (98.236(c)(15)(i)(B))	Minimum concentration of CH <sub>4</sub> (volumetric fraction) (98.236(c)(15)(i)(B))	Maximum concentration of CH <sub>4</sub> (volumetric fraction) (98.236(c)(15)(i)(B))			
Compressor Components, Gas Service - Pressure Relief Valve	01/15/2011	0											0.0	0.0	

**For each component type that uses emission factors for estimating emissions for equipment leaks calculated using population counts and factors, the facility must report (This table does not apply to Natural Gas Distribution facilities):**

- Component Type (98.236(c)(15))
  - Storage wellheads, Gas Service - Connector
  - Storage wellheads, Gas Service - Valve
  - Storage wellheads, Gas Service - Pressure Relief Valve
  - Storage wellheads, Gas Service - Open Ended Line
  - LNG Compressor - Vapor Recovery Compressor
  - Onshore, gas service - valve
  - Onshore, gas service - connector
  - Onshore, gas service - open-ended line
  - Onshore, gas service - pressure relief valve
  - Onshore, light crude service - valve
  - Onshore, light crude service - flange
  - Onshore, light crude service - connector
  - Onshore, light crude service - open-ended line
  - Onshore, light crude service - pump
  - Onshore, light crude service - other
  - Onshore, heavy crude service - valve
  - Onshore, heavy crude service - flange
  - Onshore, heavy crude service - connector
  - Onshore, heavy crude service - open-ended line
  - Onshore, heavy crude service - other
- Annual CO2 Emissions (98.236(c)(15)(ii)(C))

- Annual CH4 Emissions (98.236(c)(15)(ii)(C))

Complete the following table for each component type (major equipment type for onshore production) that uses emission factors for estimating emissions for equipment leaks calculated using population counts and factors:

Component Type (Select from list) [98.236(c)(15)]	CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) [98.236(c)(15)(ii)(C)]	CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e) [98.236(c)(15)(ii)(C)]
Onshore_gas service - valve		

### Total Emissions

The total emissions roll-up reflects the sum of the CO<sub>2</sub> equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Local Distribution Companies

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W local distribution companies source category e-GGRT reporting requirements.

The local distribution companies source category is applicable to Natural Gas Distribution.

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Reporting Requirements

**Note:** If you do not have any metering-regulating stations or transmission-distribution stations enter zero, do not leave blank.

**The facility is required to report:**

- Total number of above grade T--D transfer stations in the facility (98.236(c)(16)(i))
- Number of years over which all T--D transfer stations will be monitored at least once (98.236(c)(16)(ii))
- Number of T--D stations monitored in calendar year (98.236(c)(16)(iii))
- Total number of below grade T--D transfer stations in the facility (98.236(c)(16)(iv))
- Total number of above grade metering-regulating stations (this count will include above grade T--D transfer stations) in the facility (98.236(c)(16)(v))
- Total number of below grade metering-regulating stations (this count will include below grade T--D transfer stations) in the facility (98.236(c)(16)(vi))
- Annual CO<sub>2</sub> emissions from all above grade T--D transfer stations combined (98.236(c)(16)(xvii))
- Annual CH<sub>4</sub> emissions from all above grade T--D transfer stations combined (98.236(c)(16)(xvii))
- Annual CO<sub>2</sub> emissions from all below grade T--D transfer stations combined (98.236(c)(16)(xviii))
- Annual CH<sub>4</sub> emissions from all below grade T--D transfer stations combined (98.236(c)(16)(xviii))
- Annual CO<sub>2</sub> emissions from all above grade metering-regulating stations (including T--D transfer stations) combined (98.236(c)(16)(xix))
- Annual CH<sub>4</sub> emissions from all above grade metering-regulating stations (including T--D transfer stations) combined (98.236(c)(16)(xix))
- Annual CO<sub>2</sub> emissions from all below grade metering-regulating stations (including T--D transfer stations) combined (98.236(c)(16)(xx))
- Annual CH<sub>4</sub> emissions from all below grade metering-regulating stations (including T--D transfer stations) combined (98.236(c)(16)(xx))
- Annual CO<sub>2</sub> emissions from all distribution mains combined (98.236(c)(16)(xxi))
- Annual CH<sub>4</sub> emissions from all distribution mains combined (98.236(c)(16)(xxi))
- Annual CO<sub>2</sub> emissions from all distribution services combined (98.236(c)(16)(xxii))
- Annual CH<sub>4</sub> emissions from all distribution services combined (98.236(c)(16)(xxii))



The emissions under 98.236(c)(xvii) and (xviii), above and below grade T-D stations are also reported under 98.236(c)(16)(xix) and (XX), above and below grade metering-regulating stations. To prevent double counting of these emissions the reporting system does not include T-D transfer stations in the source total. This has caused confusion but this specifically required under 98.236(c)(16)(xix).



Complete the following table for the facility:

Total number of above grade T-D transfer stations [98.236(c)(16)(i)]	
Number of years over which all T-D transfer stations will be monitored at least once [98.236(c)(16)(ii)]	
Number of T-D stations monitored in calendar year [98.236(c)(16)(iii)]	4
Total number of below grade T-D transfer stations [98.236(c)(16)(iv)]	3
Total number of above grade metering-regulating stations (this count will include above grade T-D transfer stations) [98.236(c)(16)(v)]	2
Total number of below grade metering-regulating stations (this count will include below grade T-D transfer stations) [98.236(c)(16)(vi)]	1
Annual CO <sub>2</sub> emissions from all above grade T-D transfer stations combined (mt CO <sub>2</sub> ) [98.236(c)(16)(xvii)]	45.0
Annual CH <sub>4</sub> emissions from all above grade T-D transfer stations combined (mt CO <sub>2</sub> e) [98.236(c)(16)(xvii)]	56.0
Annual CO <sub>2</sub> emissions from all below grade T-D transfer stations combined (mt CO <sub>2</sub> ) [98.236(c)(16)(xviii)]	67.0
Annual CH <sub>4</sub> emissions from all below grade T-D transfer stations combined (mt CO <sub>2</sub> e) [98.236(c)(16)(xviii)]	13.0
Annual CO <sub>2</sub> emissions from all above grade metering-regulating stations (including T-D transfer stations) combined (mt CO <sub>2</sub> ) [98.236(c)(16)(xix)]	33.0
Annual CH <sub>4</sub> emissions from all above grade metering-regulating stations (including T-D transfer stations) combined (mt CO <sub>2</sub> e) [98.236(c)(16)(xix)]	22.0
Annual CO <sub>2</sub> emissions from all below grade metering-regulating stations (including T-D transfer stations) combined (mt CO <sub>2</sub> ) [98.236(c)(16)(xx)]	6.7
Annual CH <sub>4</sub> emissions from all below grade metering-regulating stations (including T-D transfer stations) combined (mt CO <sub>2</sub> e) [98.236(c)(16)(xx)]	23.0
Annual CO <sub>2</sub> emissions from all distribution mains combined (mt CO <sub>2</sub> ) [98.236(c)(16)(xxi)]	13.0
Annual CH <sub>4</sub> emissions from all distribution mains combined (mt CO <sub>2</sub> e) [98.236(c)(16)(xxi)]	15.0
Annual CO <sub>2</sub> emissions from all distribution services combined (mt CO <sub>2</sub> ) [98.236(c)(16)(xxii)]	16.0

Annual CH <sub>4</sub> emissions from all distribution services combined (mt CO <sub>2</sub> e) [98.236(c)(16)(xxii)]	167.0
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**The facility can optionally report:**

**Note:** Reporting of these data elements is optional. EPA has deferred the deadline for reporting these data elements until March 31, 2015 (see 76 FR 53057, published Aug. 25, 2011). You may wait until the 2015 deadline to report these data, or you may voluntarily report these data elements this year. These data elements may be subject to public availability once reported to EPA.

- Leak factor for meter/regulator run developed in Equation W-32 of 98.233 (98.236(c)(16)(viii))
- Number of miles of unprotected steel distribution mains (98.236(c)(16)(ix))
- Number of miles of protected steel distribution mains (98.236(c)(16)(x))
- Number of miles of plastic distribution mains (98.236(c)(16)(xi))
- Number of miles of cast iron distribution mains (98.236(c)(16)(xii))
- Number of unprotected steel distribution services (98.236(c)(16)(xiii))
- Number of protected steel distribution services (98.236(c)(16)(xiv))
- Number of plastic distribution services (98.236(c)(16)(xv))
- Number of copper distribution services (98.236(c)(16)(xvi))

<b>Reporting of the following data elements is <u>OPTIONAL</u></b>	
<b>NOTE:</b> EPA has deferred the deadline for reporting these data elements until March 31, 2015 You may wait until the 2015 deadline to report these data, or you may voluntarily report these data elements this year. These data elements may be subject to public availability once reported to EPA. Refer to the following page on the EPA website for more information: <a href="http://www.epa.gov/climatechange/emissions/CBI.html">http://www.epa.gov/climatechange/emissions/CBI.html</a> .	
Leak factor for meter/regulator run developed in Equation W-32 of 98.233 [98.236(c)(16)(viii)] (NOTE: Report the leak factor for CH <sub>4</sub> ONLY)	
Number of miles of unprotected steel distribution mains [98.236(c)(16)(ix)]	
Number of miles of protected steel distribution mains [98.236(c)(16)(x)]	
Number of miles of plastic distribution mains [98.236(c)(16)(xi)]	
Number of miles of cast iron distribution mains [98.236(c)(16)(xii)]	
Number of unprotected steel distribution services [98.236(c)(16)(xiii)]	
Number of protected steel distribution services [98.236(c)(16)(xiv)]	
Number of plastic distribution services [98.236(c)(16)(xv)]	
Number of copper distribution services [98.236(c)(16)(xvi)]	

**Total Emissions**

The total emissions roll-up reflects the sum of the CO2 equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

**Enhanced Oil Recovery Injection Pump Blowdown**

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W enhanced oil recovery injection pump blowdown source category e-GGRT reporting requirements.

The other emissions from enhanced oil recovery injection pump blowdown source category is applicable to Onshore Petroleum and Natural Gas Production.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Does the Facility have enhanced oil recovery injection pump blowdown subject to reporting under 98.232?

 Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

**Reporting Requirements**

**For each EOR Injection Pump, the facility must report:**

- Pump capacity (98.236(c)(17)(i))
- Annual CO2 emissions (98.236(c)(17)(v))

**The facility may optionally report:**

- Unique name or ID number for EOR injection pump

**Complete the following table for each EOR Injection Pump:**

Unique ID	Unique Name or ID Number for EOR Injection Pump (Optional)	Pump capacity (barrels per day) [98.236(c)(17)(i)]	CO <sub>2</sub> emissions (mt CO <sub>2</sub> ) [98.236(c)(17)(v)]
001	1.0	50.0	5,000.0
002		51.0	5,232.0

**Total Emissions**

The total emissions roll-up reflects the sum of the CO2 equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Enhanced Oil Recovery Hydrocarbon Liquids Dissolved CO<sub>2</sub>

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W enhanced oil recovery hydrocarbon liquids dissolved CO<sub>2</sub> source category e-GGRT reporting requirements.

The enhanced oil recovery hydrocarbon liquids dissolved CO<sub>2</sub> source category is applicable to Onshore Petroleum and Natural Gas Production, Onshore Natural Gas Processing.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Does the Facility have enhanced oil recovery hydrocarbon liquids dissolved CO<sub>2</sub> subject to reporting under 98.232?

Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Reporting Requirements

For each sub-basin, the facility must report:

- Sub-basin ID - the pick list for this data element is populated based on the Sub-Basin Selection Tab. Be sure a valid Sub-basin ID is used.
- Annual CO<sub>2</sub> emissions (98.236(c)(18)(iii))

Complete the following table for each sub-basin:

Sub-Basin ID	CO <sub>2</sub> emissions (mt CO <sub>2</sub> ) [98.236(c)(18)(iii)]
360 - BACA, CO (9) - High permeabili	300.0
360 - BECKHAM, OK (9) - Oil	300.0
360 - CADD0, OK (15) - Coal seam	300.0

### Total Emissions

The total emissions roll-up reflects the sum of the CO<sub>2</sub> equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Onshore Petroleum and Natural Gas Production and Natural Gas Distribution Combustion Emissions

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W onshore petroleum and natural gas production and natural gas distribution combustion emissions source category e-GGRT reporting requirements.

The onshore petroleum and natural gas production and natural gas distribution combustion emissions source category is applicable to Onshore Petroleum and Natural Gas Production and Natural Gas Distribution.

Please refer to [FAQ 667](#) for further information on the applicability of combustion emissions at Subpart W facilities.

**Indicate if the facility has the source type via the radio buttons.**

- If the source type is present you must report required emissions.

Does the Facility have combustion emissions subject to reporting under 98.232(c)(22)?

Yes  No

**If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.**

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

### Reporting Requirements

For each external fuel combustion unit, by type, with a heat capacity equal to or less than 5 mmBtu/hr, the facility is required to report:

- Type of Unit (98.236(c)(19)(i))
  - Well drilling and completion equipment
  - Workover equipment
  - Natural gas dehydrators
  - Steam Boilers
  - Process heaters
- Number of Units (98.236(c)(19)(i))

Complete the following table for each external fuel combustion unit, by type, with a heat capacity equal to or less than 5 mmBtu/hr:

Type of Unit [98.236(c)(19)(i)]	Number of Units [98.236(c)(19)(i)]

For each external fuel combustion unit, by type, with a heat capacity greater than 5 mmBtu/hr, the facility must report:

- Type of Unit (98.236(c)(19)(ii))
  - Well drilling and completion equipment
  - Workover equipment
  - Natural gas dehydrators
  - Steam boilers
  - Process heaters
- Number of Units (98.236(c)(19)(ii))
- Annual CO<sub>2</sub> emissions (98.236(c)(19)(iii))
- Annual CH<sub>4</sub> emissions (98.236(c)(19)(iii))
- Annual N<sub>2</sub>O emissions (98.236(c)(19)(iii))



Complete the following table for each external fuel combustion unit, by type, with a heat capacity greater than 5 mmBtu/hr:

Type of Unit [98.236(c)(19)(ii)]	Number of Units [98.236(c)(19)(ii)]	CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) [98.236(c)(19)(iii)]	CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e) [98.236(c)(19)(iii)]	N <sub>2</sub> O Emissions (mt CO <sub>2</sub> e) [98.236(c)(19)(iii)]

For each internal fuel combustion unit, by type, with a heat capacity equal to or less than 1 mmBtu/hr or 130 horsepower, the facility must report:

- Type of Unit (98.236(c)(19)(v))
  - Well drilling and completion equipment
  - Workover equipment
  - Natural gas compressors
  - Electrical generators
- Number of Units (98.236(c)(19)(v))

Complete the following table for each internal fuel combustion unit, by type, with a heat capacity equal to or less than 1 mmBtu/hr or 130 horsepower:

Type of Unit [98.236(c)(19)(v)]	Number of Units [98.236(c)(19)(v)]

For each internal fuel combustion unit, by type, with a heat capacity greater than 1 mmBtu/hr, the facility must report:

- Type of Unit (98.236(c)(19)(vi))
  - Well drilling and completion equipment
  - Workover equipment
  - Natural gas compressors
  - Electrical generators
- Annual CO<sub>2</sub> emissions (98.236(c)(19)(vi))
- Annual CH<sub>4</sub> emissions (98.236(c)(19)(vi))
- Annual N<sub>2</sub>O emissions (98.236(c)(19)(vi))

Complete the following table for each internal fuel combustion unit, by type, with a heat capacity greater than 1 mmBtu/hr:

Type of Unit [98.236(c)(19)(vi)]	CO <sub>2</sub> Emissions (mt CO <sub>2</sub> ) [98.236(c)(19)(vi)]	CH <sub>4</sub> Emissions (mt CO <sub>2</sub> e) [98.236(c)(19)(vi)]	N <sub>2</sub> O Emissions (mt CO <sub>2</sub> e) [98.236(c)(19)(vi)]

**Total Emissions**

The total emissions roll-up reflects the sum of the CO<sub>2</sub> equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

# Offshore Sources

Please see [Reporting Form Instructions](#) instructions on downloading the blank reporting form and uploading the completed reporting form. You may also refer to [Optional Calculation Spreadsheet Instructions](#) to download the Subpart W calculation spreadsheet.

This page provides an overview of the Subpart W offshore petroleum and natural gas production facilities source category e-GGRT reporting requirements.

The offshore petroleum and natural gas production source category is applicable to Offshore Petroleum and Natural Gas Production.

***If the facility has the source type, the Best Available Monitoring Methods and Missing Data table must be completed.***

- For further information, see [Best Available Monitoring Methods and Missing Data Reporting](#).

## ***Segment Definition***

Offshore petroleum and natural gas production is defined as any platform structure, affixed temporarily or permanently to offshore submerged lands, that houses equipment to extract hydrocarbons from the ocean or lake floor and that processes and/or transfers such hydrocarbons to storage, transport vessels, or onshore. In addition, offshore production includes secondary platform structures connected to the platform structure via walkways, storage tanks associated with the platform structure and floating production and storage offloading equipment (FPSO). This industry segment does not include reporting of emissions from offshore drilling and exploration that is not conducted on production platforms. The industry segment consists of both platforms that are under the jurisdiction of the U. S. Department of Interior, Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) and those that are not.

## ***Reporting Instructions***

**Note:** BOEMRE was recently replaced by the Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE).

- 98.232(s)(1) *Offshore production facilities under BOEMRE jurisdiction* shall report the same annual emissions as calculated and reported by BOEMRE in data collection and emissions estimation study published by BOEMRE referenced in 30 CFR 250.302 through 304 (GOADS).
  - For any calendar year that does not overlap with the most recent BOEMRE emissions study publication year, report the most recent BOEMRE reported emissions data published by BOEMRE referenced in 30 CFR 250.302 through 304 (GOADS). Adjust emissions based on the operating time for the facility relative to the operating time in the most recent BOEMRE published study.
- 98.232(s)(2) *Offshore production facilities that are not under BOEMRE jurisdiction* shall use monitoring methods and calculation methodologies published by BOEMRE referenced in 30 CFR 250.302 through 304 to calculate and report emissions (GOADS).
  - For any calendar year that does not overlap with the most recent BOEMRE emissions study publication, report the most recent reported emissions data with emissions adjusted based on the operating time for the facility relative to operating time in the previous reporting period.

## ***Determining if you are a GOADS or NON-GOADS reporter***

GOADS reporters are those sources located in the western Gulf of Mexico Outer Continental Shelf (i.e., west of 87° 30' West longitude). Non-GOADS reporters include all other offshore platforms, including sources located in State waters or areas outside of the Gulf of Mexico.

## ***Reporting Requirements***

**For all equipment leaks, vented emission, and flare emission source types present, the facility must report:**

- CO<sub>2</sub> emissions (98.236(b))
- CH<sub>4</sub> emissions (98.236(b))
- N<sub>2</sub>O emissions (98.236(b))

Emission Source	mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions for Source (mt CO <sub>2</sub> e)
[98.236(b)]	[98.236(b)]	[98.236(b)]	[98.236(b)]	
Amine Unit				0.0
Combustion Flares - Light Smoke - No Pilot Fuel-flaring				0.0
Combustion Flares - Light Smoke - Pilot Fuel - pilot				0.0
Combustion Flares - Light Smoke - Pilot Fuel-flaring				0.0
Combustion Flares - Medium Smoke - No Pilot Fuel - flaring				0.0
Combustion Flares - Medium Smoke - Pilot Fuel - flaring				0.0
Combustion Flares - Medium Smoke - Pilot Fuel - pilot				0.0
Combustion Flares - No Smoke - No Pilot Fuel - flaring				0.0
Combustion Flares - No Smoke - Pilot Fuel - flaring				0.0
Combustion Flares - No Smoke - Pilot Fuel - pilot				0.0
Fugitives - Compressor centrifugal dry - gas				0.0
Fugitives - Compressor centrifugal dry - NG liq				0.0
Fugitives - Compressor centrifugal dry - heavy oil				0.0
Fugitives - Compressor centrifugal dry - light oil				0.0
Fugitives - Compressor centrifugal dry - oil/water				0.0
Fugitives - Compressor centrifugal dry - oil/water/gas				0.0
Fugitives - Compressor centrifugal wet - gas				0.0
Fugitives - Compressor centrifugal wet - NG liq				0.0
Fugitives - Compressor centrifugal wet - heavy oil				0.0
Fugitives - Compressor centrifugal wet - light oil				0.0
Fugitives - Compressor centrifugal wet - oil/water				0.0
Fugitives - Compressor centrifugal wet - oil/water/gas				0.0
Fugitives - Compressor reciprocating - gas				0.0
Fugitives - Compressor reciprocating - NG liq				0.0
Fugitives - Compressor reciprocating - heavy oil				0.0
Fugitives - Compressor reciprocating - light oil				0.0
Fugitives - Compressor reciprocating - oil/water				0.0
Fugitives - Compressor reciprocating - oil/water/gas				0.0
Fugitives - Connectors - gas				0.0
Fugitives - Connectors - NG liq				0.0
Fugitives - Connectors - heavy oil				0.0
Fugitives - Connectors - light oil				0.0
Fugitives - Connectors - oil/water				0.0
Fugitives - Connectors - oil/water/gas				0.0
Fugitives - Flanges - gas				0.0
Fugitives - Flanges - NG liq				0.0
Fugitives - Flanges - heavy oil				0.0
Fugitives - Flanges - light oil				0.0
Fugitives - Flanges - oil/water				0.0
Fugitives - Flanges - oil/water/gas				0.0
Fugitives - Open-Ended Lines - gas				0.0
Fugitives - Open-Ended Lines - NG liq				0.0
Fugitives - Open-Ended Lines - heavy oil				0.0
Fugitives - Open-Ended Lines - light oil				0.0
Fugitives - Open-Ended Lines - oil/water				0.0
Fugitives - Open-Ended Lines - oil/water/gas				0.0
Fugitives - Other Equipment - gas				0.0
Fugitives - Other Equipment - NG liq				0.0
Fugitives - Other Equipment - heavy oil				0.0
Fugitives - Other Equipment - light oil				0.0
Fugitives - Other Equipment - oil/water				0.0
Fugitives - Other Equipment - oil/water/gas				0.0
Fugitives - Pumps - gas				0.0
Fugitives - Pumps - NG liq				0.0
Fugitives - Pumps - heavy oil				0.0
Fugitives - Pumps - light oil				0.0
Fugitives - Pumps - oil/water				0.0
Fugitives - Pumps - oil/water/gas				0.0
Fugitives - Valves - gas				0.0
Fugitives - Valves - NG liq				0.0
Fugitives - Valves - heavy oil				0.0
Fugitives - Valves - light oil				0.0
Fugitives - Valves - oil/water				0.0
Fugitives - Valves - oil/water/gas				0.0
Glycol Dehydrator Unit				0.0
Losses from Flashing				0.0
Mud Degassing - oil-based muds				0.0
Mud Degassing - water-based muds				0.0
Mud Degassing - synthetic-based muds				0.0
Pneumatic Pump				0.0
Pressure/Level Controllers				0.0
Storage Tank Operations - crude oil				0.0
Storage Tank Operations - condensate				0.0
Cold Vent				0.0

**Total Emissions**

The total emissions roll-up reflects the sum of the CO2 equivalents of each required gas emission for the source type. These summations are reflected and aggregated on the Introduction tab.

Total Emissions for Source [98.236]			
mt CO <sub>2</sub>	mt CH <sub>4</sub> (mt CO <sub>2</sub> e)	mt N <sub>2</sub> O (mt CO <sub>2</sub> e)	Total Emissions (mt CO <sub>2</sub> e)
1,250	1,250	10	2,510

## Subpart W Bamm Request Instructions

Owners or operators may request the use of best available monitoring methods for any parameter that cannot reasonably be measured according to the monitoring and QA/QC requirements of Subpart W. The owner or operator must use the calculation methodologies and equations in the "98.233 Calculating GHG Emissions", but may request the use of the best available monitoring method for any parameter for which it is not reasonably feasible to acquire, install, and operate a required piece of monitoring equipment. Best available monitoring methods means any of the following methods including: Monitoring methods currently used by the facility that do not meet the specifications of the relevant portion of Subpart W, supplier data, engineering calculations, or other company records.

**i** Subpart W Reports for RY 2012 are due to be submitted to EPA on or before April 1, 2013. Annual reports must be submitted by March of the following year for all years beyond 2012 unless that day falls on a weekend or a federal holiday, in which case the due date will be the next business day.

To use Bamm beyond December 31, 2013, facilities must submit a Bamm request consistent with 40 CFR 98.234(f)(8)(ii) by June 30 of the year prior to the reporting year for which Bamm is being sought.

This page provides step-by-step instructions on how to enter and edit Subpart W Bamm Request Submissions including:

- Create a Bamm Request Submission
- Add Industry Segments and Source Types
- Upload Supporting Documentation
- Submit and Certify a Bamm Submission

Instructions on the use of these e-GGRT features follows:

### Step 1: Add a Bamm Request Submission

To add a Bamm submission, click the link titled "ADD a Bamm Submission."

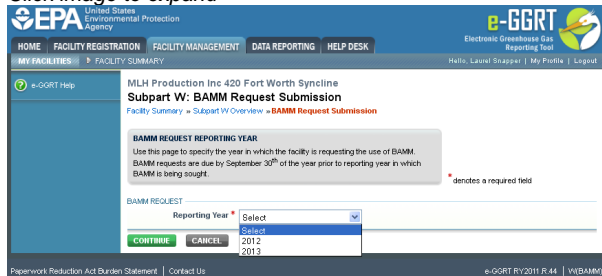
Click image to expand

The screenshot shows the EPA e-GGRT interface for a facility named 'MLH Production Inc 420 Fort Worth Syncline'. The main heading is 'Subpart W: Bamm Request Submission'. Below this, there is an 'OVERVIEW OF SUBPART W Bamm REQUEST SUBMISSION' section explaining that facilities emitting 25,000 metric tons or more of CO2 equivalent per year must submit annual reports. A table titled 'Bamm PETITION SUBMISSIONS' lists previous submissions with columns for Submission, File Uploads, Certified Date, and Submission Status. The table shows submissions from 2012 and 2013, all with a status of 'Certified and Sent'. At the bottom of the table, there is a link to 'ADD a Bamm Submission'.

Submission	File Uploads	Certified Date	Submission Status
2012 v1		December 8, 2011	Certified and Sent
2012 v2		August 8, 2012	Certified and Sent
2012 v3		August 8, 2012	Certified and Sent
2013 v1	Onshore Test.zip LNG Test.zip	August 9, 2012	Certified and Sent
2013 v2	Onshore Test.zip	August 10, 2012	Certified and Sent
2013 v3		August 10, 2012	Certified and Sent
2013 v4	Onshore Test.zip	August 10, 2012	Certified and Sent
2013 v5	Onshore Natural Gas Transmission Compression.zip	August 10, 2012	Certified and Sent
2013 v6	Onshore Natural Gas Transmission Compression.zip		Draft

For a new Bamm Request Submission, select the Reporting Year from the dropdown list and click CONTINUE.

Click image to expand



If a Bamm Request Submission for the selected reporting year has already been created but has not yet been certified, you will receive an error message. To create another Bamm Request Submission for the selected reporting year, you must first certify or delete the previous version. If a Bamm Request Submission for the selected reporting year has already been submitted, the information from that request will display.

To later edit information you have entered for a Bamm submission, click the link in the Submission column of the Bamm PETITION SUBMISSIONS table on the Subpart W Overview page.

To delete a Bamm Submission, click the red "x" in the last column of the Bamm PETITION SUBMISSIONS table.

## Step 2: Add an Industry Segment

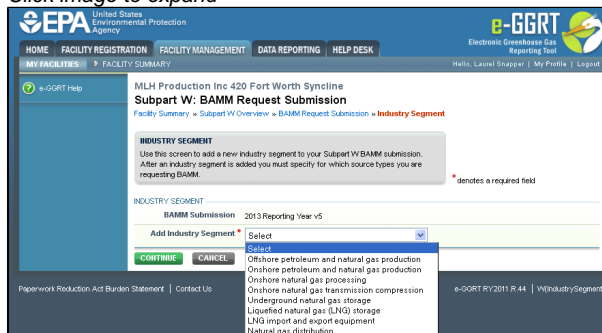
To add an Industry Segment, click the "ADD an Industry Segment" link.

Click image to expand



On the Industry Segment page, select from the list and click CONTINUE. After an industry segment is added, specify for which source types you are requesting Bamm.

Click image to expand



To make changes to an existing Industry Segment, click the link in the Industry Segment column of the INDUSTRY SEGMENTS table on the BAMM Request Submission page.

To remove an Industry Segment, click the red “x” in the Delete column of the INDUSTRY SEGMENTS table.

### Step 3: Add a Source Type to an Industry Segment

Under ADD A SOURCE TYPE, select a Source Type from the dropdown list and click ADD.

Click image to expand

The screenshot shows the EPA e-GGRT web application interface. The user is logged in as 'Hello, Laurel Snapper'. The main content area displays 'Subpart W: BAMM Request Submission' for 'MLH Production Inc 420 Fort Worth Syncline'. Under the 'ADD A SOURCE TYPE' section, a dropdown menu is open, listing various source types such as 'Acid Gas Removal Units', 'Dehydrators', 'Blowdown Vent Stacks', 'Flare Stacks', 'Centrifugal Compressors', 'Reciprocating Compressors', and 'Other Emissions from Equipment Leaks Estimated using Els'. The 'ADD' button is highlighted in green.

### Step 4: Define the Source Types

For each Source Type, enter the following required information:

- Parameters for which BAMM is requested
- Description of unique or unusual circumstances
- Explanation of how and when the facility will comply with all requirements for which BAMM is sought
- *Please note that each of these text blocks are limited to 4000 characters*

If there is an approved BAMM submission for reporting year 2012, e-GGRT is auto-populated with the list of source types. If the parameters, circumstances, and compliance plans have not changed for the source type, click in the checkbox so that a checkmark appears and leave the text fields blank. If any criteria in the BAMM request have changed from a previously approved submission for the source type, complete all fields for that source type and leave the checkbox empty.

When you are finished entering information for the Source Type, click SAVE. Then continue adding Source Types if needed.

Click image to expand

The screenshot shows the 'TRANSMISSION TANKS' form in the e-GGRT application. The form is for 'Onshore natural gas transmission compression' under the '2013 Reporting Year v6'. It includes a checkbox for 'Selecting this option indicates that no additional or updated criteria should be entered below'. Below the checkbox are four text input fields: 'Parameters for which BAMM is requested' (containing 'Scrubber dump valve volume, Tank vapor vent volume'), 'Description of unique or unusual circumstances' (containing 'Safety regulations, technical infeasibility'), 'Explanation of how and when facility will comply with all requirements for which BAMM is sought' (containing 'Upgrades, installations, and modifications are in process and will be completed before 31 Dec 2012.'), and a 'Remove Transmission Tanks' button with a red 'x' icon. The 'SAVE' button is highlighted in green.

### Step 5: Repeat Steps 2-4

Continue adding and defining Industry Segments and Source Types until all information for your facility has been entered. When you are finished, click the BAMM Request Submission button to return to the BAMM Request Submission page.

## Step 6: Upload Supporting Documentation



If you have supporting documents to upload, they must be in one of the following formats: .zip, .pdf, .doc, .docx. Previously approved reporting year 2012 BAMM submissions and supporting information are not required to be uploaded.

To upload a file, click Browse, select the file, and then click UPLOAD.

Click image to expand

The screenshot shows the EPA e-GGRT interface for a BAMM Request Submission. The user is logged in as Laurel Snapper. The page title is "MLH Production Inc 420 Fort Worth Syncline Subpart W: BAMM Request Submission". The main content area is titled "INDUSTRY SEGMENTS AND BAMM SUBMISSION" and contains instructions for adding segments and uploading documentation. Below the instructions is a table of industry segments and source types:

Industry Segment	Source Type(s)	Delete
<input checked="" type="checkbox"/> Onshore petroleum and natural gas production	Refining, Heat Treating for Liquid Unloading, Onshore Petroleum and Natural Gas Production and Natural Gas Distribution Combustion Emissions	X
<input checked="" type="checkbox"/> Onshore natural gas transmission/compression	Transmission Tanks, Reciprocating Compressors	X
<input type="checkbox"/> Add an Industry Segment		

Below the table is a "FILE UPLOADS" section with a "Browse..." button and an "UPLOAD" button. The "SUBMIT AND CERTIFY BAMM REQUEST" section has a "SUBMIT and CERTIFY" button and a "Subpart W Overview" button.

## Step 7: Submit and Certify BAMM Submission

When you are ready to submit the BAMM Request, click the SUBMIT and CERTIFY button. Enter your password and click SUBMIT, then answer the challenge question and click SUBMIT.

Click image to expand

[HOME](#) | [FACILITY REGISTRATION](#) | [FACILITY MANAGEMENT](#) | [DATA REPORTING](#) | [HELP DESK](#)

[MY FACILITIES](#) > FACILITY SUMMARY

e-GGRT Help

Submit **Certify** Confirmation

**MLH Production Inc 420 Fort Worth Syncline**  
**Subpart W: BMM Request Submission**  
[Facility Summary](#) > [Subpart W Overview](#) > [BMM Submission Certification](#)

**CERTIFY AND SUBMIT**  
 Your electronic signature is required to certify this BMM petition submission. Please review the information below, enter your password, and answer your challenge question to certify, thus completing the submission process. \*Denotes a required field

**SUBMISSION INFORMATION**

Facility Name	MLH Production Inc 420 Fort Worth Syncline
Address	123 Test Street Sanitary TX 76220
Owners and Operators	MLH Production Inc
Submitted By	Laurel Snapper Ms.
Submission	BMM 2013 Reporting Year v6

**CERTIFICATION STATEMENT**  
 I am authorized to make this submission on behalf of the owners and operators of the facility or supplier, as applicable, for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

**AGENT CERTIFICATION STATEMENT**  
 The designated representative or alternate designated representative must sign (i.e., agree to) this certification statement. If you are an agent and you click on "SUBMIT", you are not agreeing to the certification statement, but are submitting the certification statement on behalf of the designated representative or alternate designated representative who is agreeing to the certification statement. An agent is only authorized to make the electronic submission on behalf of the designated representative, not to sign (i.e., agree to) the certification statement.

**ELECTRONIC SIGNATURE**

Password \*

What is your favorite hobby? \*

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The page will display confirmation of submission.

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## See Also

- [Subpart W NOI / BMM Submission Training Webinar Presentation](#)
- [March 2012 Subpart W BMM Fact Sheet](#)

[Screen Errors](#)