Interstate Natural Gas Association of America

VIA ELECTRONIC MAIL: GHG_Reporting_Rule_Oil_And_Natural_Gas@epa.gov

October 24, 2011

Environmental Protection Agency
EPA Docket Center (EPA/DC)
Mailcode 28221T
Attention: Docket ID No. EPA-HQ-OAR-2011-0512
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

Re: Docket ID No. EPA-HQ-OAR-2011-0512 – Comments Regarding the Proposed Rule, Mandatory Reporting of Greenhouse Gases, dated September 9, 2011 (76 FR 56010)

Dear Docket Clerk:

The Interstate Natural Gas Association of America (INGAA), a trade association of the interstate natural gas pipeline industry, respectfully submits these comments regarding the Proposed Rule, "Mandatory Reporting of Greenhouse Gases: Technical Revisions to the Electronics Manufacturing and the Petroleum and Natural Gas Systems Categories of the Greenhouse Gas Reporting Rule," (Proposed Rule) dated September 9, 2011 (76 FR 56010 to 56051). The Proposed Rule includes technical corrections for greenhouse gas (GHG) reporting requirements for GHG sources in the petroleum and natural gas sectors in Title 40, Part 98, Subpart W of the Code of Federal Regulations (40 CFR 98, Subpart W).

INGAA member companies transport more than 85 percent of the nation's natural gas, through some 190,000 miles of interstate natural gas pipelines. INGAA member companies operate over 6,000 stationary natural gas-fired spark ignition IC engines and 1,000 stationary natural gas-fired combustion turbines, which are installed at compressor stations along the pipelines to transport natural gas to residential, commercial, industrial and electric utility customers. Many natural gas transmission and storage (T&S) facilities are subject to the Mandatory Reporting Rule under Subpart C, "General Stationary Fuel Combustion Sources." These facilities and additional T&S facilities will be affected by Subpart W.

Detailed INGAA comments are discussed in Attachment 1 to this letter. As discussed in the comments, and reflected in ongoing Subpart W discussions with EPA, significant concerns remain regarding Subpart W implementation due to unclear or conflicting requirements. These concerns were expressed in a September 19, 2011 letter from INGAA commenting on another proposed rule that addresses Subpart W technical corrections, and are reiterated in these comments. In addition, following a May 26, 2011 meeting with EPA and at EPA's request, on

June 6 INGAA provided a document to EPA with recommended redlines to Subpart W. The proposed redlines addressed items discussed with EPA regarding revisions to improve rule clarity (e.g., estimation methods and associated reporting in §98.233 and §98.237) and address conflicts (e.g., conflicting requirements for CO_2 and CH_4 content of natural gas and use of a default assumption for pipeline quality natural gas). The Proposed Rule does not address key issues identified in that submittal, and a related rule published on August 4 also proposes technical corrections (referred to herein as the "August 4 proposed revisions"), but also fails to address many of the issues identified by INGAA.

It is imperative that Subpart W is clarified in response to INGAA recommendations. The INGAA recommendations provided in June 2011 are provided as Attachment 2 to this letter. In addition, EPA posted the INGAA redlines within a docket document that compiles several trade association submittals – i.e., as docket document number EPA-HQ-OAR-2011-0512-0013 which is available at http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2011-0512-0013 and that document is also posted on the EPA Subpart W website under "Technical Information" as the document titled, "Revisions to Subpart I and Subpart W: Trade Association Submissions". INGAA plans to revisit the recommended redlines to assess whether additional comments are warranted. This effort is needed because INGAA developed the recommended redlines over a very short time period in response to EPA's request and deadline. After expending that, it was surprising to see that EPA failed to address many of the issues in either the Proposed Rule or August 4 proposed revisions. Since the timing for INGAA's recommended redlines was obviously not as urgent as EPA indicated, INGAA plans to conduct a more thoughtful (i.e., less time constrained) review of our previous submittal and may submit additional recommendations later this year. As has been repeatedly expressed, INGAA would like the opportunity to discuss these issues with EPA and resolve outstanding issues.

In response to these comments, other recent INGAA communications, and ongoing dialogue, INGAA is hopeful that additional technical corrections will result in a rule that meets EPA's reporting and policy objectives while ensuring safe, reasoned, and technically-sound regulatory requirements that clearly and succinctly afford compliance certainty to INGAA members. INGAA appreciates your consideration of these comments and looks forward to your response. Please contact me at 202-216-5935 or lbeal@ingaa.org if you have any questions. Thank you.

Sincerely,

Lisa S Beal

Lisa Beal
Vice President, Environment and Construction Policy
Interstate Natural Gas Association of America

Attachment 1: INGAA comments on proposed revisions to Subpart W, "Mandatory Reporting of Greenhouse Gases: Technical Revisions to the Electronics Manufacturing and the

Petroleum and Natural Gas Systems Categories of the Greenhouse Gas Reporting Rule"

Attachment 2: INGAA Recommended Subpart W Redlines Provided to EPA on June 6, 2011

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ATTACHMENT 1:

INGAA COMMENTS ON PROPOSED REVISIONS TO SUBPART W

"Mandatory Reporting of Greenhouse Gases: Technical Revisions to the Electronics Manufacturing and the Petroleum and Natural Gas Systems Categories of the Greenhouse Gas Reporting Rule"

Proposed Revisions to Title 40 of the Code of Federal Regulations

Part 98, Subpart W

76 Federal Register 56010, September 9, 2011

Submitted by:
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Submitted to:

Docket ID No. EPA-HQ-OAR-2011-0512

U.S. Environmental Protection Agency
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October 24, 2011

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INGAA Comments

The Interstate Natural Gas Association of America (INGAA), a trade association of the interstate natural gas pipeline industry, respectfully submits these comments regarding the Proposed Rule, "Mandatory Reporting of Greenhouse Gases: Technical Revisions to the Electronics Manufacturing and the Petroleum and Natural Gas Systems Categories of the Greenhouse Gas Reporting Rule," (Proposed Rule) dated September 9, 2011 (76 FR 56010 to 56051). The Proposed Rule includes technical corrections for greenhouse gas (GHG) reporting requirements for GHG sources in the petroleum and natural gas sectors in Title 40, Part 98, Subpart W of the Code of Federal Regulations (40 CFR 98, Subpart W).

INGAA comments follow. In some cases the comments refer to another proposed rule which was published in the Federal Register on August 4, 2011 (referred to in these comments as the August 4 proposed revisions), because the two proposed Subpart W amendments are linked.

1. EPA has not addressed previous INGAA comments and recommendations, especially clarifications and revisions for compressor venting emission estimates. In addition, some proposed revisions intended to address INGAA comments are insufficient and additional revisions are needed.

As discussed in INGAA's comments below, and, more importantly, as reflected in ongoing discussions with EPA regarding Subpart W, there are significant Subpart W implementation concerns due to unclear or conflicting requirements.

Previous INGAA comments (e.g., comments on the 2009 and 2010 proposed rules; comments on the August 4 proposed revisions) discuss these issues. In addition, following a May 26, 2011 meeting with EPA and at EPA's request, on June 6, 2011 INGAA provided a document to EPA with recommended redlines to Subpart W. The proposed redlines addressed items discussed with EPA regarding rule clarity (e.g., estimation methods and associated reporting in §98.233 and §98.237) and conflicts (e.g., conflicting requirements for CO_2 and CH_4 content of natural gas and use of a default assumption for pipeline quality natural gas).

Neither the Proposed Rule nor the August 4 proposed revisions address these key issues. As indicated in Table 2 of the Proposed Rule preamble and discussed in comments below, it appears that EPA intended to address some INGAA recommendations. However, in some cases the proposed revisions do not effectively address INGAA recommendations or additional revisions are needed to improve rule clarity. For example, Comment 2 discusses additional revisions that are needed to eliminate conflicting requirements when implementing a default natural gas composition for calculating emissions from the transmission and storage sectors.

As INGAA members implement Subpart W, many questions remain about reporting requirements and regulatory intent. INGAA has voiced these concerns on the record through its comments and letters to EPA. It is imperative that Subpart W is revised and clarified in response to INGAA recommendations so operators can effectively and efficiently address rule requirements and ensure compliance. The INGAA recommended Subpart W redlines provided in June 2011 are provided as Attachment 2. In addition, INGAA plans to revisit these redlines to assess whether additional comments are warranted. This effort is needed because INGAA developed the recommended redlines over approximately one week in response to EPA's request and deadline. As indicated in ongoing communications with EPA, INGAA looks forward to continued engagement until these items are resolved. Recent Subpart W revisions that provide reporting flexibility for 2011 expire at the end of the year. Thus, it is imperative that remaining issues are expeditiously resolved so the reporting requirements are clear at the start of the 2012 reporting year.

2. INGAA supports Proposed Rule revisions that allow default or standard facility-wide concentrations for natural gas composition for the transmission compression and underground storage segments. However, the Proposed Rule still contains conflicts and inconsistencies that need to be resolved.

In Table 2 of the preamble, EPA indicates that the Proposed Rule addresses INGAA's request to allow operators in natural gas transmission and storage to use a default gas composition and consisently apply the assumed gas composition for all emission estimates. INGAA supports this objective, but conflicting requirements remain, and additional revisions are needed. In addition, refer to Comment 20 regarding general issues associated with emission estimates and the lack of clarity that results form inconsistent approaches for converting from volumetric emissions (i.e., volume of natural gas) to volume and mass of CH_4, CO_2 and CO_2e emissions.

INGAA requested that transmission, storage, and distribution operations be allowed to use either a default natural gas CH_4 and CO_2 composition, or a single assumption based on a facility gas analysis. Subpart W currently stipulates different assumptions for different sources within a facility. Proposed Rule revisions in §98.233(u)(2) address the intent of INGAA's request. However, §98.233 individual source sections still contain conflicts. To enhance rule clarity and simplicity, EPA should address this issue throughout Subpart W as recommended in Comment 20. INGAA's recommendations to address the issue for the natural gas transmission compression and underground storage segments within the applicable §98.233 subsections follow:

- In §98.233(a), parameter GHG_i inappropriately references §98.233(u)(2)(i), which is for production. The parameter should be revised to reference the general section as follows (or alternatively, to reference (u)(2)(iii) and (iv) for transmission and storage, respectively):

  "GHG_i = ~~For onshore petroleum and natural gas production facilities, onshore natural gas transmission compression, and underground natural gas storage, c~~ **<u>C</u>**oncentration of GHG_i, CH_4, or CO_2, in natural gas as defined in paragraph (u)(2)~~(i)~~ of this section.

- §98.233(i) appropriately refers to §98.233(u) and (v). This is the general methodology that INGAA recommends for all §98.233(a) – (r) subsections in Comment 20.

- §98.233(k) appropriately refers to §98.233(u)(2)(iii) .

- §98.233(o) and (p) include conflicts. For centrifugal compressors, §98.233(u) is referenced following Equation W-22, but following Equation W-23 GHG_i is defined as "1". The reference to "1" should be deleted and §98.232(u)(2) should be referenced. The analogous conflict occurs for reciprocating compressors following equations W-26 and W-27. §98.233(p)(10) also includes another reference to subsection (u). Consistent regulatory text referencing (u)(2) should be used in §98.233(o) and (p).

- §98.233(q) includes different default values in the definition of GHG_i that follows Equation W-30. Section (u)(2) should be referenced rather than introducing different defaults.
- §98.233(r) includes different default values in the definition of GHG_i that follows Equation W-31. Section (u)(2) should be referenced rather than introducing different defaults.

As discussed below in Comment 20, if common approaches are implemented for converting from natural gas volumetric emission estimates in §98.233(a) – (r) to CO_2 and CH_4 voumetric and mass emissions, these conflicts can be avoided. §98.233(i) and (k) provide examples of this approach.

3. Reporting N_2O is inappropriate for vented emissions and equipment leaks unless the emissions are controlled with a combustion device. N_2O reporting is required by §98.232(n) and adding N_2O as a reportable GHG in §98.232(e) and (f) will cause confusion. This proposed revision should be deleted.

§98.232(e) and (f) list the vent and equipment leak sources that must be reported for natural gas transmission compression and for underground storage, respectively. Subpart W currently indicates that CO_2 and CH_4 should be reported and both constituents are in natural gas. The Proposed Rule adds N_2O to the list of GHGs to report. Adding this requirement preceding a list of *vented sources and equipment leaks* will cause unnecessary confusion. The proposed addition of N_2O should be deleted in the Final Rule.

Reporting N_2O is appropriate for combustion, (e.g., when vented or fugitive sources are routed to a flare or other combustion device). §98.233(n) provides the GHG estimation methods for vented and fugitive sources that are controlled via combustion and includes N_2O reporting. Since §98.232(n) addresses N_2O reporting for Subpart W transmission compression and underground storage sources that are combusted, it is not necessary to add N_2O to §98.232(e) or (f).

Pneumatic controllers:

4. Updated definitions for pneumatic controllers are generally consistent with previous INGAA recommendation, but additional clarification is needed. In addition, EPA should ensure that nomenclature for Subpart W sources are reconciled with similar sources included in the recently proposed NSPS for oil and natural gas operations (40 CFR, Part 60, Subpart OOOO).

Definitions for pneumatic devices are generally consistent with previous INGAA comments and recommendations, including INGAA's June 2011 redline recommendations. However, additional clarity on affected pneumatic devices is desired. In addition, the recently proposed New Source Performance Standard (NSPS), Part 60, Subpart OOOO, includes pneumatic controllers as an affected source. EPA should ensure similar nomenclature and definitions are used unless rule context requires differences.

In recent meetings and in its June 2011 letter to EPA, INGAA noted that confusion remains regarding classification of pneumatic devices, especially the types of intermittent devices that are subject to the rule and the types that are excluded from Subpart W. Including this level of detail in the Subpart A definition is unwieldy, so INGAA recommended including preamble discussion that would add clarity. As rules are implemented, preamble text often addresses questions that arise. As Subpart W has been implemented in 2011, it is clear that questions remain regarding pneumatic devices. Thus, INGAA recommends that the Final Rule include discussion of this issue, and example preamble text previously provided is reiterated here:

> "The definition of "intermittent bleed pneumatic device" has been revised and examples of devices that are categorized as intermittent pneumatics, as well as devices that are excluded, are provided here. Examples of intermittent pneumatic or control loop devices include level switches, positioners, pressure switches, thermostats, flow integrators, controller-pilots, and volume boosters. Gas actuated isolation valves and recording or control measurement devices are not considered pneumatic devices under Subpart W. Manual assist devices and pneumatic controller devices that are infrequently actuated, sealed, or do not emit to atmosphere are not considered pneumatic devices under Subpart W, including transmitters, transducers, relays (also called a booster, transmitter, or amplifier), gauges, control valve operator/actuators, and self-contained regulators. Subpart W intermittent bleed pneumatic device emissions are only associated with the pneumatic controller, and actuator venting is not counted as a device."

In addition, when multiple EPA regulations affect the same equipment, it is desirable for similar nomenclature and definitions across rules, accepting that minor differences may be necessary to address different regulatory context. On August 23, 2011, an NSPS was proposed for oil and natural gas operations (40 CFR, Part 60, Subpart OOOO), and the rule includes pneumatic controllers as an affected source. Common nomenclature should be used for Part 98, Subpart W (and Subpart A) and Part 60, Subpart OOOO. For example, Subpart OOOO refers to pneumatic *controllers*, but also uses the term pneumatic devices. For consistency and to better describe the affected source, INGAA recommends consistently using the term "pneumatic controller" for both rules.

5. Pneumatic controller operating hours: The Proposed Rule adds annual operating hours as a parameter in Equation W-1. Operators should be allowed to assume 8760 operating hours, with actual hours used at the operator's discretion.

Equation W-1 in §98.233(a) calculates emissions from pneumatic controllers. The Proposed Rule revises the equation to add a new parameter "T", which is defined as, "The total number of hours in the operating year that the devices were operational." Previously, Equation W-1 assumed continuous operation for the entire year – i.e., 8760 annual operating hours. In addition to substituting "controllers" for "devices" per the previous comment, INGAA strongly recommends that Subpart W clearly indicate that 8760 hours can be assumed as a default value for "T". The proposed revision will have a minimal impact on inventory estimate accuracy, and in many cases operators have already set up reporting programs based on the 8760 operating hour assumption. EPA should not add unnecessary costs and complications by mandating that annual operating hours is defined for pneumatic controllers. INGAA recommends that Subpart W include the following revisions for the description of "T" in the list of variable that follows Equation W-1:

> "T = Total ~~number of~~ **annual operating** hours for ~~in the operating year~~ the **controllers** ~~devices were operational~~. **8760 annual operating hours can be used as a default assumption.**"

6. Pneumatic controller reporting in §98.236(c)(1) for transmission and storage sectors should simply require the pneumatic controller type by count. INGAA recommended rule text is provided.

In its June 2011 letter, INGAA recommended revisions to §98.237(c)(1) reporting requirements. It appears that EPA is trying to differentiate reporting obligations for other sectors where different options are available for obtaining pneumatic controller counts. If so, that delineation should be defined in a separate subsection for the sector of interest. For natural gas transmission compression and underground storage, controller count by type and emissions reporting are all that is warranted. INGAA reiterates recommended rule text for §98.236(c)(1) provided in June 2011:

> "(1) For natural gas pneumatic **controllers** ~~devices~~ (refer to Equation W–1 of §98.233), report the following:
>
> (i) ~~Actual c~~**C**ount ~~and estimated count separately~~ of natural gas pneumatic high bleed **controllers**~~devices as applicable~~.
>
> (ii) ~~Actual c~~**C**ount ~~and estimated count separately~~ of natural gas pneumatic low bleed **controllers**~~devices as applicable~~.
>
> (iii) ~~Actual c~~**C**ount ~~and estimated count separately~~ of natural gas pneumatic intermittent bleed **controllers**~~devices as applicable~~.
>
> (iv) Report emissions collectively **for all pneumatic controllers**."

It appears that reference to "actual" or "estimated" counts is intended for the onshore production segment where requirements are phased in over multiple years. More straightforward criteria apply to transmission and storage, and reporting based on production criteria could cause confusion. If necessary, EPA should provide separate subsections in §98.236(c)(1) to clearly identify segment-specific criteria.

Blowdown vent stacks:

7. EPA should clarify that emergency events are excluded from blowdown vent stack reporting. Revisions in the Proposed Rule conflict with the August 4 proposed revisions. Additional revisions are needed to clarify Subpart W requirements.

As indicated in September 19, 2011 comments to EPA, INGAA supports the August 4 proposed revision that excludes emergency events from the definition of "blowdown vent stack ". However, the Proposed Rule confuses this issue in revisions to the introductory text of §98.233(i). The Proposed Rule should be revised to clearly indicate that emergency events are excluded from blowdown vent stack reporting.

The August 4 proposed rule revisions [76 FR 47392] revised the definition of blowdown vent stack:

> "*Blowdown vent stack* emissions mean natural gas and/or CO_2 released due to maintenance and/or blowdown operations including compressor blowdown and emergency shut-down (ESD) system testing. **Emissions from emergency events are not included**."

The new closing sentence clearly indicates that emergency venting is excluded from blowdown vent stack reporting. INGAA supports this revision. However, the Proposed Rule introduction to §98.233(i) confuses issue. Revised text from EPA's redline version of the rule available in the docket is shown here, but the last sentence is *not* included in the published Proposed Rule:

> "Calculate CO_2 and CH_4 blowdown vent stack emissions from depressurizing equipment to **reduce system pressure for planned or emergency shutdowns or to take equipment out of service for maintenance** ~~the atmosphere~~ (excluding depressurizing to a flare, over-pressure relief, operating pressure control venting and blowdown of non-GHG gases; desiccant dehydrator blowdown venting before reloading is covered in paragraph (e)(5) of this section) as follows **(Emissions from emergency vents are not included.)**:"

In this revised text, the text "or emergency" contradicts the revised §98.6 definition of blowdown vent stack and the text in the closing sentence of the EPA redline version. Both of these exclude emergency events and indicate EPA intended to exclude the reporting of emergency venting emissions. To clarify and avoid conflict with the §98.6 definition, the phrase "or emergency" should be deleted. INGAA also recommends including the closing sentence with the other list of excluded activities and referring to emergency *events* rather than emergency *vents*. The INGAA recommended revisions based on the EPA redlines above follows:

> "Calculate CO_2 and CH_4 blowdown vent stack emissions from depressurizing equipment to **reduce system pressure for planned ~~or emergency~~ shutdowns or to take equipment out of service for maintenance** ~~the atmosphere~~ (excluding depressurizing to a flare, over-pressure relief, operating pressure control venting and blowdown of non-GHG gases**, and emissions from emergency events**; desiccant dehydrator blowdown venting before reloading is covered in paragraph (e)(5) of this section) as follows ~~**(Emissions from emergency vents are not included)**~~:"

8. **INGAA supports the addition of Equation W-14B, which estimates blowdown vent stack emissions by summing venting events for the year. However, minor errors need to be corrected.**

INGAA requested that an additional calculation method be included in §98.233(i), and INGAA supports the addition of Equation W-14B. Minor errors in the new text need to be revised. For example, the reference to a "purge factor" should be deleted.

Methods prescribed in §98.233(i) are used to estimate natural gas emissions from blowdown events. Equation W-14A and associated reporting requirements apply to equipment where every blowdown event has the same physical volume, gas temperature, starting and ending pressure, and blowdown vent stack. The methods associated with this equation do not apply to normal operating practices at transmission and storage facilities. The physical volume of vented equipment depends on the locations of operational isolation valves and blowdown events do not typically have the same physical volume. Similarly, starting and ending pressures and temperatures typically vary for blowdown events. In addition, operations often dictate use of more than one vent stack (i.e., there is not a unique vent stack for each piece of equipment).

INGAA's June 2011 letter recommended the approach reflected in Equation W-14B to address these real-world considerations for estimating blowdown event emissions and to be consistent with typical blowdown data collection practices that are already in place. Equation W-14B accomplishes this by estimating annual facility blowdown emissions by summing emissions from individual events, with event emissions calculated from event-specific physical volume, temperature, and pressures. INGAA supports adding this equation to Subpart W, but there are minor corrections needed to the equation and description of Equation W-14B parameters. For example, although subtle, in the equation the subscript for "start" (i.e., pressure at start of event) should be a capital "S" rather than lower case "s" because the latter is used in the equation and throughout Subpart W to denote standard conditions. (In June 2011, INGAA recommended time zero and time final ("0" and "f" subscripts) in the equation and this avoids using a duplicative subscript). Based on EPA's subscripts, Equation W-14B should be revised (edits are not shown within the equation) and parameter definitions in Equation W-14B should be revised as follows:

$$E_{s,n} = \sum_{i=1}^{N}\left(V_{v,i}\left(\frac{(459.67+T_s)(P_{a,S,i}-P_{a,E,i})}{(459.67+T_{a,i})P_s}\right)\right) \qquad \text{(Eq. W-14B)}$$

Where:

Es,n = Annual natural gas venting emissions at standard conditions from blowdowns in cubic feet.

N = Number of repetitive blowdowns ~~for each unique volume~~ in **the** calendar year.

Vv**,i** = Total **physical** volume of blowdown equipment chamber (including pipelines, compressors and vessels) between isolation valves in cubic feet for each blowdown “i.”

~~C = Purge factor that is 1 if the equipment is not purged or zero if the equipment is purged using non-GHG gases.~~

Ts = Temperature at standard conditions (°F).

Ta**,i** = Temperature at actual conditions in the blowdown equipment chamber (°F) for each blowdown “i”.

Ps = Absolute pressure at standard conditions (psia).

Pa,~~s~~**S**,~~p~~**i** = Absolute pressure at actual conditions in the blowdown equipment chamber (psia) at the start of ~~the~~ blowdown “~~p~~**i**”.

Pa,~~e~~**E**,~~p~~**i** = Absolute pressure at actual conditions in the blowdown equipment chamber (psia) at the end of ~~the~~ blowdown “~~p~~**i**”; 0 if blowdown volume is purged using non-GHG gases.

9. Reporting requirements for blowdown vent stacks must be revised to be consistent with emission estimates calculated using Equation W-14A and Equation W-14B of §98.233(i).

The reporting criteria in §98.236(c)(7) should be revised to reflect different requirements depending on whether Equation W-14A or W-14B is used. For example, a "unique volume" attribute may be considered a reportable data element when using Equation W-14A, but it is not applicable for Equation W-14B.

Reporting of blowdown events could be based on one of three approaches: (1) use equation W-14A for calculating all facility emissions if all blowdown events can be categorized by unique physical volume with invariant blowdown gas parameters, and events are always associated with a unique blowdown stack; (2) use equation W-14B to sum the emissions for all facility blowdown events; or (3) use Equation W-14A for calculating emissions from equipment that have a unique physical volume, invariant blowdown gas parameters, and are associated with a unique blowdown stack, and use equation W-14B to sum the emissions the remaining facility blowdown events (i.e., both equations are used during a year, depending on the type of event). For natural gas transmission and storage operations, it is anticipated that option (2) will be commonly used based on Equation W-14B.

The Proposed Rule revision that requires reporting of a unique name or ID for each blowdown stack does not apply for emissions calculated using equation W-14B. During real-world operations, equipment gas releases are not always associated with a specific or unique stack. In addition, multiple equipment groupings could be vented through a single stack. Thus, unique blowdown vent stack reporting is not appropriate when using Equation W-14B.

Reporting requirements need to be revised to address the different methods for estimating blowdown vent stack emissions. INGAA recommends the following revisions to §98.236(c)(7):

"(7) For ~~each~~ blowdown vent stack**s** ~~(refer to Equation W-14 of §98.233)~~, report the following:

(i) ~~Total number of blowdowns per unique volume type in calendar year~~. **For blowdown vent stack emissions calculated using Equation W-14A, report the following for each blowdown vent stack:**

(A) Total number of blowdowns per unique volume type in calendar year.

(B) Annual CO_2 and CH_4 emissions, expressed in metric tons CO_2e for each gas, for each unique volume type, at each blowdown stack.

(C) A unique name or ID number for the blowdown vent stack.

(ii) ~~Annual CO_2 and CH_4 emissions, expressed in metric tons CO_2e for each gas, for each unique volume type, at each blowdown stack~~. **For blowdown vent stack emissions calculated using Equation W-14B, report the following:**

(A) Total number of blowdowns in calendar year.

(B) Total annual CO_2 and CH_4 emissions, expressed in metric tons CO_2e for each gas.

~~(iii) A unique name or ID number for the blowdown vent stack."~~

Transmission tanks:

10. INGAA supports Proposed Rule revisions in §98.233(k)(1) that add flexibility for transmission tank vent measurement. However, the proposed text requires minor revisions to improve clarity and consistency with the measurement methods.

INGAA supports options added to §98.233(k)(1) for detecting and measuring leaks. The revisions are based on INGAA recommendations, and the following revision is from the EPA redline version of the rule:

> "(1) Monitor the tank vapor vent stack annually for emissions using an optical gas imaging instrument according to methods set forth in §98.234(a)(1) **or by directly measuring the tank vent using a flow meter, calibrated bag, or high volume sampler according to methods in §98.234(b) through (d) for a duration of 5 minutes.** ~~for a duration of 5 minutes.~~ Or you may annually monitor leakage through compressor scrubber dump valve(s) into the tank using an acoustic leak detection device according to methods set forth in §98.234(a)(5)."

This text and associated text in (k)(2) requires a minor revision because a five minute sampling duration may not be appropriate for all methods. For example, a calibrated bag, which is a reasonable method, may fill in less than five minutes, so the specified duration is not appropriate. The five minute duration was originally included for optical imaging to ensure a sample time that captures a leaky dump valve rather than a release associated with a dump cycle, and five minutes is essentially an arbitrary choice. The other measurement approaches added to (k)(1) can identify the appropriate source (i.e., a leaky dump valve), but may accomplish this in a shorter time period. The text in (k)(1) that refers to "a 5 minute duration" should be revised to indicate, "a duration of 5 minutes or a duration adequate to demonstrate continuous leakage rather than a dump cycle release." In addition, related text in (k)(2)(i) appropriately refers to "continuous leakage" and the text, "…for five minutes…" is not necessary and should be deleted.

11. Reporting a unique name or ID for each transmission tank does not provide relevant information. EPA should eliminate the revision that adds this reporting requirement.

As noted in Comment 13, INGAA supports method and monitoring flexibility in the Proposed Rule. INGAA does not support a new reporting requirement proposed for transmission tanks. §98.236(c)(9)(iii) adds a requirement to report "a unique name or ID for the transmission storage tank." INGAA does not agree with this revision because it does not provide meaningful information. The tank is not the emission source or the monitored source. For example, multiple tanks are often tied into a single vent, and the vent, not the tank, will be monitored. In addition, providing a unique name or ID for the transmission storage tank may cause confusion with the tank ID under an existing SPCC plan. EPA should eliminate this requirement from the Final Rule.

<u>Monitoring and measurement methods</u>:

12. In a May 2011 meeting, EPA was receptive to an INGAA request to allow optical imaging to screen compressor vents subject to §98.233(o) and (p) to determine whether measurement is warranted. The Proposed Rule does not include this important revision.

As EPA has developed necessary revisions to Subpart W, INGAA has strived to provide input and recommendations on rule content. To increase the flexibility of compressor vent measurement required under §98.233(o) and (p), INGAA has requested that Subpart W allow optical imaging as a method to pre-screen affected vents. With this approach, if emissions are not seen using optical imaging, the vent line would not require measurement. This issue was discussed at a May 2011 meeting and EPA was receptive. In response to EPA's request at the meeting, INGAA provided recommended rule redlines, including the following addition to §98.234(a):

> **"An operator can elect to conduct annual optical gas imaging according to paragraph (i) or (ii) of this section to screen vents that require measurement under §98.233(o) and**

(p). Vent rate measurement is not required and the vent rate is recorded as zero if optical gas imaging does not detect vented gas."

Unfortunately, EPA has not addressed this issue in the Proposed Rule. As discussed in Comment 1, this omission may be due to EPA's failure to address revisions to §98.233(o) and (p) in either the Proposed Rule or August 4 proposed revisions. Adding this flexibility can be easily accomplished through an addition to the monitoring section, §98.234(a), and appropriate reference to the new provisions in §98.233(o) and (p). INGAA's June 2011 recommended redlines provide example text.

Availability of this option should not be delayed as EPA considers other revisions to §98.233(o) and (p). INGAA hopes that this omission from the Proposed Rule is an oversight, and recommends that EPA incorporate the text above, or similar text, in the Final Rule so this option is available for use as soon as possible.

13. INGAA supports revisions that provide additional clarity and flexibility for monitoring and measurement methods.

EPA has added monitoring and monitoring measurement flexibility in response to INGAA recommendations. INGAA supports revisions that provide additional flexibility for monitoring and measurement methods and associated recordkeeping. For example, the Proposed Rule indicates in §98.234(a) that video records are not required for optical imaging; and, provides additional flexibility in §98.233(k)(1) for measuring vented emissions from transmission tanks. Similarly, under §98.234(a)(5), INGAA supports the addition of acoustic stethoscope type devices to detect through valve leakage and recommends that the use of similar and commonly used devices such as open air attachments also be allowed.

The flexibility from these changes provides reasonable options that reduce burden while ensuring data quality objective are met. As discussed in Comment 12, an important monitoring option is not included in the Proposed Rule. Flexible approaches to acquire the necessary data should be consistently implemented throughout Subpart W, and this philosophy should be applied when addressing Comment 12 and Comment 14.

14. For optical imaging, methods other than the EPA Alternative Work Practice (AWP) should be allowed.

INGAA reiterates previous comments and concerns expressed to EPA. For optical imaging, methods other than the EPA Alternative Work Practice (AWP) are necessary and should be allowed. EPA's attempt to apply select sections of the AWP is resulting in a derivative method that is untested and has not been validated. The derivative AWP in the Proposed Rule should not be mandated as the only method allowed.

§98.234(a)(1) specifies the use of an optical gas imaging instrument for fugitive emissions detection in accordance with 40 CFR part 60, Subpart A, §§ 60.18(i)(1) and (2) of the AWP for monitoring equipment leaks. This AWP was not developed for methane or GHG leaks and contains provisions and requirements that are inappropriate or too restrictive for natural gas transmission and storage component leak screening. The Proposed Rule adds criteria and revisions to the AWP, and INGAA reiterates that this should not be the only method allowed.

§98.234(a)(1) should be revised to include additional flexibility and allow use of other methods such as manufacturer procedures or industry standards which are more appropriate for methane detection from transmission and storage sources.

The Proposed Rule attempts to rely on select provisions from an AWP that was developed for the refining sector as a Method 21 alternative work practice. Since its adoption, the AWP has not been widely adopted by that industry. It is inappropriate to assume that an AWP that is not generally accepted in its intended sector provides the only viable method for methane detection from a different sector. It is also inappropriate to unilaterally mandate a derivative method that has not been peer-reviewed or validated for this application.

A basic tenet of test method development is that the component parts collectively comprise procedures that result in a method that has been evaluated, peer-reviewed, and validated. For the GHG reporting rule, methodology guidelines are marginally less rigorous in most cases, with industry practices and manufacturer procedures commonly allowed. This is appropriate for measurement associated with data gathering for a reporting rule that includes inherent uncertainties in the estimation methods. Yet, EPA is mandating a single method for optical imaging – but revising the published method without adequately supporting the premise that this is the *only* solution. The unilateral imposition of untested criteria is contrary to the process for developing acceptable methods. In a case where *a single method is mandated* and EPA dictates only one solution, it is imperative that the procedures have been validated and scrutinized, rather than unilaterally imposed without testing, evaluation, and validation. Rule flexibility is needed to accommodate manufacturer recommendations, future test methods and method enhancement, and possible adoption of AWP revisions to address method inadequacies, shortcomings, and criteria to adapt the method to other applications (i.e., other industrial sources, gases, etc.).

In the Proposed Rule, rather than addressing comments requesting flexibility for other methods, EPA unilaterally revises the AWP, and maintains that this is the *only* viable method. The AWP revisions have not been subjected to peer review or validation. INGAA is troubled by the precedent established by unilaterally implementing untested procedural changes to a method that has not been validated. Mandating selected provisions and revisions to an AWP that has not been successfully integrated into the mainstream practices for optical imaging is inappropriate. The failure to provide alternative options is remiss. In addition, mandating a single method for optical imaging is contrary to the general tenor of Subpart W, which commonly allows manufacturer procedures and industry standard procedures for measurements. EPA has not adequately justified or supported this position.

INGAA opposes the Proposed Rule mandate that identifies the "derivative" AWP as the only allowed method. EPA has not provided documentation that supports the efficacy of the proposed AWP deviations, or assessed (and discounted) whether other viable alternatives are available. At a minimum, EPA should allow operators flexibility to document the procedures relied upon within site Monitoring Plans to ensure optical imaging performance.

INGAA refers EPA to previous INGAA comments submitted in response to Subpart W rule proposals and our June 2011 letter that provided recommended redlines. In addition, INGAA understands that optical camera vendors and users of the technology – i.e., the best experts available – are more than willing to provide alternative procedures and standards for optical imaging. If EPA retains a single method mandate, it should be subject to appropriate peer review and a refereed method validation process. INGAA strongly recommends revising §98.234(a)(1) to add flexibility. In addition to the AWP, manufacturer procedures and industry standard practices should be allowed.

Missing data, reporting and recordkeeping:

15. Missing data provisions in §98.235 should be revised to provide more flexibility.

In meetings with INGAA, EPA has indicated that §98.235 missing data provisions may provide an avenue to address reporting issues that arise in future years that may otherwise require resolution through a request for Best Available Monitoring Methods (BAMM). Despite EPA's claims, INGAA believes that §98.235 is far too restrictive to serve as a means to address out-year issues that hinder an operator's ability to fulfill Subpart W obligations. One scenario discussed with EPA is the case where a facility is not subject to Subpart W, but becomes subject late in a future year due to an unexpected event at the facility that increases emissions above the reporting threshold. If this occurs late in the calendar year, the company may not be able to acquire necessary data or complete required measurements. INGAA believes that the BAMM process would be needed in this situation. EPA indicated that missing data provisions may provide another option. However, §98.235 very narrowly defines where missing data provisions apply and INGAA does not believe it serves the purpose intimated by EPA unless revised.

For example, §98.235 limits missing data provisions to instances where, "…data are lost or an error occurs during annual emissions estimation or measurements…". The scenario described, where facility status changes late in the year, does not meet the common meaning of "lost data" or an "error during estimation or measurement." Revisions are needed to improve the utility of the missing data provisions.

To provide the additional flexibility necessary to serve scenarios such as those discussed with EPA, INGAA recommends revising §98.235 as follows:

> "A complete record of all estimated and/or measured parameters used in the GHG emissions calculations is required. If data are lost**,** ~~or~~ an error occurs during annual emissions estimation or measurements, **or an unanticipated circumstance precludes data collection or measurement,** you must repeat **or conduct** the estimation or measurement activity for those sources as soon as possible, including in the subsequent calendar year if missing data are not discovered until after December 31 of the year in which data are collected, until valid data for reporting is obtained. ~~Data developed and/or collected in a subsequent calendar year to substitute for missing data cannot be used for that subsequent year's emissions estimation.~~ Where missing data procedures are used for the previous year, at least 30 days must separate emissions estimation or measurements for the previous year and emissions estimation or measurements for the current year of data collection**, with the exception of cases where a facility becomes newly affected under this subpart in a particular year and it is not reasonably feasible to collect information or conduct measurements until the subsequent year. In this case, the first year reporting can be based on data collected in the subsequent year**. …"

If EPA is concerned that these revisions may be abused or misused, recordkeeping and/or reporting criteria could be added that require documenting the basis for using the missing data provisions in response to unanticipated circumstances.

16. To address evolving requirements associated with Confidental Business Information, EPA needs to revise Subpart A, Table A-7 to address data elements where reporting should be deferred until 2015.

INGAA provided a similar comment in response to the August 4 proposed revisions to Subpart W. To address ongoing concerns regarding Confidential Business Information (CBI), EPA published a rule in the August 25, 2011 Federal Register, "Change to the Reporting Date for Certain Data Elements Required Under the Mandatory Reporting of Greenhouse Gases Rule" (76 FR 53057). That rule identifies data elements for Subpart W emission estimation calculations where reporting is deferred until March 31, 2015. Reporting criteria affected by the Proposed Rule have not been reconciled with the August 25 CBI Rule, and EPA will need to propose *additional* corrections to Subpart A to reconcile ongoing revisions in Subpart W with the recently adopted CBI rule. The technical revisions in the Proposed Rule will result in anomalies and additional data elements will need to be added to Subpart A, Table A-7. EPA should adopt changes expediently so that 2012 reporting obligations are clearly defined in Table A-7 and reflect the pending technical corrections to Subpart W.

17. The proposed new recordkeeping requirement in §98.237(e) should be deleted because the Monitoring Plan addresses similar requirements and this revision adds unnecessary burden.

The Monitoring Plan required under Subpart A requires operators to document how data is collected and emission calculations are completed. The Proposed Rule adds new recordkeeping in §98.237(e), "The records required under §98.3(g)(2)(i) shall include an explanation of how company records, engineering estimation, or best available information are used to calculate each applicable parameter under this subpart."

This new requirement is duplicative, may cause confusion, and adds unnecessary recordkeeping burden. Since the Monitoring Plan addresses similar criteria, this addition to Subpart W is not needed and §98.237(e) should be deleted.

<u>Miscellaneous items</u>:

18. EPA should harmonize nomenclature and definitions in the Proposed Rule with similar elements in the recently proposed NSPS for oil and natural gas operations (40 CFR, Part 60, Subpart OOOO).

EPA recently proposed a new NSPS for oil and natural gas operations, 40 CFR, Part 60, Subpart OOOO. That rule proposes to regulate VOCs from three natural gas transmission and storage sources that are also subject to Subpart W reporting. Since both rules address the same equipment and processes, EPA should strive to harmonize nomenclature and definitions between the GHG Reporting Rule and Subpart OOOO. INGAA understands that regulatory context may demand differences between the rules in some cases, but EPA should strive for consistency when possible. It is apparent that EPA has cross-checked definitions in some cases, but in other cases there are differences. EPA should search the rules and compare definitions and nomenclature for common processes and equipment, and propose similar text unless rule context demands a difference.

This comment does not comprehensively address all relevant nomenclature and definitions, but several examples are provided. A similar comment will be included in INGAA's comments on Subpart OOOO, where EPA should consider adding several Subpart W definitions that are not in Subpart OOOO.

- Subpart W refers to "pneumatic devices" and Subpart OOOO typically refers to "pneumatic controllers". INGAA recommends that "pneumatic controller" be consistently used in both rules.
- Although the listed process streams are different for part 98 and part 60, the definition of "compressor" in §98.238 is preferrable to the §60.5430 definition.
- The definition of "controller" in §60.5430 should be added to §98.6, which contains related definitions for device types (e.g., high or low bleed) but not the general definition. Similarly, several definitions in §98.6 should be added to Subpart OOOO §60.5430, including "continuous bleed", "centrifugal compressor wet seal degassing vent emissions", and "centrifugal compressor dry seals".

19. Onshore production wells can use default component counts when estimating equipment leaks from wellheads. The underground storage sector should be afforded the same flexibility and be allowed to use default component counts for storage wells.

Onshore production wells can use default component counts for wellheads based on information in Tables W-1B and W-1C. Default component counts are not allowed for storage wells.

Similar to production wells, an underground storage field may include many wells dispersed over a broad area. In addition, these wells are often identically designed and constructed, and will typically be low emitters. The underground storage sector should be afforded the same flexibility as production and be should be allowed to use default component counts for storage well emission estimates.

Rather than counting components at every wellhead, defaults based on engineering judgment should be allowed, with the methodology explained in the Monitoring Plan. For example, if a storage field contains many wells with similar design and construction, component counts from a subset of the wells could be used to define the default values for other wells. This methodology would be documented in the Monitoring Plan and would provide a reasonable estimate of storage well components and associated emissions. In fact, the component count uncertainty would be much lower than the emission factor uncertainty.

20. The rule inconsistently references and applies the gas volume and mass emission conversion calculations in §98.233(t) – (v) (e.g., see Comment 2 regarding natural gas composition). To clarify and standardize calculations and avoid unnecessary confusion and associated errors, the same GHG emissions calculation methodology and common engineering units should be used for all emission sources in §98.233(a) through (r).

This is a broader comment regarding revisions associated with converting engineering units. Subpart W clarity and readability would be greatly improved if there was more commonality across emission estimate sections. §98.233(a) through (r) provide methods for source-specific emission estimates, and §98.233(t) through (v) provide calculations to convert engineering units from volumetric emissions to standard volumes and mass of CO_2e emissions. Rule clarity would be greatly enhanced if the objective of calculations in sections (a) through (r) was to calcualte emissions with a common endpoint for engineering units (i.e., volumetric emissions at actual or standard conditions). Then, consistently refer to (t), (u) and (v) to convert natural gas volumetric emissions to CO_2 and CH_4 volumetric and mass emissions. The lack of a standard format hinders implementation clarity and also results in confusing or conflicting requirements. For example, Comment 2 discusses revisions where conflicts remain regarding natural gas composition assumptions.

EPA may view this as a daunting task at this point in the process, but as Subpart W is incrementally (and repeatedly) revised, basic structural and organizational issues should be addressed. To implement this approach, only minor revisions would be needed in the equations and parameters in subsections (a) through (r) – and conflicting requirements such as natural gas composition assumptions would be clearly addressed. The revisions should follow several basic principles:

- §98.233(a) – (r) should not prescribe whether volumetric natural gas measurements are at actual or standard conditions (i.e., temperature and pressure). Rather, if volumetric gas measurements are at actual conditions, the rule should reference §98.233(t) and equation W-33 to convert the gas volumes to standard temperature and pressure. Volumetric conversions are not needed if volumetric gas measurements are reported at standard conditions.
- A specific natural gas composition (i.e., concentration of CH_4 and CO_2) should not be included in (a) – (r). Instead, §98.233(u) should always be referenced to determine the appropriate gas composition with equation W-35 referenced to calculate volumetric GHG emissions. An example of how this would be implemented is provided for reciprocating compressors based on suggested revisions to Equation W-26. (Note that this also relates to Comment 2 issues regarding conflicting natural gas composition assumptions). Equation W-26 should calculate natural gas volumetric emissions and then §98.233(u) and equation W-35 should be referenced to calculate volumetric GHG emissions. Equation W-26 revisions would include:

  "(6) Estimate annual emissions using the flow measurement and Equation W-26 of this section.

  $$E_{s,m} = MT_m * T_m$$

  Where:

  $E_{s,\cancel{i},m}$ = Annual ~~GHG i (either CH_4 or CO_2)~~ volumetric emissions **of natural gas** ~~at standard conditions~~, in **standard** cubic feet **for the unique mode and vent source combination**.

  MT_m = Measured gas **volumetric** emissions in standard cubic feet per hour **for the unique mode and vent source combination**.

  T_m= Total time the compressor **package** is in the mode for which $E_{s,\cancel{i},m}$ is being calculated, in the calendar year in hours."

- Calculations of mass emissions for each GHG should not be included in §98.233(a) – (r) equations and calculations. Instead, §98.233(v) and equation W-36 should be referenced to calculate GHG mass emissions. For example, for pneumatic devices Equation W-1 would not include "GHG_i" or $Conv_i$" terms but rather reference §98.233(u) and Equation W-35 to address natural gas composition and §98.233(v) and Equation W-36 to calculate emissions on a mass basis.

21. Reference to §98.232(j) in §98.232(a) should be deleted because (j) has been deleted.

The Proposed Rule deletes §98.232 (j), which referred to criteria for flaring, and "reserves" that section. Section §98.232(a) includes a reference to section (j), "…emissions from each flare as specified in paragraph (j) of this section, …". To reconcile with other revisions, the reference to §98.232(j) should be deleted.

<u>Comments solicited in the preamble</u>:

22. The reporting deadline should be September 28, 2011, consistent with the August 4 proposed revisions to Subpart W.

EPA requests comment on whether it is appropriate for Subpart W reporting to be delayed beyond March 31, 2012 to allow adequate time to adjust to the Proposed Rule [76 FR 56021]. This inquiry is puzzling, because the August 4 proposed revisions would change the reporting deadline to September 28, 2012, and INGAA anticipates that revision will be finalized. At any rate, a March 31, 2011 deadline is not appropriate, and INGAA supports delaying reporting until at least Septmeber 28, 2012. As INGAA indicated in its comments on the August 4 proposed revisions, INGAA supports the later deadline and recommends that reporting for all sources – including Subpart C and Subpart W emissions sources – should be deferred until the September deadline for facilities subject to Subpart W. Please refer to INGAA's comments on the August 4 proposed revisions for additional details.

23. Compressibility should be allowed in blowdown vent stack calculations at the operator's discretion.

EPA requests comment [76 FR 56031] on whether an allowance should be provided for considering compressibility in blowdown calculations. When calculating blowdown emissions for current operations, some natural gas operators include compressibility in calculations that generally follow Equation W-14B. This approach should be allowed, at the operators discretion, since it is an existing practice based on engineering principles and provides a more accurate estimate. This can be readily addressed in Subpart W by including compressibility as a parameter in equations W-14A and W-14B, and clearly indicating that the compressibility factor is assumed to be one unless the operator chooses to apply a compressibility factor.

ATTACHMENT 2:

INGAA Recommended Subpart W Redlines

Provided to EPA on June 6, 2011

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Title 40: Protection of Environment

PART 98—MANDATORY GREENHOUSE GAS REPORTING

Subpart W—Petroleum and Natural Gas Systems

(Source: 75 FR 74488, Nov. 30, 2010, unless otherwise noted.)

§ 98.230 Definition of the source category.

NO CHANGES

§ 98.231 Reporting threshold.

NO CHANGES

§ 98.232 GHGs to report.

- **Add section (m) to clarify that operators can use DEFAULT values or company records for percent methane and CO_2 for vented and fugitive emissions from transmission and storage segments**
- **Revise section (j) based on INGAA-EPA May 26 meeting discussion to clarify : (1) FLARE emissions are only reported if flares are listed for the segment in §98.232; (2) flare / vapor recovery efficiency should be applied when reporting emissions for ANY source that includes such control; and (3) if flares are not listed in §98.232 but flaring applies, the *combustion* emissions from the flare do NOT need to be reported**

(j) ~~All applicable i~~**Industry** segments **in §98.232(b) through (d) include flares as a listed source and** must report the CO_2, CH_4, and N_2O emissions from each flare.

(i) **Other industry segments in §98.232(e) through (i) should not report flare emissions but should consider flaring, vapor recovery, or other control when reporting emissions of CH_4 and CO_2 under §98.236 based on calculations in §98.233 that estimate uncontrolled emissions. The emissions reported under §98.236 should consider the reduction efficiency (e.g., flare efficiency). Equation W-19 in §98.233(n) can be used to calculate CH_4 emissions from a controlled emission source. Equation W-19 also applies for CO_2 emissions for a vapor recovery system. Equation W-20 applies for CO_2 emissions for combustion based control (flare, thermal oxidizer). The calculation approach should be documented under §98.3(g).**

…

(m) In lieu of the requirements for natural gas composition specified in §98.233, the operator may alternately apply a gas composition in (1) or (2) when calculating emissions in §98.233:

(1) For sources in §98.232(e), (f), (g) and (i), default natural gas composition of 95 percent CH_4 and 1 percent CO_2 (by volume).

(2) For sources in §98.232(e) through (i), company gas records consistent with §98.233(u)(2).

Comment [JMc1]: Approach is to provide this "direction" once rather than in each 98.233 section, and reporting criteria based on May 26 INGAA meeting with EPA.

With this addition, flare references in §98.233 sections for transmission are deleted (see below).

Comment [JMc2]: To simplify, intent is to allow operators in transmission, etc to apply either a default composition or to use company records / gas analysis.

Alternate would be to add this criteria within §98.233(u)(2) and revise equation citations for gas composition throughout §98.233 source calculation sections.

Comment [JMc3]: Based on default assumed in DOE/EIA national inventory report – e.g., see "Documentation for Emissions of Greenhouse Gases in the United States 2008", DOE/EIA-0638 (2008), January 2011

Default would apply for transmission, underground storage, LNG storage, and distribution.

§ 98.233 Calculating GHG emissions.

Clarifications in 98.33(a), (e), (i), (k), (o) and (p); minor changes to (q), (r), (t), (u), (v) for consistency

…

(a) *Natural gas pneumatic device venting.*

Clarify that best available information and engineering judgment can be used to define high vs low bleed; also address definition (and provide examples) for intermittent devices [see revision to 98.6 and recommended paragraph for preamble with examples].

Calculate CH_4 and CO_2 emissions from continuous high bleed, continuous low bleed, and intermittent bleed natural gas pneumatic devices using Equation W–1 of this section.

$$Mass_{s,i} = Count * EF * GHG_i * Conv_i * 24 * 365 \qquad \text{(Eq. W-1)}$$

Where:

$Mass_{s,i}$ = Annual total mass GHG emissions in metric tons CO_2e per year at standard conditions from a natural gas pneumatic device vent, for GHG i.

Count = Total number of continuous high bleed, continuous low bleed, or intermittent bleed natural gas pneumatic devices of each type as determined in paragraph (a)(1) of this section. **The count shall be based on best available information or engineering judgment with the approach described in the monitoring plan required under §98.3(g)(5) and does not require bleed rate measurement to define device type.**

EF = Population emission factors for natural gas pneumatic device venting listed in Tables W–1A, W–3, and W–4 of this subpart for onshore petroleum and natural gas production, onshore natural gas transmission compression, and underground natural gas storage facilities, respectively.

GHG_i = For onshore petroleum and natural gas production facilities, concentration of GHG i, CH_4or CO_2, in produced natural gas; for facilities listed in §98.230(a)(3) through (a)(8), GHG_i equals 1 **or the gas composition allowed per §98.232(m)**.

$Conv_i$ = Conversion from standard cubic feet to metric tons CO_2e; 0.000410 for CH_4, and 0.00005357 for CO_2.

24 * 365 = Conversion to yearly emissions estimate.

…

(i) *Blowdown vent stacks.*

Clarify "exempt volumes; events to include (i.e., "significant" blowdowns for maintenance or safety), and add another calc (operator selects calc to use) where events are calculated and summed.

Calculate CO_2 and CH_4 blowdown vent stack emissions from depressurizing equipment to the atmosphere **to reduce system pressure for planned or emergency shutdowns or to take equipment out of service for maintenance** (excluding depressurizing to a flare, over-pressure relief, ~~operating pressure control venting and~~ blowdown of non-GHG gases; desiccant dehydrator blowdown venting before reloading is covered in paragraph (e)(5) of this section) as follows:

Comment [JMc4]: Intent is to include "significant" blowdown events associated with shutdowns and maintenance activity.

(1) Calculate the total volume (including pipelines, compressor case or cylinders, manifolds, suction bottles, discharge bottles, and vessels) between isolation valves determined by engineering estimate based on best available data.

(2) If the total **physical** volume between isolation valves is greater than or equal to 50 ~~standard~~ cubic feet, retain logs of the number of blowdowns ~~for each equipment type~~ (including but not limited to compressors, vessels, pipelines, headers, fractionators, and tanks). ~~Blowdown~~ **Physical** volumes smaller than 50 ~~standard~~ cubic feet are exempt from reporting under paragraph (i) of this section.

(3) **The operator can elect to use either Equation W-14a or W-14b.** Calculate ~~the~~ total annual venting emissions for each equipment type using Equation W–14**a** ~~of this section.~~ **or calculate total annual venting emissions using Equation W–14b. The operator can include corrections that address factors such as gas compressibility when completing the calculation.**

$$E_{s,n} = N*\left(V_v\left(\frac{(459.67+T_s)P_a}{(459.67+T_a)P_s}\right)-V_v*C\right) \qquad \text{(Eq. W-14)}$$

[change to (Eq. W-14a)]

Where:

$E_{s,n}$ = Annual natural gas venting emissions at standard conditions from blowdowns in cubic feet.

N = Number of repetitive blowdowns for each equipment type of a unique volume in calendar year.

V_v = Total volume of blowdown equipment chambers (including pipelines, compressors and vessels) between isolation valves in cubic feet.

C = Purge factor that is 1 if the equipment is not purged or zero if the equipment is purged using non-GHG gases.

T_s = Temperature at standard conditions (°F).

T_a = Temperature at actual conditions in the blowdown equipment chamber (°F).

P_s = Absolute pressure at standard conditions (psia).

P_a = Absolute pressure at actual conditions in the blowdown equipment chamber (psia).

$$E_{s,n} = \sum_{i=1}^{N}\left(V_{v,i}\left(\frac{(459.67+T_s)(P_{a,0,i}-P_{a,f,i})}{(459.67+T_{a,i})P_s}\right)\right) \qquad \textbf{(Eq.-W-14b)}$$

Where:

$E_{s,n}$ = Annual natural gas venting emissions at standard conditions from blowdowns in cubic feet.

N = Number of blowdowns in the calendar year.

$V_{v,i}$ = Total volume of blowdown equipment chambers (including pipelines, compressors and vessels) in cubic feet.

T_s = Temperature at standard conditions (°F).

$T_{a,i}$ = Temperature at actual conditions (estimated) for event "i" in the blowdown chamber (°F).

P_s = Absolute pressure at standard conditions (psia).

$P_{a,0,i}$ = Absolute pressure at actual conditions at the start of event "i" in the blowdown chamber (psia).

$P_{a,f,i}$ = Absolute pressure of natural gas at actual conditions at the end of event "i" in the blowdown chamber (psia) ((if the equipment is purged using non-GHG gases then $P_{a,f,i}$ = 0).

(4) Calculate both CH_4 and CO_2 volumetric and mass emissions from volumetric natural gas emissions using calculations in paragraph (u) and (v) of this section. **This calculation can use the gas composition per §98.232(m).**

(5) Calculate total annual venting emissions for all blowdown vent stacks by adding all standard volumetric and mass emissions determined ~~in~~ **from** Equation**s** W–14**a or W-14b** and paragraph (i)(4) of this section.

…

Comment [JMc5]: Additional description can be included in the preamble: **Equation W-14a (former Equation W-14) applies to an equipment type (i.e., group of equipment) where the estimate is based on the following physical and operating properties: the same unique blowdown chamber volume; the same blowdown chamber pressure and temperature; and, the same equipment purging practices (i.e., C = 0 or 1). Equation W-14b is appropriate if the blowdown pressure differential (start and end pressures) vary for different events and calculations for annual emissions are based on summing the calculated volume for events that occur throughout the year. For the latter, each event can be unique, so reporting requirements include total annual emissions and number of annual events.**

Comment [JMc6]: This sentence is needed to allow operators to use existing vent records – e.g., similar equation used but longstanding calculation includes minor adjustments for factors such as compressibility. Without this sentence, some operators will have "two sets of books" for calculating vented emissions.

(k) *Transmission storage tanks.*

Correct reference to flaring in intro, add monitoring method flexibility, and delete reference to flaring calculation (broadly addressed in §98.232(j) and not needed in this section)

For condensate storage tanks, either water or hydrocarbon, ~~without vapor recovery or thermal control devices~~ in onshore natural gas transmission compression facilities calculate CH_4~~,~~ **and** CO_2 ~~and N_2O (when flared)~~ annual emissions from compressor scrubber dump valve leakage as follows:

(1) Monitor the tank vapor vent stack annually for emissions using an optical gas imaging instrument according to methods ~~set forth~~ in §98.234(a)(1) **or by directly measuring the tank vent using a flow meter, calibrated bag, or high volume sampler according to methods in §98.234(b) through (d)** for a duration of 5 minutes. Or you may annually monitor leakage through compressor scrubber dump valve(s) into the tank using an acoustic leak detection device according to methods ~~set forth~~ in §98.234(a)(5).

(2) If the tank vapors are continuous for 5 minutes, or the acoustic leak detection device detects a leak, then use one of the following two methods in paragraph (k)(2) of this section to **estimate** ~~quantify~~ emissions:

(i) Use a meter, such as a turbine meter, **calibrated bag, or high flow sampler** to estimate tank vapor volumes according to methods ~~set forth~~ in §98.234(b) **through (d)**. If you do not have a continuous flow measurement device, you may install a flow measuring device on the tank vapor vent stack. **If the vent is directly measured for five minutes under section (1) to detect continuous leakage, this serves as the measurement. If a leak of 3.1 SCF per hour or greater is measured, a leak is detected and must be reported.**

(ii) Use an acoustic leak detection device on each scrubber dump valve connected to the tank according to the method set forth in §98.234(a)(5).

(3)~~(iii)~~ **Calculate both CH_4 and CO_2 volumetric and mass emissions using calculations in (u) and (v) of this section, and using** ~~Use~~ the appropriate gas composition in paragraph (u)(2)(iii) of this section **or the gas composition allowed in §98.232(m)**.

(4)~~(3)~~ If the leaking dump valve(s) is repaired following leak detection, the annual emissions shall be calculated from the beginning of the calendar year to the time the valve(s) is repaired.

~~(4) Calculate emissions from storage tanks to flares as follows:~~

~~(i) Use the storage tank emissions volume and gas composition as determined in either paragraph (j)(1)of this section or with an acoustic leak detection device in paragraphs (k)(1) through (k)(3) of this section.~~

~~(ii) Use the calculation methodology of flare stacks in paragraph (n) of this section to determine storage tank emissions from the flare.~~

…

§98.233(n) PROVIDED HERE FOR REFERENCE ONLY – NO CHANGES… "Efficiency" calcs in Equations W-19 and W-20 are shown here because these are referenced in proposed new section §98.232(j)(1) [see above] for calculating "reduction efficiency" from §98.233 sources.

(n) *Flare stack emissions.* Calculate CO_2, CH_4, and N_2O emissions from a flare stack as follows:

…

(4) Calculate GHG volumetric emissions at actual conditions using Equations W–19, W–20, and W–21 of this section.

$$E_{a,CH4}(un-combusted) = V_a * (1-\eta) * X_{CH4} \quad \text{(Eq. W-19)}$$

$$E_{a,CO2}(un-combusted) = V_a * X_{CO2} \quad \text{(Eq. W-20)}$$

$$E_{a,CO2}(combusted) = \sum_j \eta * V_a * Y_j * R_j \quad \text{(Eq. W-21)}$$

Where:

$E_{a,CH4}$(un-combusted) = Contribution of annual un-combusted CH_4 emissions from flare stack in cubic feet, under actual conditions.

$E_{a,CO2}$(un-combusted) = Contribution of annual un-combusted CO_2 emissions from flare stack in cubic feet, under actual conditions.

$E_{a,CO2}$(combusted) = Contribution of annual combusted CO_2 emissions from flare stack in cubic feet, under actual conditions.

V_a= Volume of gas sent to flare in cubic feet, during the year.

η = Fraction of gas combusted by a burning flare (default is 0.98). For gas sent to an unlit flare, η is zero.

X_{CH4}= Mole fraction of CH_4 in gas to the flare.

X_{CO2}= Mole fraction of CO_2 in gas to the flare.

Y_j= Mole fraction of gas hydrocarbon constituents j (such as methane, ethane, propane, butane, and pentanes-plus).

R_j= Number of carbon atoms in the gas hydrocarbon constituent j: 1 for methane, 2 for ethane, 3 for propane, 4 for butane, and 5 for pentanes-plus).

...

Sections (o) and (p) for compressor emissions include significant revisions based on recent discussions with EPA on intended requirements for calculating and reporting compressor vent emissions. In addition, revisions were completed so that the format / structure of the two sections is analogous.

(o) *Centrifugal compressor venting.* Calculate CH_4~~,~~ **and** CO_2 ~~and N_2O (when flared)~~ emissions from both wet seal and dry seal centrifugal compressor vents as follows:

(1) **Centrifugal compressor package operating status includes two reportable modes: operating and not operating de-pressurized. Centrifugal compressor package vent sources are wet seal oil degassing vents, unit isolation valve vents, and blowdown valve vents.** For each centrifugal compressor **package** covered by §98.232 (d)(2), (e)(2), (f)(2), (g)(2), and (h)(2) you must conduct an annual measurement in the ~~operating~~ mode in which it is found **during the annual measurement**. Measure emissions from **each unique mode and vent source combination in (i) through (iii) of this section applicable to the as-found mode.** ~~all vents (including emissions manifolded to common vents) including wet seal oil degassing vents, unit isolation valve vents, and blowdown valve vents).~~ **Measurement from a single compressor package can** ~~(~~includ**e**~~ing~~ emissions **from unique vent sources** manifolded to common vent~~s)~~. Record emissions from the following vent **sources**~~types~~ in the specified ~~compressor~~ mode~~s~~ during the annual measurement.

(i) Operating mode, blowdown valve leakage through the blowdown vent, **for both** wet seal and dry seal compressors.

(ii) Operating mode, wet seal oil degassing vents.

(iii) Not operating depressurized mode, unit isolation valve leakage through open blowdown vent, without blind flanges, **for both** wet seal and dry seal compressors.

(A) For the not operating depressurized mode, each compressor **package** must be measured at least once in any three consecutive calendar years. If a compressor **package** is not operated and has blind flanges in place throughout the 3 year period, measurement is not required in this mode. ~~If the compressor is in standby depressurized mode without blind flanges in place and is not operated throughout the 3 year period, it must be measured in the standby depressurized mode.~~

(2) **Measure emissions from each vent including emissions manifolded to a common vents from a single vent source (**~~For~~ wet seal oil degassing vents, ~~determine vapor volumes sent to an atmospheric vent or flare~~, **unit isolation valves, or blowdown valve vents) for a single compressor package** using **any of the methods in (o)(2)(i) though (iv) of this section. Vents may be screened annually using an optical imaging instrument according to methods in §98.234(a)(1) and if emissions are not present, then measurement per §98.234(b) is not required and emissions are estimated as zero.**

(i) **A**~~a~~ temporary meter such as a vane anemometer or permanent flow meter **such as an orifice meter** according to 98.234(b) ~~of this section~~. ~~If you do not have a permanent flow meter, you may install a permanent flow meter on the wet seal oil degassing tank vent.~~

~~(3) For blowdown valve leakage and unit isolation valve leakage to open ended vents, you can use one of the following methods:~~

(ii) Calibrated bagging ~~or high volume sampler~~ according to methods set forth in §98.234(c) ~~and §98.234(d), respectively.~~

(iii) High volume sampler according to methods set forth in §98.234(d),

(iv) For through valve leakage, such as isolation valves **on not operating depressurized compressor packages and blowdown valves on pressurized compressor packages,** you may use an acoustic leak detection device according to methods set forth in §98.234(a). ~~If you do not have a flow meter, you may install a port for insertion of a temporary meter, or a permanent flow meter, on the vents.~~

(4~~3~~) **For each unique mode and vent source combination for which vent gas emission measurements were conducted during the reporting year, e**~~E~~stimate annual emissions **for each centrifugal compressor package** using the flow measurement and Equation W–22 of this section.

Comment [JMc7]: Sentence is redundant and not needed.

Comment [JMc8]: Sentence is not needed because operator clearly has the option to use a temporary or permanent meter.

Comment [JMc9]: NOTE: Calculation and reporting requirements would likely be clearer to reader if Eqn W-24 (i.e., Section 5) was introduced first, which would then provide a more logical flow through the estimates. INGAA did not make this change to avoid section "restructuring" in these edits, but recommends that EPA re-order the sections

~~$E_{s,i,m} = MT_m * T_m * M_{i,m} * (1-B_m)$ (Eq. W-22)~~

$$E_{s,i,m} = MT_m * T_m * M_i$$ **(Eq. W-22)**

Where:

$E_{s,i,m}$ = Annual GHG_i (either CH_4 or CO_2) volumetric emissions ~~at standard conditions~~, in **standard** cubic feet **for the unique mode and vent source combination**.

MT_m = Measured gas **volumetric** emissions in standard cubic feet per hour **for the unique mode and vent source combination**.

T_m = Total time the compressor **package** is in the mode for which $E_{si,\mathbf{m}}$ is being calculated, in the calendar year in hours.

$M_{i,\cancel{m}}$ = Mole fraction of GHG_i in the vent gas; use the appropriate gas composition~~s~~ in paragraph (u)(2) of this section **or according to §98.232(m)**.

~~B_m = Fraction of operating time that the vent gas is sent to vapor recovery or fuel gas as determined by keeping logs of the number of operating hours for the vapor recovery system and the time that vent gas is directed to the fuel gas system or sales.~~

(~~5~~**4**) **For each unique mode and vent source combination for which vent gas emission measurements were not conducted during the reporting year, c**~~C~~alculate annual emissions from each centrifugal compressor **package** using Equation W–23 of this section.

~~$E_{s,i} = \sum_m EF_m * T_m * GHG_i$ (Eq. W-23)~~

$$E_{s,i,m} = EF_m * T_m * GHG_i$$ **(Eq. W-23)**

Where:

$E_{s,i,\mathbf{m}}$ = Annual **GHG_i (either CH_4 or CO_2)** ~~total~~ volumetric ~~GHG~~ emissions ~~at standard conditions~~ from each centrifugal compressor **package** in **standard** cubic feet **for the unique mode and vent source combination**.

EF_m = **For each unique mode and vent source combination,** ~~R~~**r**eporter emission factor ~~for each mode m~~, in **standard** cubic feet per hour, from Equation W–24 ~~of this section~~ as calculated in paragraph **5**~~6~~.

T_m = Total time **the compressor package is in the mode for which $E_{si,m}$ is being calculated, in the calendar year** ~~in hours per year the compressor was in each mode, as listed in paragraph (o)(1)(i) through (o)(1)(iii).~~

GHG_i = For onshore natural gas processing facilities, concentration of GHG_i, CH_4 or CO_2, in produced natural gas or feed natural gas; for other facilities listed in §98.230(a)(4) through (a)(8),GHG_i equals 1 **or use the gas composition allowed in §98.232(m)**.

(5) You shall use **all of** the **volumetric gas** flow measurements **(MT_m)** **for each unique mode and vent source combination (**~~of~~ operating mode wet seal oil degassing vent, operating mode blowdown valve vent**,** and not operating depressurized mode isolation valve vent**)** **to develop** ~~for all the~~ reporter~~'s~~ **emission factors that are mode and vent source-specific. Use Equation W-24** to develop the ~~following~~ emission factors ~~using Equation W–24 of this section~~ for each emission source and mode as listed in paragraph (o)(1)(i) through (o)(1)(iii).

$$EF_m = \frac{\sum MT_m}{Count_m}$$ **(Eq. W-24)**

Where:

EF_m = Reporter emission factor~~s~~ for **centrifugal** compressor **packages** ~~in the~~ **for a unique** ~~three~~ mode~~s~~ ~~m~~ **and vent source combination** as listed in paragraph**s** (o)(1)(i) through (o)(1)(iii)) **of this section,** in **standard** cubic feet **of natural gas** per hour.

MT_m = **All** ~~F~~**f**low ~~M~~**m**easurements from ~~all~~ centrifugal compressor **packages for a unique mode and vent source combination as listed** in **paragraphs** (o)(1)(i) through (o)(1)(iii) of this section**,** in **standard** cubic feet **of natural gas** per hour.

$Count_m$ = Total number of **centrifugal** compressor~~s~~ **packages** measured **in the respective unique mode and vent source combination**.

m = **Three unique** ~~Compressor~~ mode **and vent source combinations** as listed in paragraph (o)(1)(i) through (o)(1)(iii).

(i) **For each of the unique mode and vent source combinations in §98.233(o)(1)(i) through (iii),** ~~The~~ emission factors must be calculated annually. You must use all measurements from the current calendar year and the preceding **one (after the second annual measurement) or** two calendar years, totaling three consecutive calendar years of measurements in paragraph (o)(**5**~~6~~) of this section **for year three and beyond**. **The emission factor is used for calculating compressor package emissions from the unique mode and vent source combinations not measured in a particular year.**

(ii) [Reserved]

(**6**~~7~~) Onshore petroleum and natural gas production shall calculate emissions from **wet seal** centrifugal compressor **packages** ~~wet seal~~ ~~oil degassing vents~~ as follows:

$$E_{s,i} = Count * EF_i \quad \text{(Eq. W-25)}$$

Where:

$E_{s,i}$ = Annual total volumetric GHG emissions ~~at standard conditions~~ from **wet seal** centrifugal compressor **packages** ~~wet seals~~ in **standard** cubic feet.

Count = Total number of **wet seal** centrifugal compressor~~s~~ **packages** for the reporter.

EF_i = Emission factor for GHG_i. Use 12.2 million standard cubic feet per year per compressor **package** for CH_4 and 538 thousand standard cubic feet per year per compressor **package** for CO_2 at 68 °F and 14.7 psia or 12 million standard cubic feet per year per compressor **package** for CH_4 and 530 thousand standard cubic feet per year per compressor **package** for CO_2 at 60 °F and 14.7 psia.

(**7**~~8~~) **Estimate**~~Calcul~~ate ~~both~~ CH_4 and CO_2 mass emissions from volumetric emissions using **the** calculations in paragraph (v) of this section.

~~(9) Calculate emissions from seal oil degassing vent vapors to flares as follows:~~

~~(i) Use the seal oil degassing vent vapor volume and gas composition as determined in paragraphs (o)(5) of this section.~~

~~(ii) Use the calculation methodology of flare stacks in paragraph (n) of this section to determine degassing vent vapor emissions from the flare.~~

(p) *Reciprocating compressor venting.* Calculate CH_4 and CO_2 emissions from all reciprocating compressor vents as follows.

(1) Reciprocating compressor package operating status includes three modes: operating, standby pressurized, and not operating de-pressurized. Reciprocating compressor package vent sources are reciprocating rod packing vents, unit isolation valve vents, and blowdown valve vents**.** For each reciprocating compressor **package** covered in §98.232(d)(1), (e)(1), (f)(1), (g)(1), and (h)(1) you must conduct an annual measurement ~~for each compressor~~ in the mode in which it is found during the annual measurement, except as specified in paragraph (p)(**7**~~9~~) of this section. Measure emissions from **each unique mode and vent source combination in (i) through (iv) of this section applicable to the as-found mode.** ~~(including emissions manifolded to common vents) reciprocating rod packing vents, unit isolation valve vents, and blowdown valve vents~~**). Measurement from a single compressor package can include emissions from unique vent sources manifolded to common vents**. Record emissions from the following vent **sources**~~types~~ in the specified ~~compressor~~ modes during the annual measurement ~~as follows~~:

(i)~~(1)~~ Operating ~~or standby pressurized~~ mode~~,~~ blowdown vent leakage through the blowdown vent stack.

(ii) Operating mode, reciprocating rod packing emissions.

(iii) ~~(2)~~ **Standby pressurized mode blowdown vent leakage through the blowdown vent stack.**

(iv)~~(3)~~ Not operating depressurized mode, unit isolation valve leakage through the blowdown vent stack, without blind flanges.

(A)~~(i)~~ For the not operating depressurized mode, each compressor **package** must be measured at least once in any three consecutive calendar years ~~if this mode is not found in the annual measurement~~. If a compressor **package** is not operated and has blind flanges in place throughout the 3 year period, measurement is not required in this mode. ~~If the compressor is in standby depressurized mode without blind flanges in place and is not operated throughout the 3 year period, it must be measured in the standby depressurized mode.~~

(B)~~(ii)~~ [Reserved]

(2)~~(4)~~ If reciprocating rod packing and blowdown vent are connected to an open-ended vent line**,** ~~use one of the following two methods to calculate emissions~~**.** ~~(i) M~~**m**easure emissions from **each**~~all~~ vent~~s (~~including emissions manifolded to **a** common vent~~s~~ **from a single vent source (**~~including~~ rod packing, unit isolation valves, ~~and~~**or** blowdown **valve** vents**) for a single compressor package**~~)~~ using ~~either~~ **any of the methods in (p)(2)(i) though (iv) of this section. Vents may be screened annually using an optical imaging instrument according to methods in §98.234(a)(1) and if emissions are not present, then measurement per §98.234(b) is not required and emissions are estimated as zero.**

~~calibrated bagging or high volume sampler according to methods set forth in §98.234(c) and §98.234(d), respectively.~~

~~(ii) Use a temporary meter such as a vane anemometer or a permanent meter such as an orifice meter to measure emissions from all vents (including emissions manifolded to a common vent including rod packing vents, unit isolation valve leakage through blowdown vents according to methods set forth in §98.234(b). If you do not have a permanent flow meter, you may install a port for insertion of a temporary meter or a permanent flow meter on the vents.~~

(i) A temporary meter such as a vane anemometer or a permanent meter such as an orifice meter according to methods set forth in §98.234(b).

(ii) Calibrated bagging according to methods set forth in §98.234(c).

(iii) High volume sampler according to methods set forth in §98.234(d).

(iv) For through-valve leakage ~~to open ended vents~~, such as unit isolation valves on not operating depressurized compressor~~s~~ **packages** and blowdown valves on pressurized compressor~~s~~ **packages**, you may use an acoustic detection device according to methods set forth in §98.234(a).

(3)~~(5)~~ If reciprocating rod packing is not equipped with a vent line use the following method to calculate emissions:

(i) You must use the methods described in §98.234(a) to conduct annual leak detection of equipment leaks from the packing case into an open distance piece, or from the compressor crank case breather cap or other vent with a closed distance piece.

(ii) Measure emissions found in paragraph (p)**(3)**~~(5)~~(i) of this section using an appropriate meter, or calibrated bag, or high volume sampler according to methods set forth in §98.234(b), (c), and (d), respectively.

(4)~~(6)~~ **For each unique mode and vent source combination for which vent gas emission measurements were conducted during the reporting year,** ~~E~~estimate annual emissions **for each reciprocating compressor package** using the flow measurement and Equation W–26 of this section.

$$\cancel{E_{s,i,m} = MT_m * T_m * M_{i,m} \quad \text{(Eq. W-26)}}$$

$$E_{s,i,m} = MT_m * T_m * M_i \qquad \textbf{(Eq. W-26)}$$

Where:

$E_{s,i,m}$ = Annual GHG i (either CH_4 or CO_2) volumetric emissions ~~at standard conditions~~, in **standard** cubic feet **for the unique mode and vent source combination**.

MT_m = Measured gas **volumetric** emissions in standard cubic feet per hour **for the unique mode and vent source combination**.

T_m= Total time the compressor **package** is in the mode for which $E_{s,i,m}$ is being calculated, in the calendar year in hours.

$M_{i,m}$ = Mole fraction of GHGi in **the vent** gas; use the appropriate gas composition~~s~~ in paragraph (u)(2) of this section **or according to §98.232(m)**.

(5)~~(7)~~ **For each unique mode and vent source combination for which vent gas emission measurements were not conducted during the reporting year,** ~~C~~**c**alculate annual emissions from each reciprocating compressor **package** using Equation W–27 of this section.

$$\cancel{E_{s,i} = \sum_m EF_m * T_m * GHG_i \quad \text{(Eq. W-27)}}$$

$$E_{s,i,m} = EF_m * T_m * GHG_i \qquad \textbf{(Eq. W-27)}$$

Where:

$E_{s,i,\underline{m}}$ = Annual **GHG_i (either CH_4 or CO_2)** ~~total~~ volumetric ~~GHG~~ emissions ~~at standard conditions~~ from each reciprocating compressor **package** in **standard** cubic feet **for the unique mode and vent source combination**.

EF_m = **For each unique mode and vent source combination,** ~~R~~**r**eporter emission factor ~~for each mode, m,~~ in **standard** cubic feet per hour, from Equation W–28 ~~of this section~~ as calculated in paragraph (p)(~~7~~**6**)~~(i)~~ of this section.

T_m = Total time **the compressor package is in the mode for which $E_{si,m}$ is being calculated, in the calendar year** ~~in hours per year the compressor was in mode, m, as listed in paragraph (p)(1) through (p)(3).~~

GHG_i = For onshore natural gas processing facilities, concentration of GHG i, CH_4 or CO_2, in produced natural gas or feed natural gas; for other facilities listed in §98.230(a)(4) through (a)(8), GHG_i equals 1~~.~~ **or gas composition allowed per §98.232(m)**.

~~m = Compressor mode as listed in paragraph (p)(1) through (p)(3).~~

Comment [JMc10]: NOTE: Calculation and reporting requirements would likely be clearer to reader if Eqn W-28 (i.e., Section 6) was introduced first, which would then provide a more logical flow through the estimates. INGAA did not make this change to avoid section "restructuring" in these edits, but recommends that EPA re-order the sections.

(**6**~~i~~) You shall use **all of** the **volumetric gas** flow ~~meter readings from~~ measurements **(MT_m)** **for each unique mode and vent source combination (**~~of~~ operating **mode** ~~and standby pressurized~~ blowdown vent, **operating mode reciprocating rod packing** vents, **standby pressurized mode blowdown vent**, **and** not operating depressurized isolation valve vent**)** ~~for all the reporter's compressor modes not measured in the calendar year~~ to develop ~~the following~~ **reporter** emission factors **that are mode and vent source-specific**. ~~u~~**U**s**e**~~ing~~ Equation W–28 ~~of this section for~~ **to develop the emission factors** for each **emission source and** mode as listed in paragraph (p)(1)**(i)** through (p)(~~3~~**1**)**(iv)**.

$$\cancel{EF_m = \sum \frac{MT_m}{Count_m} \quad \text{(Eq. W-28)}}$$

$$EF_m = \frac{\sum MT_m}{Count_m} \qquad \textbf{(Eq. W-28)}$$

Where:

EF_m= Reporter emission factor~~s~~ for **reciprocating** compressor **packages** ~~in the~~ **for a unique** ~~three~~ mode~~s, m,~~ **and vent source combination as listed in paragraphs (p)(1)(i) through (p)(1)(iv) of this section,** in **standard** cubic feet **of natural gas** per hour.

MT_m= **All** **flow measurements** ~~Meter readings~~ from ~~all~~ reciprocating compressor **packages for a** **unique** ~~vents in each and~~ mode~~, m,~~ **and vent source combination as** ~~identified~~ **listed** in **paragraphs (p)(1)(i) through (p)(1)(iv) of this section**, in **standard** cubic feet **of natural gas** per hour.

$Count_m$ = Total number of **reciprocating** compressor~~s~~ **packages** measured ~~in each mode, m~~ **in the respective unique mode** **and vent source combination**.

m = **Four unique** ~~Compressor~~ mode **and vent source combinations** as listed in paragraphs (p)(1)(i) through (p)(**1**~~3~~)(iv).

~~(A) You must combine emissions for blowdown vents, measured in the operating and standby pressurized modes.~~

(**i**~~B~~) **For each of the unique mode and vent source combinations in §98.233(p)(1)(i) through (iv),** ~~The~~ emission factors must be calculated annually. You must use all measurements from the current calendar year and the preceding **one (after the second annual measurement) or** two calendar years, totaling three consecutive calendar years of measurements **in paragraph (p)(6) of this section for year three and beyond. The emission factor is used for calculating compressor package emissions from the unique mode and vent source combinations not measured in a particular year**.

(ii) [Reserved]

~~(8) Determine if the reciprocating compressor vent vapors are sent to a vapor recovery system.~~

~~(i) Adjust the emissions estimated in paragraphs (p)(7) of this section downward by the magnitude of emissions recovered using a vapor recovery system as determined by engineering estimate based on best available data.~~

~~(ii) [Reserved]~~

(7)~~(9)~~ Onshore petroleum and natural gas production shall calculate emissions from reciprocating compressor~~s~~ **packages** as follows:

$$E_{s,i} = Count * EF_i \qquad \text{(Eq. W-29)}$$

Where:

$E_{s,i}$= Annual total volumetric GHG emissions ~~at standard conditions~~ from reciprocating compressors in **standard** cubic feet.

Count = Total number of reciprocating compressor~~s~~ **packages** for the reporter.

EF_i= Emission factor for GHG i. Use 9.63 thousand standard cubic feet per year per compressor **package** for $CH_4$and 0.535 thousand standard cubic feet per year per compressor **package** for CO_2at 68 °F and 14.7 psia or 9.48 thousand standard cubic feet per year per compressor **package** for $CH_4$and 0.527 thousand standard cubic feet per year per compressor **package** for CO_2at 60 °F and 14.7 psia.

(8)~~(10)~~ Estimate CH_4 and CO_2 ~~volumetric and~~ mass emissions from volumetric ~~natural gas~~ emissions using the calculations in paragraph~~s (u) and~~ (v) of this section.

...

In (q) and (r), add references to gas composition; minor clarifications and corrections to (t) though (v)

(q) Leak detection and leaker emission factors.

...

GHGi = For onshore natural gas processing facilities, concentration of GHGi, CH_4 or CO_2, in the total hydrocarbon of the feed natural gas; for other facilities listed in § 98.230(a)(4) through (a)(8), GHGi equals 1 for CH_4 and 1.1×10^{-2} for CO_2**, or use the gas composition allowed in §98.232(m)**.

...

(r) *Population count and emission factors.*

...

GHGi = For onshore petroleum and natural gas production facilities and onshore natural gas processing facilities, concentration of GHG i, CH_4 or CO_2, in produced natural gas or feed natural gas; for other facilities listed in § 98.230(a)(4) through (a)(8), GHGi equals 1 for CH_4 and 1.1×10^{-2} for CO_2**, or use the gas composition allowed in §98.232(m)**.

...

(t) *Volumetric emissions.* Calculate volumetric emissions at standard conditions as specified in paragraphs (t)(1) or (2) of this section**, with actual pressure and temperature** determined by engineering estimate based on best available data unless otherwise specified.

(1) Calculate natural gas volumetric emissions at standard conditions ~~by converting actual temperature and pressure of natural gas emissions to standard temperature and pressure of natural gas~~ using **actual natural gas emissions temperature and pressure, and** Equation W–33 ~~of this section~~.

$$E_{s,n} = \frac{E_{a,n} * (459.67 + T_s) * P_a}{(459.67 + T_a) * P_s} \qquad \text{(Eq. W-33)}$$

Where:

$E_{s,n}$ = Natural gas volumetric emissions at standard temperature and pressure (STP) conditions in cubic feet.

$E_{a,n}$ = Natural gas volumetric emissions at actual conditions in cubic feet.

T_s = Temperature at standard conditions (°F).

T_a = Temperature at actual emission conditions (°F).

P_s = Absolute pressure at standard conditions (psia).

P_a = Absolute pressure at actual conditions (psia).

(2) Calculate GHG volumetric emissions at standard conditions ~~by converting actual temperature and pressure of GHG emissions to standard temperature and pressure~~ using **actual GHG emissions temperature and pressure, and** Equation W–34 ~~of this section~~.

$$E_{s,i} = \frac{E_{a,i} * (459.67 + T_s) * P_a}{(459.67 + T_a) * P_s} \quad \text{(Eq. W-34)}$$

Where:

$E_{s,i}$= GHG i volumetric emissions at standard temperature and pressure (STP) conditions in cubic feet.

$E_{a,i}$= GHG i volumetric emissions at actual conditions in cubic feet.

T_s= Temperature at standard conditions (°F).

T_a= Temperature at actual emission conditions (°F).

P_s= Absolute pressure at standard conditions (psia).

P_a= Absolute pressure at actual conditions (psia).

(u) *GHG volumetric emissions.* Calculate GHG volumetric emissions at standard conditions as specified in paragraphs (u)(1) and (2) of this section**, with mole fraction of GHGs in the natural gas** determined by engineering estimate based on best available data unless otherwise specified.

(1) Estimate $CH_4$and CO_2emissions from natural gas emissions using Equation W–35 of this section.

$$E_{s,i} = E_{s,n} * M_i \quad \text{(Eq. W-35)}$$

Where:

$E_{s,i}$= GHG i (either CH_4or CO_2) volumetric emissions at standard conditions in cubic feet.

$E_{s,n}$= Natural gas volumetric emissions at standard conditions in cubic feet.

M_i= Mole fraction of GHGi in the natural gas.

(2) For Equation W–35 of this section, the mole fraction, M_i, shall be the annual average mole fraction for each facility, as specified in paragraphs (u)(2)(i) through (vii) of this section.

(i) GHG mole fraction in produced natural gas for onshore petroleum and natural gas production facilities. If you have a continuous gas composition analyzer for produced natural gas, you must use these values for determining the mole fraction. If you do not have a continuous gas composition analyzer, then you must use your most recent gas composition based on available sample analysis of the field.

(ii) GHG mole fraction in feed natural gas for all emissions sources upstream of the de-methanizer or dew point control and GHG mole fraction in facility specific residue gas to transmission pipeline systems for all emissions sources downstream of the de-methanizer overhead or dew point control for onshore natural gas processing facilities. If you have a continuous gas composition analyzer on feed natural gas, you must use these values for determining the mole fraction. If you do not have a continuous gas composition analyzer, then annual samples must be taken according to methods set forth in §98.234(b).

(iii) GHG mole fraction in transmission pipeline natural gas that passes through the facility for onshore natural gas transmission compression facilities **or the composition in §98.232(m)(1)**.

(iv) GHG mole fraction in natural gas stored in underground natural gas storage facilities **or the composition in §98.232(m)(1)**.

(v) GHG mole fraction in natural gas stored in LNG storage facilities **or the composition in §98.232(m)(1)**.

(vi) GHG mole fraction in natural gas stored in LNG import and export facilities.

(vii) GHG mole fraction in local distribution pipeline natural gas that passes through the facility for natural gas distribution facilities **or the composition in §98.232(m)(1)**.

(v) *GHG mass emissions.* Calculate GHG mass emissions in carbon dioxide equivalent ~~at standard conditions~~ by converting the GHG volumetric emissions **at standard conditions** into mass emissions using Equation W–36 of this section.

$$Mass_{s,i} = E_{s,i} * \rho_i * GWP * 10^{-3} \qquad \text{(Eq. W-36)}$$

Where:

$Mass_{s,I}$ = GHG i (either CH_4**,** ~~or~~ CO_2 **or N_2O**) mass emissions at standard conditions in metric tons CO_2e.

$E_{s,i}$ = GHG i (either CH_4**,** ~~or~~ CO_2 **or N_2O**) volumetric emissions at standard conditions, in cubic feet.

ρ_i = Density of GHG i. Use 0.0538 kg/ft^3 for CO_2 and N_2O, and 0.0196 kg/ft^3 for CH_4 at 68 °F and 14.7 psia or 0.0530 kg/ft^3 for CO_2 and N_2O, and 0.0193 kg/ft^3 for CH_4 at 60 °F and 14.7 psia.

GWP = Global warming potential, 1 for CO_2, 21 for CH_4, and 310 for N_2O.

...

§ 98.234 Monitoring and QA/QC requirements.

REVISIONS TO ADD METHOD FLEXIBILITY AND TO ALLOW AN ALTERNATIVE TO AWP IN 60.18(i) THAT CAPTURES THE RELEVANT PERFORMANCE SPECS FOR DAILY QA/QC

The GHG emissions data for petroleum and natural gas emissions sources must be quality assured as applicable as specified in this section. Offshore petroleum and natural gas production facilities shall adhere to the monitoring and QA/QC requirements as set forth in 30 CFR 250.

(a) You must use any of the methods described as follows in this paragraph to conduct leak detection(s) of equipment leaks and through-valve leakage from all source types listed in §98.233(k), (o), (p) and (q) that occur during a calendar year, except as provided in paragraph (a)(4) of this section.

(1) *Optical gas imaging instrument.* Use an optical gas imaging instrument for equipment leak detection in accordance with **(i) or (ii).**

(i) 40 CFR part 60, subpart A, §60.18(i)(1)**(i)** and (2) of the *Alternative work practice for monitoring equipment leaks* **with a detection sensitivity of 60 grams per hour**. Any emissions detected by the optical gas imaging instrument is a leak unless screened with Method 21 (40 CFR part 60, appendix A–7) monitoring, in which case 10,000 ppm or greater is designated a leak. **Video records per §60.18(i)(1)(ii) are not required.** ~~In addition, you must operate the optical gas imaging instrument to image the source types required by this subpart in accordance with the instrument manufacturer's operating parameters.~~

(ii) Operate the optical gas imaging instrument consistent with manufacturer operating procedures. The instrument must meet the specification in §60.18(i)(1)(i) and manufacturer procedures must include daily instrument check procedures similar to those in §60.18(i)(2) based on a detection sensitivity level of 60 grams methane per hour (equivalent to 3.1 SCFH) with a purity of no less than 98 percent by volume. Video records per §60.18(i)(1)(ii) are not required.

(iii) An operator can elect to conduct annual optical gas imaging according to paragraph (i) or (ii) of this section to screen vents that require measurement under §98.233(o) and (p). Vent rate measurement is not required and the vent rate is recorded as zero if optical gas imaging does not detect vented gas.

(2) *Method 21.* Use the equipment leak detection methods in 40 CFR part 60, appendix A–7, Method 21. If using Method 21 monitoring, if an instrument reading of 10,000 ppm or greater is measured, a leak is detected. Inaccessible emissions sources, as defined in 40 CFR part 60, are not exempt from this subpart. Owners or operators must use alternative leak detection devices as described in paragraph(a)(1) of this section to monitor inaccessible equipment leaks or vented emissions.

(3) *Infrared laser beam illuminated instrument.* Use an infrared laser beam illuminated instrument for equipment leak detection. Any emissions detected by the infrared laser beam illuminated instrument is a leak unless screened with Method 21 monitoring, in which case 10,000 ppm or greater is designated a leak. In addition, you must operate the infrared laser beam illuminated instrument to detect the source types required by this subpart in accordance with the instrument manufacturer's operating parameters.

(4) *Optical gas imaging instrument.* An optical gas imaging instrument must be used for ~~all source types~~ **components requiring a leak survey** that are inaccessible and cannot be monitored without elevating the monitoring personnel more than 2 meters above a support surface.

(5) *Acoustic leak detection device.* Use the acoustic leak detection device to detect through-valve leakage. When using the acoustic leak detection device to quantify the through-valve leakage, you must use the instrument manufacturer's calculation methods to quantify the through-valve leak. When using the acoustic leak detection device, if a leak of 3.1 scf per hour or greater is calculated, a leak is detected. In addition, you must operate the acoustic leak detection device to monitor the source valves required by this subpart in accordance with the instrument manufacturer's operating parameters. **Acoustic devices that provide an audible leak signal but do not calculate a leak rate can be used to identify non-leakers with subsequent measurement required to calculate the rate if through-valve leakage is identified. Leaks are reported if a leak rate of 3.1 scf per hour or greater is measured.**

(b) You must operate and calibrate all flow meters, composition analyzers and pressure gauges used to measure quantities reported in §98.233 according to the procedures in §98.3(i) and the procedures in paragraph (b) of this section. You may use an appropriate standard method published by a consensus-based standards organization if such a method exists or you may use an industry standard practice. Consensus-based standards organizations include, but are not limited to, the following: ASTM International, the American National Standards Institute (ANSI), the American Gas Association (AGA), the American Society of Mechanical Engineers (ASME), the American Petroleum Institute (API), and the North American Energy Standards Board (NAESB).

(c) Use calibrated bags (also known as vent bags) only where the emissions are at near-atmospheric pressures **and below the maximum temperature specified by the vent bag manufacturer** such that ~~it~~ **the bag** is safe to handle**.** ~~and can capture all the emissions, below the maximum temperature specified by the vent bag manufacturer,~~ ~~and~~ **The bag must be of sufficient size that** the entire emissions volume can be encompassed for measurement.

(1) Hold the bag in place enclosing the emissions source to capture the entire emissions and record the time required for completely filling the bag. If the bag inflates in less than one second, assume one second inflation time.

(2) Perform three measurements of the time required to fill the bag, report the emissions as the average of the three readings.

(3) Estimate natural gas volumetric emissions at standard conditions using calculations in §98.233(t).

(4) Estimate $CH_4$and CO_2volumetric and mass emissions from volumetric natural gas emissions using the calculations in §98.233(u) and (v).

(d) Use a high volume sampler to measure emissions within the capacity of the instrument.

(1) A technician following manufacturer instructions shall conduct measurements, including equipment manufacturer operating procedures and measurement methodologies relevant to using a high volume sampler, including positioning the instrument for complete capture of the equipment leak without creating backpressure on the source.

(2) If the high volume sampler, along with all attachments available from the manufacturer, is not able to capture all the emissions from the source then use anti-static wraps or other aids to capture all emissions without violating operating requirements as provided in the instrument manufacturer's manual.

(3) Estimate natural gas volumetric emissions at standard conditions using calculations in §98.233(t).

(~~3~~**4**) Estimate CH_4 and CO_2 volumetric and mass emissions from volumetric natural gas emissions using the calculations in §98.233(u) and (v).

(~~4~~**5**) Calibrate the instrument at 2.5 percent methane with 97.5 percent air and 100 percent CH_4 by using calibrated gas samples and by following manufacturer's instructions for calibration.

...

§ 98.235 Procedures for estimating missing data.

[INITIAL SUGGESTION OF TEXT TO BROADEN "ACCESS" TO MISSING DATA PROVISIONS]

A complete record of all estimated and/or measured parameters used in the GHG emissions calculations is required. If data are lost or an error occurs during annual emissions estimation or measurements, **or an unanticipated circumstance prevents a measurement or leak survey,** you must repeat **or conduct** the estimation or measurement activity for those sources as soon as possible, including in the subsequent calendar year if missing data are not discovered until after December 31 of the year in which data are collected, until valid data for reporting is obtained. Data developed and/or collected in a subsequent calendar year to substitute for missing data cannot be used for that subsequent year's emissions estimation. Where missing data procedures are used for the previous year, at least 30 days must separate emissions estimation or measurements for the previous year and emissions estimation or measurements for the current year of data collection. For missing data which are continuously monitored or measured, (for example flow meters), or for missing temperature or pressure data that are required under § 98.236, the reporter may use best available data for use in emissions determinations. The reporter must record and report the basis for the best available data in these cases.

§ 98.236 Data reporting requirements.

CORRECTIONS ARE ADDED FOR CONSISTENCY WITH §98.233 REVISIONS AND UNDERSTANDING OF EPA'S INTENT ON DESIRED INFO FOR REPORTING

In addition to the information required by §98.3(c), each annual report must contain reported emissions and related information as specified in this section.

(a) Report annual emissions separately for each of the industry segments listed in paragraphs (a)(1) through (8) of this section in metric tons CO_2e per year~~ at standard conditions~~. For each segment, report emissions from each source type §98.232(a) in the aggregate, unless specified otherwise. For example, an onshore natural gas production operation with multiple reciprocating compressors must report emissions from all reciprocating compressors as an aggregate number.

...

(c) For each aggregated source, unless otherwise specified, report activity data and emissions (in metric tons CO_2e per year ~~at standard conditions~~) for each aggregated source type as follows:

(1) For natural gas pneumatic devices (refer to Equation W–1 of §98.233), report the following:

(i) ~~Actual~~ ~~c~~**C**ount ~~and estimated count separately~~ of natural gas pneumatic high bleed devices~~ as applicable~~.

(ii) ~~Actual~~ ~~c~~**C**ount ~~and estimated count separately~~ of natural gas pneumatic low bleed devices~~ as applicable~~.

Comment [JMc11]: Reference to "actual" deleted for consistency with language added in 98.233(a) regarding "best available info" for defining device type. In addition, §98.233(a) criteria clearly identify differences allowed for device counts for different segments.

(iii) ~~Actual~~ ~~c~~**Count** ~~and estimated count separately~~ of natural gas pneumatic intermittent bleed devices ~~as applicable~~.

(iv) Report emissions collectively **for all pneumatic devices**.

...

(7) For ~~each~~ blowdown vent stack**s** (refer to Equation W–14**a or W-14b** of §98.233), report the following:

(i) Total number of blowdowns per equipment type in calendar year **for Equation W-14a**.

(ii) **Total number of blowdowns in calendar year for Equation W-14b.**

(iii) Report emissions collectively ~~per equipment type~~.

Comment [JMc12]: As noted in section 98.233(i), for facility blowdowns calculated using Eq W-14b, most or all events will include a unique volume, so tracking counts "per equipment type" is not appropriate

...

(9) For transmission tank ~~emissions identified using optical gas imaging instrument per §98.234(a) (refer to §98.233(k)), or acoustic leak detectionof~~ scrubber dump valves**,** report the following for each tank:

(i) Report emissions individually **for each tank**.

(ii) [Reserved]

...

(13) For ~~each~~ centrifugal compressor **package**s:

(i) For **each wet seal centrifugal** compressor~~s~~ **package** ~~with wet seals~~ in operati**ng**~~onal~~ mode ~~(refer to Equations W–22 through W–24 of §98.233)~~, report the following ~~for each degassing vent~~:

(A) Number of wet seals connected to the degassing vent.

(B) Fraction of **wet seal oil degassing** vent gas recovered for fuel or sales or flared.

(C) ~~Annual throughput in million scf, use an engineering calculation based on best available data.~~

~~(D) Type of meters used for making measurements.~~

~~(E) Reporter emission factor for wet seal oil degassing vents in cubic feet per hour (refer to Equation W–24 of §98.233).~~

~~(F) Total time the compressor **driver** is operating in hours.~~

(~~G.~~) ~~Report~~ **Annual wet** seal oil degassing vent emissions **in metric tons of CH_4 and metric tons of CO_2** ~~Report seal oil degassing vent emissions for compressors measured (refer to Equation W–22 of §98.233) and for compressors not measured (refer to Equation W–23 and Equation W–24 of §98.233)~~.

(ii) For **each** wet ~~and~~ **or** dry seal centrifugal compressor~~s~~ **package** in operating mode~~, (refer to Equations W–22 through W–24 of §98.233),~~ report the following:

(A) Total time in hours the compressor **package** is in operating mode.

(B) ~~Reporter emission factor for blowdown vents in cubic feet per hour (refer to Equation W–24 of §98.233).~~

~~(C)~~ ~~Report~~ **B**~~b~~lowdown vent emissions **in metric tons of CH_4 and metric tons of CO_2** ~~when in operating mode (refer to Equation W–23 and Equation W–24 of §98.233~~).

(C) Annual throughput in million scf, use an engineering calculation based on best available data.

(iii) For **each** wet ~~and~~ **or** dry seal centrifugal compressor~~s~~ **package** in not operating depressurized mode ~~(refer to Equations W–22 through W–24 of §98.233)~~, report the following:

(A) Total time in hours the compressor **package** is in ~~shutdown,~~ **not operating** depressurized mode.

(B) ~~Reporter emission factor for isolation valve emissions in shutdown, depressurized mode in cubic feet per hour (refer to Equation W–24 of §98.233).~~

~~(C)~~ ~~Report the~~ ~~i~~**I**solation valve leakage emissions in not operating depressurized mode in ~~cubic feet~~ **metric tons of CH_4** ~~per hour~~ **and metric tons of CO_2** ~~(refer to Equation W–23 and Equation W–24 of §98.233).~~

(iv) **For each centrifugal compressor package**, ~~R~~**r**eport total annual ~~compressor~~ emissions from all modes of operation ~~(refer to Equation W–24 of §98.233~~).

(v) Report the following:

(A) Reporter emission factor for wet seal oil degassing vents in operating mode in standard cubic feet of natural gas per hour (refer to Equation W–24 of §98.233).

(B) Reporter emission factor for blowdown vents in operating mode in standard cubic feet of natural gas per hour (refer to Equation W–24 of §98.233).

(C) Reporter emission factor for isolation valve emissions in not operating depressurized mode in cubic feet of natural gas per hour (refer to Equation W–24 of §98.233).

(v**i**) For centrifugal compressors in onshore petroleum and natural gas production (refer to Equation W–25 of § 98.233), report the following:

(A) Count of compressor~~s~~ **packages**.

(B) Report emissions (refer to Equation W–25 of § 98.233) collectively.

(14) For reciprocating compressor **package**s:

(i) For **each** reciprocating compressor~~s~~ **package** ~~rod packing emissions with or without a vent~~ in operating mode, report the following:

(A) Annual throughput in million scf, use an engineering calculation based on best available data.

(B) Total time in hours the reciprocating compressor **package** is in operating mode.

(C) ~~Report~~ **Annual** rod packing emissions **in metric tons of CH_4 and metric tons of CO_2** ~~for compressors measured (refer to Equation W–26 of §98.233) and for compressors not measured (refer to Equation W–27 and Equation W–28 of §98.233).~~

(D) Annual blowdown vent emissions in metric tons of CH_4 and metric tons of CO_2.

(ii) For **each** reciprocating compressor~~s~~ **package** ~~blowdown vents not manifold to rod packing vents~~, in ~~operating and~~ standby pressurized mode ~~(refer to Equations W–26 through W–28 of §98.233)~~, report the following:

(A) Total time in hours the compressor is in standby, pressurized mode.

(B) ~~Reporter emission factor for blowdown vents in cubic feet per hour (refer to §98.233, Equation W–28).~~

~~(C)~~ ~~Report~~ **Annual** blowdown vent emissions **in metric tons of CH_4 and metric tons of CO_2** ~~when in operating and standby pressurized modes (refer to Equation W–27 and Equation W–28 of §98.233).~~

(iii) For **each** reciprocating compressor~~s~~ **package** in not operating depressurized mode ~~(refer to Equations W–26 through W–28 of §98.233)~~, report the following:

(A) Total time the compressor **package** is in not operating depressurized mode.

(B) ~~Reporter emission factor for isolation valve emissions in not operating depressurized mode in cubic feet per hour (refer to Equation W–28 of §98.233).~~

~~(C) Report the~~ **Annual** isolation valve leakage emissions **in metric tons of CH_4 and metric tons of CO_2** ~~in not operating depressurized mode.~~

(iv) **For each reciprocating compressor <u>package</u>**, ~~R~~**<u>r</u>**eport total annual ~~compressor~~ emissions from all modes of operation ~~(refer to Equation W–27 and Equation W–28 of §98.233)~~.

(vi) <u>Report the following:</u>

<u>(A) Reporter emission factor for rod packing vents in operating mode in standard cubic feet of natural gas per hour (refer to Equation W–28 of §98.233).</u>

<u>(B) Reporter emission factor for blowdown vents in operating mode in standard cubic feet of natural gas per hour (refer to Equation W–28 of §98.233).</u>

<u>(C) Reporter emission factor for blowdown vents in standby pressurized mode in standard cubic feet of natural gas per hour (refer to Equation W–28 of §98.233).</u>

<u>(D) Reporter emission factor for isolation valve emissions in not operating depressurized mode in cubic feet of natural gas per hour (refer to Equation W–28 of §98.233).</u>

(v**<u>ii</u>**) For reciprocating compressors in onshore petroleum and natural gas production (refer to Equation W–29 of §98.233), report the following:

(A) Count of compressor~~s~~ **<u>packages.</u>**

(B) Report emissions collectively.

(15) For each equipment leak source~~s~~ that use~~s~~ emission factors for estimating emissions (refer to §98.233(q) and (r)**<u>)</u>**.

(i) For equipment leaks found in each leak survey (refer to §98.233(q)), report the following:

(A) Total count of leaks found in each complete survey listed by date of survey and each type of leak source for which there is a leaker emission factor in Tables W–2, W–3, W–4, W–5, W–6, and W–7 of this subpart.

(B) ~~Concentration of CH_4 and CO_2 as described in Equation W–30 of §98.233.~~

~~(C)~~ ~~Report~~ **<u>Annual</u>** CH_4 and CO_2 emissions (refer to Equation W–30 ~~of §98.233~~) collectively by equipment type.

(ii) For equipment leaks calculated using population counts and **<u>emission</u>** factors (refer to §98.233(r)), report the following:

(A) For source categories §98.230(a)(3), (a)(4), (a)(5), (a)(6), and (a)(7), total count for each type of leak source in Tables W–2, W–3, W–4, W–5, and W–6 of this subpart for which there is a population emission factor, listed by major heading and component type.

(B) For onshore production (refer to §98.230 paragraph (a)(2)), total count for each type of major equipment in Table W–1B and Table W–1C of this subpart, by field.

(C) ~~Report~~ **<u>Annual</u>** CH_4 and CO_2 emissions (refer to Equation W–31 ~~of §98.233~~) collectively by equipment type.

...

§ 98.237 Records that must be retained.

Monitoring Plans, as described in §98.3(g)(5), must be completed by April 1, 2011. In addition to the information required by §98.3(g), you must retain the following records:

(a) Dates on which measurements were conducted.

(b) Results of all emissions detected and measurements **<u>except video records from optical imaging conducted according to §98.234(a)(1) or (4) are not required</u>**.

...

§ 98.238 Definitions.

Except as provided in this section, all terms used in this subpart have the same meaning given in the Clean Air Act and subpart A of this part.

...

Compressor means any machine for raising the pressure of a natural gas or CO_2 by drawing in low pressure natural gas or $CO_2$and discharging significantly higher pressure natural gas or CO_2.

***Compressor package* means one or more compressors with a single drive, including separable, integral, and multi-stage compressor designs.**

...

TABLES – APPARENT ERROR IN TABLE W-4

There appears to be a heading in Table W-4 that is not appropriate. The third bold heading in the table states, **"Leaker Emission Factors—Storage Station, Gas Service".** It appears that this heading should be **deleted** and the following line that present a component emission factor ("open ended line............ 0.03") should be merged with the previous section under the second heading, "**Population Emission Factors—Storage Wellheads, Gas Service".**

Definitions for Pneumatics in Subpart A

§ 98.6 Definitions.

...

Continuous bleed means a continuous flow of pneumatic supply gas to the process **control** ~~measurement~~ device (*e.g.* level control, temperature control, pressure control) where the supply gas pressure is modulated by the process condition, and then flows to the valve controller where the signal is compared with the process set-point to adjust gas pressure in the valve actuator.

...

Intermittent bleed pneumatic devices mean automated flow control devices powered by pressurized natural gas and used for **automatically** maintaining a process condition such as liquid level, pressure, delta-pressure and temperature. These are snap-acting or throttling devices that discharge **a portion or** the full volume of the actuator intermittently when control action is necessary, but does not bleed continuously.

IN ADDITION – RECOMMEND EXPLANATORY PARAGRPAH FOR THE PREAMBLE TO PROVIDE EXAMPLES (PER DISCUSSION WITH EPA) OF DEVICES INCLUDED AND DEVICES EXCLUDED. Example text follows:

The definition of "intermittent bleed pneumatic device" was revised and examples of devices that are categorized as intermittent pneumatics, as well as devices that are excluded, are provided here. Examples of intermittent pneumatic or control loop devices include level switches, positioners, pressure switches, thermostats, flow integrators, controller-pilots, and volume boosters. Gas actuated isolation valves and recording or control measurement devices are not considered pneumatic devices under Subpart W. Manual assist devices and pneumatic controller devices that are infrequently actuated, sealed, or do not emit to atmosphere are not considered pneumatic devices under Subpart W, including transmitters, transducers, relays (also called a booster, transmitter, or amplifier), gauges, control valve operator/actuators, and self contained regulators. Subpart W intermittent bleed pneumatic device emissions are only associated with the pneumatic controller, and actuator venting is not counted as a device.

Comment [JMc13]: INGAA considered including "examples" in the definition on "intermittent" device, but the list may be too large and cumbersome. As an alternative, INGAA recommends including a paragraph in the preamble that lists examples.