Interstate Natural Gas Association of America

June 11, 2010

Environmental Protection Agency
EPA Docket Center (EPA/DC)
Attention: Docket ID No. EPA-HQ-OAR-2009-0923
Mailcode 2822T
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

Re: **Comments Regarding the Proposed Rule, Mandatory Reporting of Greenhouse Gases: Petroleum and Natural Gas Systems dated April 12, 2010 (75 FR 18608)**

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: Petroleum and Natural Gas Systems (Proposed Rule) dated April 12, 2010 (75 FR 18608). The Proposed Rule addresses 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 90 percent of the nation's natural gas, through some 200,000 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 already 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 the Proposed Rule requirements in Subpart W.

INGAA member companies have taken a proactive role on greenhouse gas emissions, including supporting development of the INGAA document, *Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage*. The INGAA GHG Guidelines present emission estimation approaches for natural gas transmission and storage systems. INGAA has also completed a cooperative effort with other natural gas trade associations to review currently available GHG emission factors, and INGAA and its members continue to pursue projects to improve GHG emission factors and estimation methods for natural gas systems.

As discussed in detail in the attached comments, EPA's decision to exclude Subpart W from the October 2009 final Mandatory Reporting Rule provided the opportunity to improve upon the original Subpart W proposal from April 2009. INGAA supports a number of facets of the April 2010 Proposed Rule. However, INGAA still has concerns with the proposed Subpart W, including the need for an applicability screening method, prescriptive criteria that should be replaced with flexibility for measurement and monitoring requirements and emission factor updates, unnecessary requirements for annual three mode testing of reciprocating compressors, the potential for unacceptable safety risk to conduct vent measurements, and the need for a phased approach to rule implementation.

INGAA comments document support where appropriate and recommend solutions to outstanding issues. Through these comments and cooperative ongoing dialogue with EPA, INGAA believes that a final rule is achievable 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
Director, Environment and Construction Policy
Interstate Natural Gas Association of America

Attachment: INGAA Comments, Docket No. EPA-HQ-OAR-2009-0923, Mandatory Reporting of Greenhouse Gases: Petroleum and Natural Gas Systems, dated April 12, 2010 (75 FR 18608)

cc by email: Bill Irving, US EPA
Dina Kruger, US EPA
Paul Gunning, US EPA
Roger Fernandez, US EPA
Akachi Imegwu, US EPA
Carole Cooke, US EPA
Regan Tate, US EPA
Lisa Hanle, US EPA

COMMENTS ON THE PROPOSED RULE
FOR MANDATORY REPORTING OF GREEENHOUSE GASES

Proposed Addition to Code of Federal Regulations Title 40, Part 98

75 Federal Register 18608, April 12, 2010

Submitted by:
Interstate Natural Gas Association of America (INGAA)
10 G Street, N.E., Suite 700
Washington, D.C. 20002

Submitted to:
Docket ID No. EPA-HQ-OAR-2009-0923
U.S. Environmental Protection Agency
EPA Docket Center (EPA/DC)
Attention: Docket ID No. EPA-HQ-OAR-2009-0923
Mailcode 2822T
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

June 11, 2010

[This page intentionally blank]

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

EXECUTIVE SUMMARY

INGAA members share EPA's desire to collect accurate, reliable and reasonably complete data on greenhouse gas (GHG) emissions. In fact, INGAA members have voluntarily worked with EPA to develop improved tools for collecting emissions data and estimating GHG emissions from natural gas systems for more than a decade. INGAA members also acknowledge EPA's desire to improve the quality of data on fugitive and vented emissions of methane from natural gas transmission compressor stations. INGAA agreed with EPA's decision to defer promulgation of Subpart W when the GHG Mandatory Reporting Rule was adopted in October 2009. Additional time was warranted to address compelling issues associated with GHG emission estimates and reporting from natural gas systems. However, INGAA refrains from endorsing the Proposed Rule, which imposes significant new cost and logistical issues for the natural gas transmission and storage segments. Issues clearly remain that necessitate the commitment of additional time and resources to finalize the Proposed Rule.

INGAA supports a number of key provisions in the proposed rule that include, in some cases, changes from the 2009 proposed version of Subpart W, particularly: (1) excluding natural gas transmission pipeline segments from Subpart W; (2) focusing on key source types and limiting the sources to report for each industry segment; (3) eliminating some of the direct measurement requirements proposed in 2009; (4) increasing the use of emission factors (EFs) relative to the April 2009 rule proposal; and (5) defining fugitive and vented emissions more clearly. In addition, INGAA generally supports the primary basis of emission estimates for the seven sources identified for gas transmission compression facilities, five sources for underground natural gas storage facilities, and three sources for liquefied natural gas storage facilities. Still, these emission estimation methods need to be further revised and clarified.

While the April 2010 proposed Subpart W includes improvements from the 2009 version, important issues remain that must be reconciled to facilitate implementation of Subpart W reporting and to provide clear compliance criteria for subject facilities. Primary INGAA issues regarding the Subpart W Proposed Rule include:

- Either reporting should be deferred for a year, or a phased approach should be implemented over three years for reporting Subpart W vented and fugitive emission sources that require measurement or leak monitoring. The Proposed Subpart W implementation schedule needs to be revised due to: the breadth of coverage; new monitoring and measurement requirements for natural gas transmission and storage; safety and measurement accessibility concerns; and the limited availability of qualified service providers and trained technicians, as well as certain monitoring equipment or instrumentation. For the phased approach, INGAA recommends reporting combustion and some vented emissions for all affected facilities in the first year, with GHG emission estimates based on vent measurement and leak monitoring phased-in over three years.
- An applicability screening method is needed to identify facilities that are required to report. INGAA recommends an emissions applicability threshold based on combustion emissions and event-based blowdown emissions that includes a compliance assurance margin. This screening method is necessary to provide compliance certainty, avoid unnecessary costs for testing at smaller facilities that would emit below the 25,000 metric tons CO_2e threshold, and

reduce additional strain on the limited availability of technology (e.g., optical imaging camera), service providers, and technicians qualified to complete measurements.

- Additional clarity is needed in §98.232 regarding segment-specific sources to report and segment categorization. INGAA supports EPA's intent to limit reporting to segment-specific sources listed in §98.232. However, the regulatory text needs to be further clarified to avoid unnecessary implementation questions. In addition, INGAA recommends using the facility primary NAICS code as the basis to identify the appropriate segment for a particular facility.
- For reciprocating compressor rod packing, an alternative to annual three-mode testing is required. Multi-mode testing, including tests with the compressor de-pressurized, would result in additional facility GHG emissions because a compressor blowdown would be required to complete the test. In addition, annual three-mode tests will add considerable burden, negatively impact system operations and unit availability, be difficult to coordinate, and place additional strain on the limited availability of service providers and qualified technicians. INGAA strongly recommends that annual tests be conducted at a single, "as found" mode. With the test mode reported, EPA will be able to evaluate sector-wide information on emissions during the three different operating modes without increasing GHG emissions or temporarily stopping needed energy supply. Furthermore, rule requirements could be stipulated to ensure that atypical modes are not preferentially measured during the annual test.
- The Proposed Rule is too prescriptive and additional flexibility is needed to avoid unnecessary burden and safety risk while ensuring quality data. Rule requirements are too limiting and additional flexibility should be provided for several areas, including:
  - Preclude unnecessary safety risk associated with vent access. In many cases, the design of existing facilities precludes safe access to roofline compressor vents and safe access to condensate tank vents. In addition, accessing vents could place technicians at risk should an emergency shutdown (i.e., blowdown) occur while conducting a vent measurement. While alternative access may be feasible at some facilities, the Proposed Rule implementation schedule precludes design and installation of vent access points at all facilities within the prescribed timeframe for initial reporting. Alternatives are necessary as discussed in more detail below.
  - A single vent measurement should be allowed as an acceptable option for manifolded vent lines that combine multiple sources in lieu of other methods including multi-mode testing. Some facilities include manifolded vent lines which are amenable to *continuous, direct measurement and reporting of a total, measured, annual vent volume*. Operators should be allowed to measure and report these emissions, which could cover multiple emission sources within the segment and/or multiple compressor modes. These highly accurate data will provide EPA with additional, valuable information on facility GHG emissions that supplements data from other facilities that follow conventional requirements in the Proposed Rule. In general, for emission estimation methods provided in Subpart W, proven direct measurement alternatives implemented at the operator's discretion should be included.
  - To facilitate revisions as information improves, emission factors (EFs) in Subpart W tables should be moved to a separate EPA document that is incorporated into the rule by reference. The Proposed Rule includes default methane EFs in Tables W-1 through W-7,

including Table W-3 and Table W-4 for natural gas transmission and storage, respectively. Once final, the rule will not likely change for many years; thus, the emission factors will become outdated and inaccurate. This is the same issue that plagues some current emission estimates based on factors that are over ten years old. To facilitate updates and ensure that the state-of-the-science advances, emission factors should be referenced in the rule and published in a separate EPA technical document.

- Alternatives to the optical camera should be allowed for fugitive emissions leak screening. Limiting leak identification technologies to the optical camera alone is too restrictive and will increase costs and exacerbate the current shortage of qualified personnel. Accepted alternatives (e.g., methane detectors, ultrasonic/acoustical methods, and soap solution) are available, are already used in practice, and provide better or equivalent data in many cases. These methods should be included in §98.234(a), and where standard methods are not readily available, industry standards or best practices should be allowed.
- Flexibility should be provided for metering technology and acceptable monitoring and measurement methods. This includes use of a larger suite of methods and technologies for vent measurement as long as accuracy criteria can be met, and the ability to employ industry standard practices when consensus-based measurement or monitoring methods are not available. Without this flexibility, technology will remain stagnant and innovation will be suppressed.

Additional concerns are expressed and discussed in the detailed INGAA comments regarding issues including reporting and recordkeeping, storage tank reporting for compressor stations, clarifications to address ambiguity in definitions and calculation methods, missing data criteria, and recognition of implementation and cost concerns and limited expertise to address rule requirements in initial years.

Consistent with its past work with EPA on GHGs and other Clean Air Act rulemakings, INGAA prefers to address the Proposed Rule through cooperative engagement to address the issues in these comments. INGAA offers its assistance to reconcile the issues herein and facilitate the development of viable Subpart W requirements for natural gas transmission and storage facilities.

I. Introduction

A. The Natural Gas Transmission and Storage Sector and the Role of Natural Gas in National Energy and Environmental Policy

The Interstate Natural Gas Association of America (INGAA) is the trade association of the interstate natural gas pipeline industry, with members operating natural gas transmission and storage facilities along interstate natural gas pipelines. These natural gas operations result in methane emissions through vented emissions and fugitive emissions (i.e., equipment leaks). On April 12, 2010, the Proposed Rule, Mandatory Reporting of Greenhouse Gases: Petroleum and Natural Gas Systems (Proposed Rule) was published in the Federal Register at 75 FR 18608. The Proposed Rule addresses greenhouse gas (GHG) reporting requirements for GHG sources in the petroleum and natural gas sectors.

While INGAA understands EPA's mandate to develop GHG reporting requirements, INGAA believes that reporting requirements must properly and equitably balance reporting burden with reasoned objectives for data quality and accuracy. The vital role of natural gas in meeting national environmental and energy security objectives should also be acknowledged while ensuring that inequitable burden is not placed on this industrial sector.

As the nation's economy moves to reduce GHG emissions and lessen its dependence on foreign oil, natural gas will continue to play an important role. The role of natural gas in balancing energy demand, increasing energy security, and meeting environmental goals will endure because natural gas is the cleanest burning fossil fuel and because it is abundant in the U.S. and North America as reserves continue to grow. Natural gas is already recognized as a clean source of fuel for generating electricity and has been the fuel of choice for the vast majority of new electrical generating capacity built in the U.S. over the last ten years. Also, natural gas is a vital, value-added feedstock in chemical manufacturing and many other industries, and it is an extremely efficient and cost effective fuel for home heating, water heating, stovetops and other direct uses.

The carbon content of natural gas (measured in CO_2 emissions per unit of energy) is about 40 percent less than the carbon content of coal. Moreover, because of the relative efficiency of currently deployed combustion technologies for natural gas versus coal, the carbon advantages of natural gas are even greater when considering CO_2 emissions per unit of electricity output. Simply put, electricity produced from natural gas generates less than half the GHG emissions of electricity produced from coal, with significant reduction or elimination of other pollutants such as particulate matter, mercury, and ash. Gas-fired electricity generation is also well suited to supplement and back-up renewable electricity generation.

A well-balanced domestic energy portfolio is needed, employing all fossil fuels, renewable sources, nuclear, and hydroelectric facilities. Research and development as well as deployment of new nuclear generating stations and clean coal technologies [e.g., Integrated Gasification Combined Cycle (IGCC) units and carbon sequestration] require taxpayer subsidies and will take years to achieve significant market penetration. Natural gas-fired power plants are one of the few low-emissions alternatives for generating the electricity needed to keep pace with increasing

demand, as well as achieving capacity needs that may result from the retirement of less efficient and higher emitting older generators. And, while solar- and wind-fueled electricity technologies will play an increasing role in meeting U.S. energy needs, these technologies still continue to depend on natural gas-fired generation to compensate for their intermittent availability.

Federal climate policy is inextricably linked to national energy policy and energy security. Therefore, all climate polices must be optimized to ensure energy supply and energy security concerns are addressed, while mitigating potential risks from climate change. Hence, the effect on the nation's energy and economic security must be considered as GHG regulations are developed.

B. The 2010 Version of Proposed Subpart W Includes Positive Revisions to the 2009 Version

In response to the April 2009 proposed GHG Mandatory Reporting Rule, INGAA and others filed comments identifying significant issues with Subpart W, the portion of the 2009 Proposed Rule dealing with GHG emissions from petroleum and natural gas systems. In response to those comments, EPA chose to withdraw Subpart W from the 2009 final rule and re-propose it at a later date. The re-proposed version of Subpart W, published in the Federal Register on April 12, 2010, includes some changes that INGAA supports.

Revisions in the 2010 Proposed Rule that INGAA supports include:

- §98.232 identifies a specific list of sources to report for each of the eight Subpart W industry segments and focuses on primary sources for each segment;
- The direct measurement requirements for natural gas transmission and storage sources are better balanced to consider data quality and measurement burden than they were when proposed in 2009;
- Fugitive and vented emissions are more clearly segregated and defined; and
- Emission factor use is more prevalent than as proposed in 2009.

For several of these items, INGAA believes that the Proposed Rule requires additional clarity and revision to facilitate rule interpretation and implementation. Such issues are discussed in the following comments.

In addition, and consistent with the 2009 rule proposal, INGAA supports the Subpart W source applicability criteria for natural gas transmission and storage which includes emissions from compressor stations and storage facilities, while excluding pipeline emissions. The Technical Support Document provides sound reasoning for this approach.

DETAILED INGAA COMMENTS

A detailed discussion of INGAA comments follows. Primary issues are summarized in the following bullets, with additional detail following in subsequent sections. Comments on

additional issues other than the primary issues are also provided below. Primary issues of concern include:

- An applicability screening method is needed to identify the facilities that are required to report. INGAA recommends an emissions applicability threshold based on combustion emissions and event-based blowdown emissions that includes a compliance assurance margin.
- Additional clarity is needed in §98.232 regarding segment-specific sources to report and segment categorization.
- For reciprocating compressor rod packing, an alternative to annual three-mode testing is required. INGAA strongly recommends that annual tests be conducted at a single, "as found" operating condition.
- The Proposed Rule is too prescriptive and additional flexibility is needed to avoid unnecessary burden and safety risk while ensuring quality data. Additional flexibility should be provided for several areas, including:
  - Preclude unnecessary safety risk associated with vent access.
  - A single vent measurement should be allowed as an acceptable option for manifolded vent lines that combine multiple sources in lieu of other methods.
  - To facilitate revisions as information improves, emission factors in Subpart W tables should be moved to a separate EPA document that is incorporated into the rule by reference.
  - Alternatives to the optical camera should be allowed for fugitive emissions leak screening.
  - Flexibility should be provided for metering technology and acceptable monitoring and measurement methods.
- Reporting should be deferred for a year, or a phased approach should be implemented over three years for reporting Subpart W vented and fugitive emission sources that require measurement or leak monitoring.

This list of primary issues and the comments that follow are not in priority order. Many of the issues and comments are inter-related and several comments reference others. For example, many comments identify implementation challenges that support the need for a more reasonable implementation schedule. Although an alternative implementation schedule is a high priority issue, the detailed comment that includes INGAA recommendations is related to several other issues, thus the comment is provided in Section XII rather than earlier in this document.

II. An Applicability Screening Method is Needed to Identify Facilities that Report

As defined in 40 CFR Part 98, Subpart A, a 25,000 metric tons CO_2e annual facility emission threshold triggers reporting obligations under the Mandatory Reporting Rule. However, for Subpart W facilities, the absence of a workable screen method to facilitate the applicability determination significantly undermines the benefits of that threshold. To initially determine

whether a given natural gas facility exceeds the threshold for emissions reporting, the General Provisions (i.e., Subpart A) require an estimation of facility emissions using the measurement and monitoring methods prescribed in the Final Rule. In subsequent years, per §98.2(h), this facility estimate would need to be revisited to ensure that smaller facilities that did not previously report have not exceeded the reporting threshold in a subsequent year. Thus, while smaller facilities that do not report are relieved of the actual reporting burden, there is significantly more monitoring and measurement required than EPA estimates to ensure compliance.

INGAA strongly recommends that a streamlined applicability screening method be included in the rule for natural gas sector sources to preclude the need for monitoring and measurement at many facilities that fall below the applicability threshold. The Proposed Rule precludes compliance certainty and unnecessarily complicates regulatory compliance for INGAA members. By defining a screening method to identify affected facilities, compliance certainty can be assured, and unnecessary measurement and monitoring can be avoided.

In developing an applicability screening method, INGAA understands that it is important to ensure, with a high degree of confidence, that facilities with actual emissions above the reporting threshold are captured. Another objective is to define a screening method that provides a means to determine facility applicability based on readily-available information – independent of additional measurement and monitoring requirements. For the natural gas sector, it is understood that combustion, vented and fugitive emissions are all contributors to the total industry and facility-specific inventories. It is also understood that fugitive emissions and some vented emissions are difficult to estimate or measure, and programs are typically not currently in place that support such measurement.

A. Applicability Determination Costs and Burden

In discussing the Proposed Rule implementation schedule, EPA assumes that many reporting entities already have GHG monitoring capability due to the requirements of other air quality programs. This assumption is **not** valid for natural gas transmission and storage systems, which have never been subject to direct measurement of vented emissions or fugitive emissions monitoring, as required in the Proposed Rule. Natural gas transmission and storage facilities do not have currently-installed mechanisms or data systems for monitoring and measuring fugitive or most vented fugitive emission sources as called for in the Proposed Rule. For INGAA members, the task of determining whether GHG reporting is required for specific facilities under Subpart W would represent a significant departure from current practices, requiring considerable time and resource allocations.

In reviewing EPA cost estimates, INGAA generally agrees with the per facility monitoring costs for years subsequent to the initial year. **However, that cost does not consider important logistical factors such as vent access safety issues, three-mode testing, and availability of service providers, which will escalate per-facility costs.** In addition, EPA cost estimates do not consider costs associated with measurement and monitoring at smaller facilities to determine

their need to report; therefore, cumulative costs are significantly underestimated. For natural gas transmission and storage, EPA estimates that 59% of 1944 compressor stations and 34% of 397 underground storage facilities will exceed the reporting threshold [see 75 FR 18618], and approximately 1060 facilities (or 45%) would not report for these two industry segments. However, as noted above, absent a screening method, these facilities would still be faced with vent measurement, leak monitoring, and population counts for pneumatic devices and storage wellhead components to estimate facility GHG emissions and document that total facility emissions are less than the threshold, in essence to provide a "negative determination" relative to the 25,000 metric ton CO_2e threshold. Thus, with an additional 45% of facilities that do not report still required to conduct monitoring (e.g., leak surveys) and direct vent measurement, the cumulative costs would be nearly double EPA's estimate.

In addition, the number of available service providers and qualified technicians is limited, and monitoring and measurement are required for many segments in Subpart W. Thus, the added need to monitor at smaller facilities would exacerbate this shortage, and market pressure could escalate per-facility costs. This shortage could also compromise the ability of operators to meet the Proposed Rule schedule and is one of several factors contributing to the need for a phased approach for reporting. In addition, the Proposed Rule compromises compliance certainty due to the uncertainty associated with GHG estimates for fugitive emissions and some vented sources.

The Proposed Rule essentially requires that Subpart W emission estimation methods (monitoring and direct measurement) be applied to **every** natural gas transmission compression facility and natural gas storage facility, every year. These requirements would not only increase the cost of Subpart W, but also negate the administrative and cost advantages that EPA sought to achieve by selecting a 25,000 metric ton CO_2e threshold. In conclusion, a screening method that provides reasonable compliance certainty is needed to avoid unnecessary compliance risk, implementation complexity, and financial burden.

B. INGAA Recommended Applicability Screening Method

INGAA's principal intent is to report GHG emissions for subject facilities, simplify and add compliance certainty in the applicability determination, and avoid unnecessary leak monitoring and measurement costs for smaller facilities. An effective applicability screening method should address the following:

- Provide reasonable assurance that facilities with emissions above the 25,000 metric tons CO_2e threshold are captured and required to report;
- Be based on an emission threshold from sources that can be estimated with reasonable accuracy using readily available data – and not depend on any new or additional measurement and monitoring requirements at the facility;
- Consider that combustion, vented, and fugitive emissions all contribute to natural gas transmission and storage facility emissions, and that fugitive emissions and some vented emissions are difficult to estimate or measure;
- Identify an emissions threshold from select sources that has an established relationship to the 25,000 metric ton CO_2e facility threshold; and,

- Consider the relative emissions from facility sources and address facility types that will be covered.

INGAA strongly recommends that the screening method be included in the Final Rule as opposed to a supplementary guidance document. Direct reference in the Rule is desirable to avoid implementation and enforcement uncertainty.

INGAA recommends basing the screening threshold on the following two key emission sources that can be estimated with reasonable accuracy based on accessible information: combustion emissions and event-based blowdown vent emissions. For each of these emission sources, information is available to provide a facility emissions estimate on an annual basis. To identify the proper threshold with an assurance margin, emissions from other sources need to be considered, including: vented emissions from compressors, pneumatic device emissions, tank emissions, and fugitive emissions.

INGAA has reviewed available data from published emission factors and available GHG inventories to identify emissions associated with sources that could be excluded from the screening method applicability determination. A detailed discussion of the assessment is provided in Attachment A. A summary of key points and technical issues related to defining an appropriate screening threshold includes the following:

- To define the threshold, combustion calculations were completed as a function of facility horsepower-hours, and vented and fugitive emissions used public domain emission factors commonly applied for gas transmission sources – i.e., typically from the original EPA/GRI project on methane emissions from natural gas systems. The analysis requires an assumption on the number and type of combustion units because some emission factors are based on compressor counts and types. This parameter was a "variable" in the analysis. Emissions from the fugitive and vented sources *not* planned for inclusion in the screening method (e.g., compressor venting, pneumatic devices, fugitive emissions), were subtracted from the 25,000 metric ton threshold to define the emission "threshold" associated with combustion and blowdown emissions.
- Regarding the "balance" of emissions that comprise the screening threshold, for discussion purposes the relative contribution of combustion and blowdown emissions can be considered as discussed in Attachment A, and indicate the following:
  - The screening threshold combustion emissions, which are a portion of the screening threshold, are based on 40 CFR Part 98, Subpart C calculations and represent approximately 3,300 hp (assuming 100% utilization).
  - The screening threshold blowdown emissions are based on the commonly applied facility emission factor published in the INGAA GHG Guidelines and based on the EPA/GRI study and Canadian data.
- **Conclusion: An applicability screening method threshold of 15,000 metric tons CO_2e per year based on combustion and station event-based blowdown vent emissions.**
- To apply the screening method, facility status would be determined based on actual combustion emissions from the previous year calculated per Subpart C and actual blowdown

event venting emissions from the previous year calculated per §98.233(i), then comparing that total to an adopted annual threshold of 15,000 metric ton CO_2e.

In addition to INGAA's recommended Screening Method, there are any number of related approaches that could be used to define this threshold or an appropriate screening method. Example alternative approaches include the following:

- Use of "best practices" to estimate facility emissions with assurance that an applicability determination based on these practices meets rule requirements;
  - For example, this approach could use "most recent" emission factors to estimate vented and fugitive emissions or a combination of emission factors and emission engineering calculations to estimate fugitive and vented emissions;
- Base applicability solely on combustion CO_2 emissions with a defined threshold indicative of combustion GHG emissions contribution to total facility emissions;

INGAA offers a single, more specific recommendation at this time, as discussed above and in Attachment A. INGAA evaluated affected emission sources and determined that combustion and event-based blowdown venting would be appropriate for the screening methodology, because those emissions are relatively straightforward to determine based on readily-accessible operational data and address a majority of facility emissions.

Finally, although a generally applicable method that addresses all industry segments may be desired, the screening method could be applied to a subset of Subpart W segments if including all segments is too complicated. For example, from Table W-2 in the preamble [75 FR 18617-18618], EPA estimates that facilities for several segments are either nearly all in or all excluded from reporting at the 25,000 metric tons CO_2e per year threshold. The INGAA proposed method would address natural gas transmission and storage and the relative threshold may also be acceptable for gas processing. From Table W-2 of the preamble, 50 to 60% of the compressor stations and processing plants are estimated to require reporting, thus it appears that these segments will have a relatively high percentage of facilities with compliance uncertainty with emissions either marginally above or below the proposed applicability threshold. For these segments, the screening method may be more relevant and the INGAA recommended approach should be viable.

If EPA does not support the approaches discussed above, an alternative screening method should be considered. Without a screening method, the compliance burden for natural gas transmission and storage will be significantly increased, and timely compliance will be compromised due to the lack of service providers and trained technicians to conduct measurement and monitoring. As needed, INGAA offers its assistance to further discuss and address this topic with EPA.

III. Section 98.232 Segment-Specific Source Reporting Should Be Clarified

§98.232(b)–(i) identify the emission sources to report for each of the eight industry segments. These are the primary sources identified by EPA for each segment. INGAA recommends focusing on sources that comprise the majority of emissions, and the current Proposed Rule is

more focused on primary emission sources than the 2009 version of Subpart W. INGAA supports this approach. INGAA's understanding is that only those sources listed in the applicable §98.232 subsection that applies to a particular segment are to be reported for a facility – i.e., the source list is specifically defined and limited to those sources in the §98.232 subsection for that segment.

A facility's segment should be based on the primary facility function. For example, for natural gas transmission compression, the seven source types listed in §98.232(e) are to be reported under Subpart W. If another source type listed for another segment is at a compressor station (e.g., a dehydrator), reporting and other associated requirements for that source would not be required.

To facilitate implementation and to reduce ambiguity, INGAA recommends revisions to §98.232 to: (1) clarify identification of an industry segment for a particular facility; and (2) clearly indicate the segment-specific limitation in sources to report.

A. INGAA Recommends Relying on Primary NAICS Code to Identify Segment

Natural gas industry operations include an array of processes, and equipment/source types prevalent in a particular segment that may also be located at facilities in other segments. INGAA understands that EPA's intent is that a particular facility would only report emissions from the corresponding source types listed for the applicable segment in 98.232. EPA has indicated it plans to add a "frequently asked question" to its on-line support material to address this issue. Without additional clarity, INGAA is concerned that implementation questions could arise. Thus, it is important that the Final Rule more clearly reflects EPA's intent and also provides a means to document the appropriate segment for a facility.

To identify the segment that applies to a facility, INGAA recommends that EPA initially rely on the primary six digit NAICS code. As needed, additional information can be provided to further refine the segment. For example, NAICS code 486210 applies to "pipeline transportation of natural gas". Since there is not a separate code for storage, this code should apply for both transmission compressor stations and natural gas storage facilities. To provide additional differentiation beyond the NAICS, operators should clarify additional segmentation in the GHG Monitoring Plan and identify the segment that applies under §98.232 in the annual report. This approach would be supported by recent General Provision proposed amendments to require NAICS reporting.

On April 12, 2010, EPA proposed amendments to 40 CFR Part 98, Subpart A of the Mandatory Reporting Rule at 75 FR 18455 – 18468. The proposed amendments include the requirement for reporters to provide, "…their primary and all other applicable North American Industry Classification System (NAICS) code(s)". [75 FR 18455] INGAA understands that this requirement is not yet final, but with expectations that NAICS code reporting will be required, INGAA recommends relying on the NAICS code to identify the industry segment under §98.232. Since NAICS code reporting will likely be instituted, this information can also be used to clarify the applicable industry segment under §98.232. Some NAICS codes apply to multiple

segments within §98.232, and in such cases additional clarification can be provided in the GHG Monitoring Plan.

To address this issue presuming the proposed General Provision amendments are finalized, INGAA recommends revisions to §98.232(a) to indicate the following:

> "(a) You must report CO_2 and CH_4 emissions from each industry segment specified in paragraph (b) through (i) of this section.
>
> **(i) The industry segment specified in paragraph (b) through (i) shall be based on the primary NAICS code reported under §98.3(c)(10)(i).**
>
> **(ii) When the NAICS code includes multiple industry segments from paragraph (b) through (i) of this section, the basis and determination for the industry segment shall be documented in the facility GHG Monitoring Plan required under §98.3(g)(5)."**

This language, or similar text, should be added to section §98.232 to clarify the source segment for a particular facility. If the Subpart A amendments are not finalized for reference in the Final Rule, the language provided in (a)(i) above could be revised to delete reference to Subpart A, but still provide similar criteria.

B. Additional INGAA Recommended Clarifications to §98.232

INGAA recommends additional clarifications in the rule text to clarify rule intent. Minor revisions can add considerable clarification, and INGAA recommends the following revision to §98.232(a):

> "(a) You must report CO_2 and CH_4 emissions from each industry segment specified in paragraph (b) through (i) of this section**, and only those sources specified for the industry segment shall be reported for an applicable facility under this subpart**."

This proposed revision is in addition to the text proposed in Comment III.A above, but is provided separately to avoid confusion. If EPA elects not to include such text in the Final Rule, then the Final Rule preamble should, at a minimum, include a discussion to clearly indicate the requirement – i.e., the preamble should indicate that an applicable facility would only report emissions from the emission sources listed for its corresponding industry segment in §98.232. For example, a natural gas transmission compressor station would only report emissions for the seven sources identified in §98.232(e) under Subpart W.

In addition, further clarification is required regarding §98.232(j) which addresses reporting of flare emissions. INGAA understands that flare emissions reporting is not required for natural gas transmission or storage because it is not included in the segment-specific list. However, the subsection hierarchy in §98.232 causes confusion, where §98.232(j) through (l) are separate from the criteria in §98.232(b) through (i). Paragraph (j) could be perceived as a stand-alone requirement, similar to criteria in (k) and (l), which indicate Subpart C combustion emissions and Subpart PP emissions must be reported. Since paragraph (j) has the same hierarchy as (k) and (l), it causes confusion. Thus, §98.232(j) should be clarified to indicate the following:

"(j) **Where flare emissions reporting is required in paragraph (b) through (i) of this section, y**~~Y~~ou must report the CO_2, CH_4, and N_2O emissions~~ from each flare~~.

If an alternative interpretation is intended – i.e., flares reporting is applicable to all industry segments specified in paragraph (b) through (i), then EPA should explain the basis for this decision.

IV. Emission Estimation Methods for Vented Emissions from Pneumatic Devices, Blowdown Venting, and Centrifugal Compressor Wet Seals are Generally Acceptable; INGAA Recommends Minor Revisions

In general, INGAA accepts the methods proposed in §98.233 for reporting vented emissions from pneumatic devices, blowdown venting, and centrifugal compressor wet seals. Minor revisions, clarifications, and equation corrections are recommended below. In addition, as discussed in Comment VII, INGAA recommends allowing direct measurement of co-mingled vented emissions (i.e., emitted through a common, manifolded line) as an alternative that operators can elect to employ.

A. High Bleed and Low Bleed Natural Gas-Driven Pneumatic Devices

§98.233(a) and (b) provide emission estimates based on emission factors for high bleed and low bleed natural gas-driven pneumatic devices, respectively. Low bleed devices are defined as devices with gas bleed rates less than or equal to 6 scf/hr. For low bleed devices, a Subpart W population emission factor is used. Emissions from *all* low bleed devices are calculated from the count of low bleed devices, the population emission factor, and an assumption of 8,760 operating hours per year.

High bleed devices are defined as devices with gas bleed rates greater than 6 scf/hr. Equation W-1 is used to estimate gas emissions from *each* high-bleed device:

$$E_{s,n}\left(\frac{scf}{device\text{-}yr}\right) = B_s\left(\frac{scf}{device\text{-}min}\right) * T\left(\frac{operating\ minutes}{yr}\right) \qquad \text{Eqn. W-1}$$

The emission factor (B_s) is the device bleed rate provided by the manufacturer or based on data for a similar device. Annual operating minutes (T) for each device must be determined.

INGAA accepts these methods for pneumatic device emission estimates with the request that two clarifications be provided in the Final Rule:

(1) "time" basis for high bleed devices is facility operating time and not related to time based on device actuation; and

(2) definitions of "low-bleed pneumatic device" and "high-bleed pneumatic device" in §98.6 are revised to clarify that applicability is based on continuous bleed rate and facility operating time.

Further, it is INGAA's understanding that pneumatic devices addressed under §98.233(a) and (b) are *continuous* bleed devices and not intermittent devices. Thus, valve actuators with intermittent releases are *not* covered by this section and intermittent release valve actuators do not meet the definition of high-bleed or low-bleed pneumatic device under Subpart W. For natural gas transmission and storage, valve actuator components would be screened during the leak survey required under §98.233(q).

B. Blowdown Venting

Subpart W annual emission estimates for equipment blowdowns are calculated from the volume of gas vented during each event and the number of events per year. The volume of gas vented is determined from the vented equipment internal geometric volume with corrections for pressure and temperature to standard conditions.

In general, INGAA accepts the proposed method in §98.233(i) for estimating equipment blowdown emissions, but INGAA recommends minor revisions to add clarity and correct erroneous references and formula errors – the Subpart W calculation of vented gas volume at standard conditions (equation W-10 and equation W-20) is not correct and requires revision. In addition, flexibility in documenting the emission calculations is needed.

Errors in Section Labeling Should Be Corrected

The Proposed Rule includes a typographical error in the section hierarchy for the blowdown calculation section. The Proposed Rule indicates this subsection is §98.233(h)(iii); this subsection should be §98.233(i). This error is not found in the pre-publication version of the Proposed Rule, but is in the Federal Register version of the Proposed Rule. There is a related section hierarchy error in §98.233(h), where the first subsection is labeled (h)(i). The proper "subsection" protocol is to migrate from letters to numbers to (i), (ii), etc. Thus, §98.233(h)(i) and (ii) should be labeled §98.233(h)(1) and (2).

For clarity, INGAA provides appropriate revisions to the erroneous "§98.233(h)(i) – (iii)" text from 75 FR 18640:

> ~~(i)~~**(1)** Calculate natural gas volumetric emissions at standard conditions using calculations in paragraph (t) of this section.
>
> ~~(iii)~~**(2)** Both CH4 and CO2 volumetric and mass emissions shall be calculated from volumetric natural gas emissions using calculations in paragraphs (u) and (v) of this section.
>
> ~~(iii)~~**(i)** *Blowdown vent stacks*. Calculate blowdown vent stack emissions as follows:

Emission Calculation Flexibility Should Be Provided

Subpart W should allow flexibility in documenting the emission calculations. Many companies currently employ algorithms and programs to calculate and document blowdowns, and these methodologies use the same ideal gas law principles as intended by the Subpart W equations to calculate "event-based" blowdown volumes. Companies currently employing analogous equivalent methods would document the calculation basis and Subpart W equivalence in their

GHG Monitoring Plan. This could include an approach that calculates the gas volumes for individual venting events and sums the event volumes to determine annual emissions. For blowdowns of equipment where process conditions (e.g., blowdown beginning and/or ending pressures) vary for different events that occur in a year, this approach would provide a more accurate emission estimate than the Proposed Subpart W equations which assume the process pressure change and temperature are the same for each blowdown.

Equations for Blowdown Volume and Volume Correction to Standard Conditions Require Revisions

Corrections to equations and nomenclature presented in §98.233 are needed to correct calculations and to properly represent blowdown pressure changes and associated volumes:

- As currently written in §98.233, "$E_{a,n}$" in equation W-10 should be defined as, "Annual natural gas venting emissions at ~~ambient~~ **process** conditions from blowdowns in cubic feet." That is, the gas inside the vented equipment is at process temperature and pressure. The gas is not at ambient conditions.
- The §98.233 pressure correction calculation in Equation W-20 is not correct for blowdown emission estimates. The pressure parameters are "ambient" and "standard" conditions in Equation W-20, whereas the relevant pressures are ΔP – the system/process gas pressure *change* during the blowdown – and standard pressure. That is, the system pressure change from event start to finish is not the same as "ambient" and "standard" in Equation W-20, and the equation to correct volumes to standard conditions requires revision.
- Thus, Equation W-10 could be revised to eliminate a separate calculation (i.e., Equation W-20) to correct to standard conditions via the following formula:

$$E_{s,i}\left(\frac{scf}{event\ i}\right) = Vi\,(cf) * \frac{P_I - P_F}{P_{STD}}\left(\frac{psi}{psi}\right) * \frac{(460 + T_{STD})}{(460 + T_P)}\left(\frac{^\circ R}{^\circ R}\right) \qquad \text{Eqn. W-10A}$$

$$E_s\left(\frac{scf}{yr}\right) = \sum E_{s,i}\left(\frac{scf}{event\ i}\right) \qquad \text{Eqn. W-10B}$$

Where:

Es,i = volume of gas vented, at standard temperature and pressure, from event i;

Vi = total geometric volume of blowdown equipment chambers (including, but not limited to, pipelines, compressors and vessels) between isolation valves in cubic feet;

P_I = initial equipment gas pressure; i.e. gas pressure at the start of the blowdown;

P_F = final equipment gas pressure; i.e. gas pressure at the end of the blowdown;

P_{STD} = standard gas pressure (14.7 psi);

T_{STD} = standard gas temperature (60°F);

T_P = process gas temperature (°F); and

Es = annual volume of gas vented, at standard temperature and pressure, from the equipment.

With the above revisions, the result is at standard conditions and Equation W-20 would not be needed to calculate emissions at standard conditions. Note that these estimation equations do not consider the non-ideal gas behavior of natural gas at various pressures (i.e., equations do not include the compressibility factor "z") and assume the process temperature does not change during the venting (i.e., the initial and final process temperatures are the same). These are standard assumptions for calculating vented volumes. In general, the effects from these parameters will typically be small relative to pressure changes, but in some cases may be included in company algorithms and programs for more rigorous calculations.

If EPA makes alternative revisions to Equation W-10 to determine vented volumes at other than standard conditions and retains the reference to Equation W-20, then Equation W-20 must be revised so that corrections to standard conditions can consider the "scenario" pressure and temperature, which may be at process conditions or ambient pressure and temperature. Currently, Equation W-20 only provides a means to correct from ambient conditions to standard conditions. While INGAA has not reviewed requirements for all industry segments in the Proposed Rule, INGAA expects there are additional rule references to §98.233(t) and Equation W-20 that reflect similar anomalies. EPA should reconcile other anomalies or reference conditions (e.g., process versus ambient conditions for volume calculations) that introduce errors.

C. Centrifugal Compressor Wet Seal Degassing Vents

§98.233(o) defines emission estimates for centrifugal compressor wet seal degassing vents based on annual measurement of the wet seal oil degassing tank vent. In general, INGAA accepts the proposed vent measurement requirements for wet seal degassing, with the request that the following three issues be addressed in the Final Rule:

- As discussed in Comment VI, operators should be allowed to elect to conduct direct measurement of common vent lines, where applicable, and report the actual annual volume measured;
- In addition to flow measurement meters prescribed in the Proposed Rule, alternative tools for vent gas measurement should be allowed, provided that the vented rate is within an acceptable range of the instrument. These alternatives should include calibrated bags (§98.234(c)) and high-volume samplers (§98.234(d)); and
- Engineering units should be provided for parameters in equation W-16 and these units should be consistent with the referenced calculations in §98.233(t) and §98.233(v). This issue is highlighted here, and a similar general statement is provided in Comment XIII regarding review and correction of equations, especially broadly-applied equations such as those in §98.233(t) and (v).

Furthermore, as discussed in Comment X, reporting individual compressor throughput is not feasible or practical and should be deleted from the Rule.

V. Reciprocating Compressor Rod Packing – Annual Vent Measurements Add Complexity and Increase GHG Emissions. Measurement is Reasonable when Access is Available, but Safety Concerns and Alternatives to Three-Mode Testing Must be Addressed

§98.233(p) identifies requirements for estimating emissions from reciprocating compressor rod-packing vents that include annual "three-mode" testing (i.e., measurements during each operational mode that occurs during a reporting period): operating; standby pressurized; and not operating, depressurized. INGAA is receptive to conducting annual reciprocating compressor rod-packing vent measurements at applicable facilities. However, it is imperative that EPA reconsider mode testing requirements, and thus rule refinements are required. INGAA strongly recommends that annual tests be conducted at a single "as-found" operating mode each year. Vent access safety concerns, manifolded vent lines, and the creation of GHG emissions from unit blowdowns for the sole purpose of depressurized-mode testing present significant obstacles that must be practically resolved.

A. Annual Three-Mode Testing is Complicated and Would Increase GHG Emissions

As required in §98.233(p)(4), three-mode testing introduces significant logistical complexity, burden, cost, and results in unnecessary GHG emissions due to unit blowdowns to complete tests in the "not operating, depressurized" mode. Annual three-mode testing will be difficult, if not impossible, to coordinate with gas control pipeline operations. In addition, testing all modes in a single site visit would be the likely approach. Increases in fuel (to bring on alternative compression) and unnecessary GHG vented emissions from compressor blowdown to address reporting requirements is contrary to overall climate change objectives, and the Final Rule should not introduce such scenarios. Operational changes for the sole purpose of making an emission measurement for the remaining operating modes adds significantly to the burden of this Proposed Rule, and poses significant scheduling issues for initial rule implementation.

"Standby test crews" or other "opportunity" approaches to test a compressor during periods when the operating mode actually occurs are impractical due to logistics, service provider availability, and/or extraordinary inefficiencies and implementation costs. Especially for initial reporting years, multi-mode testing presents significant scheduling and resource issues (e.g., test crew availability). The availability of qualified and experienced test personnel is not expected to be sufficient to meet the demands during the initial years of the Final Rule – and additional demand from multi-mode testing would exacerbate this problem. The expected resource limitations require a practical, phased-in approach or delay for the initial year of measurement (as discussed in Comment XII).

Additional complexities are caused by vent accessibility issues. These include important safety concerns that are discussed in Comment VI. In some cases, multiple compressor vents are manifolded together, and measurement of the common vent line will not provide unit-specific data by mode. However, manifolded vent line measurements can provide a reasonable, accurate alternative for reporting annual vent emissions (see Comment VII).

In addition, "forced-mode" testing may not be indicative of actual emissions. For example, if the common operating mode for a compressor is idle and depressurized, but three-mode annual tests

are required, the engine and compressor would likely be started from an idle mode to complete the test. In this case, since the rod packing has not been energized for a considerable time, the short-term emissions measured while test crews are on-site for a "force-mode" test may not be indicative of typical emissions for that mode. Thus, the "characterization" test for the operating mode could misrepresent emissions for that mode.

B. INGAA Recommends a Single Test Each Year in the "As-Found" Mode

In response to issues with three-mode testing, INGAA strongly recommends that annual tests be conducted for a single "as-found" operating mode each year. This approach can be refined based on EPA requirements. For example, the test could be completed in the prevalent operating mode for that engine based on historical utilization records. This could be documented in the annual report under §98.236 and the basis for the prevalent mode determination could be documented in the GHG Monitoring Plan. INGAA recommends rule text revisions to §98.233(p)(4) to include the following:

> "(4) Conduct one measurement for each compressor in ~~each of the operational modes that occurs during a reporting period~~ **its as-found operational mode. Document which of the three modes was tested**:
>
> (i) Operating~~.~~**;**
>
> (ii) Standby pressurized~~.~~**; or**
>
> (iii) Not operating, depressurized."

INGAA understands EPA's interest in mode-based testing is primarily due to vented emissions from leakage through the unit isolation / block valve during the depressurized and standby, pressurized compressor modes, respectively – i.e., natural gas leakage past block valves when the compressor is not operating. Emissions from leakage past pipeline unit isolation / block valves are subsequently vented to atmosphere through the unit blowdown vent (i.e., unit blowdown valve is open to atmosphere). As discussed in Comment V.D, the emission sources and measurement or monitoring requirements related to these vented emissions needs to be clarified, and considerable revisions may be required in the Final Rule to clearly address EPA's intent. If INGAA's proposed alternative to annual three-mode testing is unacceptable to EPA, INGAA requests additional discussion to ensure that a reasonable alternative to the Proposed Rule requirements can be identified.

In employing the INGAA recommended approach, EPA will acquire data over time that provide information on mode-based emissions without creating the significant problems described here. In aggregate, mode-specific data gathered for this segment will facilitate an understanding of mode-based emissions. "As-found" test data would continue to build upon existing mode-specific operating data collected through the voluntary EPA Natural Gas STAR program, as well as other available GHG emissions studies. These data should provide an adequate basis to inform policy decisions.

EPA should also consider that operating time in standby pressurized mode is minimal. For most operators in the gas transmission segment, the standby pressurized mode is a transient or

temporary mode, and company procedures typically limit time in this mode. This operating mode exists after engine shutdown for a relatively short period, generally two to four hours, to facilitate a short-duration maintenance activity or other near-term restart of the engine. Once the allotted time period is reached, the pressure is released from the compressors, with the natural gas vented or burned off as fuel. Regardless, cumulative time in this mode is short duration. This action is driven by safety concerns, and the desire to release energy contained within pressurized compressors out of the compressor building. As an example for annual implications, if a company holds compressor pressure for four hours and releases pressure off the compressor 20 times throughout the year, this amounts to 80 annual hours in the standby pressurized mode or less than one percent of the available annual time.

In addition, industry continues to implement programs to improve emission factors and reduce the uncertainty of GHG emission estimates, including recent initiation of a project directed at mode-based emissions. Testing is expected to begin in the summer of 2010 and data from the program, in combination with INGAA member data and the existing knowledge noted above, are expected to result in an improved understanding of mode-specific emissions. Thus, in the interim until all three modes are tested, these data could be used to address data gaps, supplement data collected from reporting, and provide interim access to mode-based data to inform this issue.

C. The Rule Should Include Alternative Tools for Vent Measurement and Vent Emissions Detection

To provide flexibility, the Final Rule should allow all reasonable technologies and methods for measuring leaks from reciprocating compressor rod-packing vent using a suite of technologies and methods to provide flexibility. Alternative tools (e.g., high volume sampler) for vent measurement should also be included provided that the vent rate is within the acceptable range of the instrument. Thus, §98.233(p)(2) should reference §98.234(c) to allow use of calibrated bags and §98.234(d) to allow use of a high volume sampler. The Proposed Rule should also reference §98.234(a)(1) within §98.233(p)(2)(i) to allow optical camera screening of elevated vents prior to measurement.

INGAA requests that EPA broaden the list of allowed detection and measurement tools to include all demonstrated technologies and alternatives that are used in practice. EPA studies have employed all of the recommended measurement and leak detection technologies discussed below in previous field studies. These “tools” provide the necessary flexibility to screen leaking components via alternative techniques that may be more suitable to ambient conditions, available equipment, or survey team experience level.

Since EPA proposes to require optical gas imaging for fugitive component screening and natural gas transmission condensate tank vent monitoring, INGAA is curious why EPA elected to exclude this technology for detecting leaks from elevated vent sources. Screening the compressor rod-packing vent using an optical gas imaging instrument would provide a safer method for detecting leakage through roofline vents and eliminate the need to measure non-leaking, difficult-to-access vents. Unsafe or difficult-to-monitor compressor rod-packing vents

with visible leaks could be measured using conventional sampling or metering – if the vent can be accessed at an alternative location in the line.

Safe access to measure roofline vent lines and condensate tank vents, or alternative sampling locations, will need to be integrated into existing facilities. Thus, during the initial year, INGAA recommends phasing in these measurements (see Comment XII). INGAA recommends reporting combustion and some vented emissions starting in year one and phasing in measurement and monitoring over three years. Other phase-in options include precluding inaccessible vents from reporting during initial years, or allowing vent screening using optical imaging. In the latter case, if the camera detects vented emissions, a measurement would be completed if the vent is safely accessible. If not accessible, vent status would be noted in the report and measurement would be initiated in the second or third year after safe access has been established.

EPA should be familiar with these alternative "tools" and methods as all been have been used to identify, quantify, and/or report venting losses under other EPA programs including Natural Gas STAR.

D. Clarification is Needed on Vents Included under §98.233(p)

Vents that require measurement should be specified and clearly defined. It could be interpreted that §98.233(p)(2)(i) reference to "*all*" vents means only those atmospheric vents associated with reciprocating compressor rod packing, because that is the source type addressed by this section. However §98.233(p)(2)(i) references rod packing, unit isolation valves, and blowdown valves. INGAA requests that EPA specifically list the emission sources and associated vent lines to clarify required measurements for each operating mode. For example, in the de-pressurized mode, it is INGAA's understanding that leakage past unit isolation valves that find a path to atmosphere through the blowdown vent is the emission source of concern to EPA. Additional clarification and definitions should be provided to specify the emission sources and associated vents.

Vented and fugitive emissions are better defined than in the 2009 Subpart W proposal. However, consistent nomenclature is ultimately required to eliminate ambiguity, redundancy (i.e., double counting) and unnecessary confusion in rule implementation. EPA should clearly define and elaborate upon the intended source(s) and the measurement point(s) for reciprocating compressor rod-packing vents under each operating mode. These nuances and measurement criteria are not clearly defined and should be addressed in the Final Rule.

Finally, as discussed in Comment X, reporting individual compressor throughput is not feasible or practical and should be deleted from the rule.

VI. Safety Must Be Considered and Alternatives Provided for Inaccessible Vents

Safety is an extremely important concern when attempting to collect measurements from roofline vents at transmission compressor stations. At existing facilities, most vents are routed outside the compressor building and elevated above the roof line to disperse vented gas. Similarly, there are safety concerns associated with vent access for condensate tank vents at some facilities.

Resolving these safety concerns will likely require modifications to provide vent access at a safer location. However, line accessibility (e.g., within the compressor building) may not be readily available as the facilities were not constructed considering these criteria. Due to an aggressive proposed implementation schedule, this would put operators at risk of failing to comply with the annual survey requirement, or placing personnel in harms way – i.e., violating safety procedures. Additional time should be provided to implement the vent measurement program so that modifications can be made to accommodate measurement from a safer location than from a building roofline or difficult to access condensate tank vent.

Safety concerns and vent measurement issues are exhibited in a photograph from a recent pilot study shown in Figure 1. To reach the roofline vents, the picture shows the manlift extended to maximum length and precariously suspended above high-pressure natural gas lines. This measurement should not have been pursued and cannot be mandated, as it creates unsafe conditions for workers and our facilities. In addition, vent locations require manlift placement in areas not designed for that use, resulting in significant destruction of walkways and the pipeyard grounds at this facility. For this pilot study, even with unacceptable manlift use, not all vents could be accessed and were therefore not measured.

Figure 1. Manlift Use for Roofline Vent Access Can Introduce Significant Safety Concerns.

In addition to the safety issues clearly shown in the above figure, vent measurement also introduces safety concerns by placing personnel in proximity to vents that are potential release points if an unplanned emergency blowdown were to occur. Even if safe access is achieved, additional safety concerns exist regarding roofline vent measurement. Facility safety requirements preclude the testing of a functioning pressurized compressor relief valve vent that could potentially discharge during measurement activities, thus placing personnel in a potentially flammable or explosive environment. To address this issue, process and procedural modifications would be required to eliminate the potential for an emergency blowdown. Implementation would be costly and complex.

The majority of building roofline vents and some condensate tank vents would be deemed inaccessible under conventional LDAR programs, as such components would be considered unsafe or difficult-to-monitor in a typical LDAR program (e.g., components that cannot be monitored without elevating the monitoring personnel more than 2 meters above a support surface). Under a typical LDAR program, monitoring can be deferred due to unsafe or difficult-to-monitor components. In response, the facility must maintain documentation that explains the conditions under which the components become safe to monitor or no longer difficult to monitor. For vent lines at most compressor stations, typical conditions under which these vents would be "safe" would preclude normal engine operations or pressurized scenarios where the potential for a vented release is possible. References are available from several rules that require VOC reductions through LDAR programs. Examples include the following:

- 40 CFR 60, Subpart VVa addresses performance standards for VOC leaks from chemical manufacturing and provides criteria for addressing access and safety issues including these examples:
  - §60.482-7a(g) identifies a valve as "unsafe" to monitor if:

    "The owner or operator of the valve demonstrates that the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying… [with leak monitoring requirements]";
  - §60.482a-11a(f) identifies "inaccessible" and "unsafe" connectors:

    "(f) *Inaccessible, ceramic, or ceramic-lined connectors* . (1) Any connector that is inaccessible … is exempt from the monitoring requirements … and from the recordkeeping and reporting requirements …. An inaccessible connector is one that meets any of the provisions specified in paragraphs (f)(1)(i) through (vi) of this section, as applicable:

    …

    (iii) Obstructed by equipment or piping that prevents access to the connector by a monitor probe;

    (iv) Unable to be reached from a wheeled scissor-lift or hydraulic-type scaffold that would allow access to connectors up to 7.6 meters (25 feet) above the ground;

    (v) Inaccessible because it would require elevating the monitoring personnel more than 2 meters (7 feet) above a permanent support surface or would require the erection of scaffold; or

> (vi) Not able to be accessed at any time in a safe manner to perform monitoring. Unsafe access includes, but is not limited to, the use of a wheeled scissor-lift on unstable or uneven terrain, the use of a motorized man-lift basket in areas where an ignition potential exists, or access would require near proximity to hazards such as electrical lines, or would risk damage to equipment."

- §60.486a(f) includes provisions for documenting and retaining records for components that are unsafe or difficult to monitor.

There are additional examples from similar performance standards for VOC leaks. These criteria regarding inaccessible and unsafe-to-monitor components apply to many vents at transmission and storage facilities, and it is clear that *regulated VOC sources* have allowances for inaccessible components. Similar criteria should be applied to address vent access under Subpart W.

Implementation also requires additional training and expertise. Access to elevated vents requires test personnel to obtain fall protection training and annual certification. Physical access to the majority of reciprocating compressor rod-packing vents requires a manlift or a ladder on an elevated walkway grate that is typically located above high pressure discharge yard piping. A certified manlift operator is required to safely position the manlift bucket to properly access and measure vented gas volumes. Facility grounds in proximity to these locations may not be conducive to manlift siting, and care must be taken to avoid uneven ground, drop offs, holes, adjacent structures, pipe racks, and overhead obstructions. Weather and surface conditions can also significantly affect the ability to properly position the manlift. These access restrictions present a considerable safety risk, which could lead to reassessment of insurance liability. In addition, facility and tank configuration for gas transmission condensate tank vents may present similar access problems at some facilities. Clearly, there will be instances when vent access is not possible and/or would violate accepted safety practices.

INGAA members are currently pursuing alternative sample points at safer vent measurement locations. However, accessibility will be an issue at some facilities, and this will not be a trivial matter when Subpart W is implemented across the nation's transmission pipeline system. There is no reasonable basis to impose an implementation schedule that requires operating a manlift unsafely just to acquire a mandated measurement.

As discussed in Comment XII, additional time should be allowed to implement Subpart W. Furthermore, allowances must be provided in the Final Rule if facility design precludes reasonable access to vent lines or condensate tank vents at a safe measurement location. Operators should not be required to pursue extraordinary facility modifications, such as costly re-design and modification to existing infrastructure, only for the purpose of vent access. In these instances, operators should be able to identify inaccessible vents within the GHG Monitoring Plan, as well as include the basis for such judgments and explanation as to the infeasibility of alternative vent line access. "Best available" data options should be allowed for emissions estimates under these cases. INGAA offers its assistance to work with EPA to define a reasonable basis to ensure inventory integrity, while considering important safety issues regarding vent accessibility.

VII. Vent Measurement – Subpart W Should Allow Continuous Direct Measurement of Manifolded Vent Lines as an Alternative that Operators Can Elect to Employ

The previous sections discuss emission estimation methods for vented sources and INGAA comments on these vented emissions. In addition to those source-specific comments, the Proposed Rule should allow continuous direct vent flowrate measurement as an approved alternative, with that option selected at the discretion of the owner/operator. In general, INGAA recommends that "direct measurement" alternatives should not be precluded from Subpart W, and flexibility should be provided to apply demonstrated methods with similar or higher accuracy. Specifically, INGAA recommends that continuous direct measurement of vented lines, including manifolded lines, should be allowed as an operator option under Subpart W. In this case, the annual vented emissions would be measured and reported, and the report would identify the sources addressed by the vent measurement. For a transmission compressor station, this could include more than one of the seven sources (or more than one reciprocating compressor operating mode).

Some facilities are equipped with existing manifolded vent lines, but this type of configuration is not prevalent in the natural gas transmission and storage segments. At other facilities, vent access issues discussed above may increase interest in developing alternative vent line configurations. In the long term, issues with conducting annual measurements may result in some facilities migrating to continuous direct measurement. A direct measurement approach for manifolded lines would provide accurate annual data rather than projection of a one-time snapshot to annual emissions. However, the Proposed Rule precludes this option. INGAA recommends rule revisions to allow continuous direct measurement as an optional approach that the owner/operator may elect to use. This alternative is consistent with data quality and inventory accuracy objectives. In addition, the alternative will provide near-term options while providing the flexibility to adapt and implement new technology.

For manifolded vent lines, the vent measurement would co-mingle streams from multiple sources (e.g., multiple compressors), such that mode-based or source-specific emissions (e.g., compressor vent versus compressor unit blowdown) would not be available. However, the tradeoff for lack of this particular information for a facility is a more accurate annual report of cumulative facility vented gas emissions. It appears that mode-based and source-specific information is of interest to help inform policy objectives, and EPA may be concerned by aggregation resulting from manifolded lines. However, the vast majority of existing facilities will not employ continuous vent measurement, so source-specific data will be broadly available from those facilities. Complementing such information with total vent volume measurements at other facilities should actually provide EPA with more compelling and complete information on facility GHG emissions to help inform future policy decisions.

In addition, measurement of manifolded vents is analogous to EPA provisions for general stationary combustion sources that allow aggregate reporting of common flows – i.e., §98.36(c)(2) and (3) allow combustion sources to use aggregated volumes from common stacks and common fuel lines.

INGAA recommends that EPA add another paragraph (i.e., subsection) to §98.233 to indicate that direct, continuous measurement of vent lines, including manifolded lines, is an acceptable alternative to the source-specific procedures identified in §98.233.

Requirements for this alternative measurement approach should include the following:

- Owners and operators can elect to use continuous direct vent measurement as an alternative to other estimation methods defined in §98.233.
- Meters should be accurate to within 5%, as defined in Subpart A, §98.3(i).
- As with vent measurement under §98.233(p), the use of any acceptable measurement device should be allowed. For example, §98.233(p)(2)(ii) indicates, "Use a temporary meter such as, ***but not limited to***, a vane anemometer or a permanent meter such as, ***but not limited to***, an orifice meter…". [emphasis added] Any measurement device should be allowed that meets the accuracy criteria in Subpart A, §98.3(i).
- For manifolded vents that measure multiple sources, the company GHG Monitoring Plan would identify the sources emitting gas through the common vent and ensure that all applicable sources are addressed. The aggregated sources would also be identified in the annual report.
- To address aggressive schedule implementation, operators should be allowed to start continuous monitoring by October 1 of the first year – i.e., 3 months of data would be used to estimate annual emissions for the first reporting year.

INGAA recommends the following addition as §98.233(aa) to add this option to the Rule:

> **"(aa) *Alternative Continuous Monitoring of Common Vent Lines.* In lieu of the methods defined in §98.233, the owner or operator can elect to continuously monitor a vent line or lines that includes emissions from one or more sources identified in §98.232 for the industry segment, including common or manifolded vents lines that combine more than one source. The following requirements apply.**
>
> (i) **The GHG Monitoring Plan and annual report shall identify the §98.232 sources addressed. The GHG Monitoring Plan shall describe the venting system, measurement basis, and data acquisition system.**
>
> (ii) **The meter shall meet the requirements of §98.3(i).**
>
> (iii) **Annual emissions shall be reported based on continuous monitoring throughout the year or upon facility startup with the exception of the initial reporting year, when continuous monitoring must be initiated no later than October 1 with annual emissions estimated based on three months of continuous monitoring data."**

VIII. Fugitive Emissions – INGAA is Receptive to the Proposed Approaches but Revisions and Refinements are Needed to Add Flexibility and Clarity, and Facilitate Improvements

For fugitive emission estimates from natural gas transmission and storage, the breadth of the fugitive leak survey program, the basis for emission factors (EFs), and prescriptive technology requirements are cause for concern. Although EPA has reduced direct measurement requirements in the re-proposed Rule, it continues to mandate leak screening. INGAA is willing to accept the survey approach and proposed EFs at this time, but several revisions and clarifications are needed to make this a workable approach, including:

- Emission factors should be moved to a separate EPA technical document and incorporated by reference to facilitate EF improvement;
- Alternatives to the optical gas imaging instrument (also referred to as "optical camera") should be allowed for leak screening;
- Practices and procedures for the optical camera developed for VOC leaks from other industrial sectors should be revised to appropriately address methane leak surveys from natural gas transmission and storage sources;
- Provisions for eliminating or decreasing the frequency of leak screening should be adopted if data and/or EF advances meet accuracy needs or leak screening data indicates that intervals can be increased; and,
- To eliminate ambiguity, definitions and clarification are needed for component types and associated criteria for conducting a leak survey.

A. Emissions Factors Should Be Published in a Separate EPA Technical Document and Incorporated By Reference to Facilitate Emission Factor Updates

INGAA **strongly** recommends that emission factors (EFs) in Subpart W tables (e.g., Table W-3 and W-4) should be moved to a separate EPA reference document that is incorporated into the rule by reference. Reopening a rule to update emission factors would be difficult to accomplish and is a time consuming activity, resulting in outdated EFs. Thus, a separate EPA reference document should be developed and maintained. Review and updates would still require public involvement and peer review, but this approach will facilitate EF improvements and updates as new data are collected and compiled. This reference document can be periodically revisited and updated to ensure that best available data and EFs are being used.

A supplemental technical document incorporated by reference provides a means to advance state-of-the-science without requiring onerous rule revision / re-opening. Impeding more accurate natural gas systems emissions reporting due to the rule revision process will preclude timely updates and changes to the EFs necessary to advance the state-of-the-science and facilitate informed decisions on fugitive emissions.

The Proposed Subpart W emission factors are questionable in some cases. For example the compressor blowdown valve leaker EF is more than an order of magnitude greater than any component EF listed in Table W-3. This value is significantly higher than the value of 276.4 scf/hour per component listed in the 2007 Canadian Best Management Practices and 61.8

scf/hour per component listed in the INGAA Guidelines. A separate peer-reviewed EF document that contains background data used to develop the EF should be provided for all listed components.

Additional questions and concerns arise from the application of EFs that were developed using methods (i.e., Method 21) to detect leaks other than the optical camera. No credible study or technical analysis has been completed to support the application of the leaker EFs in Table W-3 and W-4 to leaks identified using the optical camera. The Method 21 approach and optical camera have different sensitivities. These differences and the potential implications on fugitive emissions estimate accuracy have not been reconciled. Therefore, it is conceivable that near-term updates to EFs will be desirable based on either a more in-depth understanding of the EPA-sanctioned EFs or an exponential growth of near-term data as rule requirements are implemented.

EF studies have recently occurred and recently initiated studies are ongoing. INGAA, EPA, and other stakeholders have been engaged in programs to improve EFs and such efforts should not be undermined (e.g., University of Texas-Austin study, US EPA Cooperative Agreement no. XA-83376101UTx which includes natural gas transmission participation). As discussed below, EF projects should be undertaken with the goal and objective of improving current EFs and ultimately simplifying or replacing annual leak surveys. For example, additional data could document an alternative survey frequency or a need to focus on facility subsystems, such as components in vibration or heat-cycle service that are more prone to leak.

In addition, Final Rule text and associated equations that reference EFs should be generically written. For example, at a future point in time, alternative EFs may be desired that are population-based to replace the currently-proposed leaker EFs (or vise versa). The separate EPA technical document can provide the EFs and the context (e.g., activity data needs) for emission calculations. Restricting some fugitive estimate approaches to leaker-only EFs and restricting all emission factors to those published in the Rule will be too restrictive and will suppress innovation and improvements in the accuracy of GHG emission reports.

B. Alternatives to the Optical Gas Imaging Instrument Should Be Allowed for Leak Screening

As discussed in Comment XII, the current lack of trained and experienced infrared camera operators and GHG fugitive emissions survey companies required to complete the annual leak inspections necessitates a phased-in approach. Furthermore, limited camera technology options exist, severely limiting the options for compliance. INGAA recommends the acceptance of alternatives.

Leak screening and detection can be accomplished using a variety of lower cost tools and methods. The Proposed Rule prescribes an optical camera to identify leaks during the annual facility leak survey. INGAA recommends allowing alternatives to the optical camera for leak detection. Standard methods are available, including methane detectors, ultrasonic/acoustical instruments, soap solution, etc. In most applications, these methods have been used in practice for a longer period than the optical gas imaging camera technology and are equal to or better than infrared optical imaging camera technology for locating accessible leaking components.

INGAA requests that the Final Rule include all demonstrated technologies and alternatives that are used in practice. Limiting the technology choice to optical infrared cameras is unreasonably restrictive, and unintentionally implies favoritism or endorsement of a single technology by precluding proven, less expensive leak detection and measurement instruments and/or methods. It is also important to note that the optical infrared camera only indicates the presence of a leak. Therefore, the optical camera, Method 21, and soap solution perform the identical function of identifying leaks. The camera does provide the advantage of surveying difficult to access (e.g., elevated) components, as other methods require direct access to the component.

A rule that allows alternative methods, with consensus methods validated separate from the rule and industry practices used in the interim, provides the most expedient path to support rather than preclude innovation and technology advancement. Limiting instrumentation or prescribing hierarchy for monitoring and measurement introduces unnecessary restrictions which preclude knowledgeable professionals from implementing the "right" technical approach for leak monitoring.

It is INGAA's understanding that the FLIR GasFindIR camera is currently the primary optical infrared camera technology manufactured in commercial quantities. With limited market competition, EPA has inappropriately endorsed a technology vendor and created a demand that will preserve or even raise the cost of this technology. Alternatives based on industry standard practices in the near-term and peer-reviewed, consensus (e.g., ASTM) methods in the long-term should be allowed.

In addition to substantial instrument cost, camera technology performance is susceptible to environmental factors. The camera is not intrinsically safe within an enclosed environment (e.g., compressor building) and typically requires a hot work permit to conduct a leak survey. The expertise required to operate the camera involves significant training and experience with imaging at similar industry sources, whereas other technologies and methods such as soap solution can be easily applied and observed by less-experienced personnel. EPA should not select and promote a single preferred technology when suitable and viable alternatives are available and used in practice.

EPA has funded field studies that have employed all of the recommended technologies and leak detection methodologies discussed in these comments. These "tools" provide the necessary flexibility to screen leaking components through use of accepted and practiced techniques that may be more suitable based on environmental conditions, available tools, and/or survey team experience level.

Similar to the October 2009 Final Rule, "industry practices" or consensus standard should be permissible. For example, the 2009 Final Rule references industry practices in many subparts, such as Subpart MM for Suppliers of Petroleum Products which indicates at §98.394(a)(1)(ii):

> "(ii) Where no appropriate standard method developed by a consensus-based standards organization exists, industry standard practices shall be followed."

Since methods are not consistently available for leak surveys of natural gas systems, similar language should be added to Subpart W. EPA should allow emissions detection and measurement methods developed and relied on in practice, including use in EPA-sponsored projects and for emissions reported under the Natural Gas STAR program. INGAA recommends adding language in §98.234(a)(2) [currently reserved] to include the following:

> "In addition to the optical gas imaging instrument, alternative technologies may be used to conduct annual leak detection of fugitive emissions in accordance with industry standard practices, consensus-based standards, or manufacturer recommendations. These include, but are not limited to, organic vapor analyzers, portable hydrocarbon gas detectors, ultrasonic leak meters, ultrasonic acoustic detectors, and soap solution."

As discussed in these comments, the optical gas imaging instrument has limitations that are best resolved through the inclusion of alternative technologies, practices, and standards.

C. Optical Gas Imaging Instrument Procedures and References to the AWP Should Be Revised

§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 Alternative Work Practice (AWP) for monitoring equipment leaks. INGAA supports EPA's decision to limit and minimize the AWP requirements listed in §60.18. However, this AWP was not intended to address methane or GHG leaks and contains many provisions and requirements that are inappropriate or too restrictive for natural gas transmission and storage component leak screening.

For example, §60.18(i)(1) specifies the optical gas imaging instrument specifications. This section precludes the use of the commercially available Remote Methane Leak Detector (RMLD^{TM}) because it does not provide an "image" of the potential leak as defined in (1)(i) or video records as defined in (1)(ii).

§60.18 (i)(2) provides a detailed procedure for daily instrument checks that was intended to address mixed hydrocarbon streams and varied flow rates from refinery processes. This process scenario is not applicable to natural gas transmission and storage sources. Natural gas composition is well defined, and is not subject to the significant composition variability considered under this section. Furthermore, the mass flow rate determination [paragraph (i)(2)(i)(B)] using monitoring frequency and mass fraction of detectable chemicals is also inappropriate for natural gas transmission and storage sources.

INGAA recommends that reference to §60.8(i)(2) be replaced with an alternative calibration approach that is more appropriate for application to natural gas sector sources for methane leak surveys. For example, flow could be modulated using a rotameter selected to provide a three-point check over a range of flows using a 100 percent methane standard. In addition, a calibration check could be completed using the available high volume sampler calibration standards per §98.234(d)(4) and this section should be cited under §98.234(a)(1). The calibration criteria under §98.234(d)(4) indicates the following:

> "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."

The Proposed Rule referenced only certain sections of the AWP and eliminated the AWP leak practice procedure. INGAA recommends instrument operation in accordance with the manufacturer's recommendations or industry standard practices. In addition, the General Provisions under 40 CFR Part 60 Subpart A, Section 18, Paragraph (a) should be revised to include reference to leak screening under 40 CFR Part 98.

D. The Rule Should Include Provisions for Eliminating or Decreasing the Frequency of Leak Screening

The requirement for an annual survey is basically an arbitrary decision since data are not available to support the proposed frequency required for surveys of natural gas transmission and storage facilities. In addition, portions of the facility that are not in vibration or heat-cycle service may be amenable to much less frequent surveys. Thus, the Proposed Rule should include provisions for eliminating or decreasing the frequency of annual leak screening should data and/or EF advances meet accuracy needs and leak screening data indicate that intervals can be relaxed. Since data gathering for reporting will provide a significant influx of information on leaks from natural gas systems, fugitive leak detection should not be adopted in perpetuity. Annual leak surveys should be phased out over time as data are collected and assessed, alternatives such as improved equipment- or component-based emission factors are identified, and reasonable data quality and inventory accuracy objectives are met.

This could be implemented through text additions to the rule, or citations to procedures in the EF reference document discussed above that could be used to identify alternative approaches (e.g., population-based emission factors that preclude a leak survey and identification of facility systems (e.g., yard piping) that do not warrant annual surveys).

E. Clarifications or Definitions are Required for Component Types and Related Survey Criteria

Vented and fugitive emissions are better defined in the Proposed Rule than in the 2009 version of Subpart W. However, consistent nomenclature is ultimately required to eliminate ambiguity, redundancy (i.e., double counting), and unnecessary confusion in rule implementation. For example, "compressor blowdown valve" is listed as a component in Table W-3 and the associated EF is more than an order of magnitude larger than any other listed. It appears that the emissions are *not* related to a leaking valve body or stem, but rather natural gas bypassing the valve seat, through the valve, and vented out a blowdown vent stack. Thus, the "survey point" for leak detection is the blowdown vent even though the source is a fugitive leak through an unseated valve. The Proposed Rule presumes a certain level of expertise and understanding of facility-level components, operation, and similar issues, and there is *no ability* for the reader to discern this point. Similar ambiguity in the Final Rule could cause significant implementation and compliance issues.

The lack of clarity regarding component names, component types, associated leak "source", and leak survey criteria for the "emission" point will result in misapplication of emission factors, survey errors, and reporting errors. INGAA recommends that clarity and definition of the source and measurement method(s) be addressed through the EF reference document discussed above. There must be clear, concise definitions and explanations within Subpart W, especially regarding differentiation among the sources and their associated emission estimation criteria.

INGAA recommends that additional clarity be added to the Final Rule. This may best be accomplished by including component definitions, source descriptions, and related leak survey criteria with citation to the EPA technical reference document discussed above. Although INGAA strongly advocates this separate document for emission factors, it is imperative that the document be available concurrent with the Final Rule because it will play an important role in compliance and implementation. INGAA offers its assistance in development and peer review of this important technical resource.

IX. Tank Emission Requirements for Gas Transmission Compression Facilities Should Be Limited to Condensate Tank Emissions and Clarifications are Required

§98.233(k) identifies emission reporting requirements for storage tanks located at natural gas transmission compression facilities. In the Proposed Rule preamble, EPA indicates that atmospheric tank working and breathing emissions associated with the condensate are insignificant. Rather, the concern is, "scrubber dump valves malfunction or stick-open due to debris in the condensate and can remain open resulting in natural gas bypass via the open dump valve to and through the condensate tank." [75 FR 18620] EPA provides no indication that other storage tank emissions for gas transmission are a significant emission source. However, §98.233(k) includes provisions for reporting from additional tanks.

INGAA recommends that §98.233(k) be limited to condensate tank emissions and deleting §98.233(k)(3), which references other tanks and calculation methods that apply for onshore production and processing. EPA should rename the source as "malfunctioning scrubber dump valve venting from condensate tank" to clarify the source of interest and avoid confusion with emission estimates commonly applied for atmospheric tank emissions.

If tanks and emission sources other than condensate tank emissions from malfunctioning scrubber dump valves are intended to be included, EPA should explain the significance of these emissions and why they should be considered for natural gas transmission sources, per the "80/20 rule" concerning insignificant emissions. In addition, calculation methodology should be clarified with options other than the optical camera allowed for detecting emissions from a malfunctioning scrubber dump valve.

A. Transmission Tank Emissions Reporting Should Be Limited to Condensate Tank Emissions

The Proposed Rule should be revised to appropriately refer to a malfunctioning scrubber inlet dump valve as the intended GHG emission source. Although the measurement point is located at

condensate tank vents, defining "transmission storage tanks" as a source creates a broad undefined source category that extends monitoring, measurement and reporting provisions beyond the intended emission source.

The Proposed Rule preamble defines the five sources where EPA is requiring direct measurement, including natural gas transmission storage tanks. EPA has characterized these five sources as significant enough to warrant reporting, and the preamble states that no credible engineering method or emission factor exists to accurately quantify emissions. EPA further explains malfunctioning scrubber dump valves as the primary intended GHG emission source. These valves are located upstream of the transmission condensate tank and are the focus of the required leak screening and measurement requirements. The intent is clearly reflected in several quotes from 75 FR 18620 that are provided here:

> "EPA is proposing to require five sources in this supplemental proposal to directly measure emissions: storage tanks (transmission) **when scrubber dump valves are detected leaking** (emphasis added)…"

The preamble further discusses rationale surrounding the inclusion of transmission storage tanks in direct emissions measurement. This discussion states that the actual transmission storage tank condensate volume is *typically low* and emissions are considered *insignificant,* emphasizing the intent to include the condensate tank only for the purpose of measuring emissions from malfunctioning scrubber dump valves.

> "For example, storage tanks in the onshore natural gas transmission segment typically store the condensate (water, light hydrocarbons, seal oil) from the scrubbing of pipeline quality gas. The **volume and composition of liquid is typically low and variable**, respectively, in comparison to the volumes and composition of hydrocarbon liquids stored in the upstream segments of the industry. Hence the **emissions from condensate itself in the transmission segment are considered insignificant** (emphasis added)."

The preamble also acknowledges that the measurement requirement is directed at identifying and measuring *malfunctioning* scrubber dump valves that have the potential to remain open, resulting in unintended gas bypass through the condensate tank.

> "If the scrubber dump valve is **stuck and leaking natural gas through the tank then the emissions will be visibly significant and will not subside to inconspicuous volumes**. If the **scrubber dump valve functions normally and shuts completely** after the condensate has been dumped then the storage tank, **emissions should subside and taper off to insignificant quantities** (emphasis added)."

Since the preamble clearly identifies the intent to include identification and measurement of malfunctioning scrubber dump valves, the Final Rule should limit transmission storage tanks to *condensate tank vents* to capture the scrubber dump valve as the GHG emission source and only refer to the associated tank vapor vent as the measurement point for determining excessive leakage. INGAA is receptive to monitoring the condensate tank vapor vent to identify leaking scrubber dump valves. To address this, INGAA recommends that §98.232(e)(3) be revised to read as follows:

"(3) Transmission **condensate** storage tanks **venting due to scrubber dump valve malfunction**."

Subsequent rule reference to this source should apply the same nomenclature. Without this clarification, the undefined open-ended definition of *transmission storage tanks* could significantly broaden this source category to insignificant tank sources that were not characterized by EPA as emission points of concern and apparently not intended for reporting. Per EPA's discussion in the preamble, the volume and composition of liquid are typically low and variable from this segment and GHG emissions are expected to be insignificant.

Although INGAA strongly opposes inclusion of additional transmission compressor station storage tanks, if EPA decides to do so, the Final Rule should clearly identify and define the tanks of interest. EPA should document why inclusion of additional tanks is warranted. In addition, the Rule should allow flexibility in applying software tools and simulation programs to estimate such emissions (e.g., E&P Tanks, HYSIS, etc.). INGAA notes that E&P Tanks is the prescribed methodology for storage tanks at processing facilities.

B. Clarify Condensate Tank Vent Measurement and Emissions Calculation

A single annual "snapshot" optical screening and measurement (if continuous for more than 5 minutes) of condensate tank vent(s) does not consider the estimated time operating in a malfunctioning mode. While 98.233 (k) does outline the volume and concentration measurements, this section does not provide a calculation methodology for determining the annual emissions from a malfunctioning scrubber dump valve routed to a transmission condensate storage tank.

§98.233(k)(2) uses the undefined term "continuous" to determine whether the transmission condensate tank vapor vent should be measured with a meter. However, this terminology is not clearly defined and the emissions calculation method is not provided, including the time basis for estimating the duration of the malfunction event. These items should be clarified. For example, §98.233(k)(2) should indicate that "continuous" does not mean "measurable" over the 5-minute monitoring time, but rather "continuous and unabated" over the 5-minute monitoring time.

Similarly, §98.233(k)(2) should provide a calculation method and time basis for the calculation. INGAA recommends the following formula to calculate total annual emissions:

$$Ea = V \times CH_4 \times T$$

Where:

Ea = Annual methane emissions in cubic feet at ambient conditions from tank vapor venting resulting from a malfunctioning scrubber dump valves;

V = Measured tank vapor flow rate in cubic feet per hour;

CH_4 = Mole or volume fraction of methane in tank vapor; and

T = Approximate duration of malfunctioning scrubber dump valves in hours during the year (maintenance records or event logs can be used to "bound" the duration of the venting event).

C. Vent Emissions Detection Technology Should Not Be Limited to the Optical Gas Imaging Instrument

Alternatives to the optical camera should be allowed for identifying a malfunctioning scrubber dump valve and associated vent emissions.

EPA states in the preamble that "The **only potential option** for measuring emissions from scrubber dump valves is to **monitor storage tank emissions with a gas imaging camera** to determine if the emissions become negligible when dump valves close (emphasis added)." [75 FR 18620] Additional methods are available, as acknowledged by EPA in the Spring 2006 EPA Natural Gas STAR Partner Update Technology Spotlight:

"…methane leaks through dump valves can be **discovered** in several ways: (emphasis added)

- Go to the slop tank and listen for excess gas flowing to or through the tank (the easiest method).
- Look at the sight glass on the scrubber (if so equipped); if there is no liquid in the vessel, a leak should be suspected.
- Examine the throttling of gas through a leaking dump valve; a valve with frost indicates a leak.
- Listen for a leak through a dump valve.
- Use ultrasonic leak detection equipment with a touch probe to locate leaks through dump valves."

Similar to comments in the fugitive emissions section above, INGAA requests that EPA broaden the detection and measurement technology suite of tools to include all demonstrated technologies and alternatives that are used in practice. This should include alternative tools for vent gas measurement including calibrated bags and high-volume samplers (i.e., see Comment IV.C). Limiting the technology choice to optical infrared cameras is unnecessarily restrictive and precludes better and more efficient detection and measurement instruments.

X. Reporting, Recordkeeping and Missing Data Provisions include Requirements that Are Infeasible, Costly, or Not Warranted to Support Mandatory Reporting Rule Objectives

Reporting and recordkeeping requirements are identified in §98.236 and §98.237. Missing data procedures are identified in §98.235. INGAA recommends revisions or clarification to these sections to eliminate requirements that are not practical or do not add substantive value while incurring unwarranted costs.

A. Missing Data Procedures Should Not Require a Repeat Test in All Cases

Missing data requirements are defined in §98.235, which indicates, "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, you must repeat the estimation or measurement activity for those sources as soon as possible…". This is an unnecessary and burdensome requirement. Missing data procedures should consider the relative importance of the lost data in question, and whether reasonable means are available to provide an estimate of that parameter, before conducting repeat measurements.

For example, if a vent measurement is conducted at ambient conditions, and it is discovered after the fact that ambient temperature was not recorded or was recorded erroneously, §98.235 would require a repeat test. In addition to mobilizing a test crew, this could require operator actions such as manlift rental and process manipulation to achieve the proper operating mode (e.g., for multi-mode testing on reciprocating compressors). As an alternative, ambient temperature would likely be available from either a related test conducted at the same facility on the same day, or from weather records from a station in proximity to the facility location. These alternatives would provide a very reasonable means to replace the missing data and calculate flowrate at standard conditions and the associated emission rate. For example, relatively accurate "replacement" temperature data may be available, but even if the ambient temperature estimate was 5 ^{o}F in error, the resulting error in the flow correction to standard conditions would be approximately 1 percent or less.

EPA has avoided addressing "materiality" or "*de minimus*" emissions in the Reporting Rule. However, common sense approaches to address missing data should be allowed that consider the relative importance of the data, and whether reasonable alternatives are available. For example, §98.3(i) provides accuracy requirements for device calibrations and indicates that, "All measurement devices shall be calibrated to an accuracy of 5 percent." A similar threshold could be included in §98.235 that indicates: (1) the operator required to complete a repeat measurement unless replacement data or a reasonable estimate is available; (2) the operator shall ensure that a source-specific error of less than 5 percent would result; and (3) the basis for the replacement data and accuracy is documented in the annual report. It is in the operator's best interest to ensure that all data are routinely acquired and lost data issues are minimized. However, if EPA is concerned that abuse may occur, maximum usage of this allowance could be stipulated in the rule (e.g., no more than four occasions in any annual report).

B. Recordkeeping and Reporting Requirements Should Be Limited to Data that Are Reasonably Accessible and Pertinent to the Regulatory Objective

§98.236 identifies reporting requirements associated with the sources listed in §98.233. Some requirements are infeasible. In other cases, INGAA recommends that EPA not require data collection based on the possibility that the data could be useful in the future, such as to formulate new EFs or emission intensity factors.

INGAA comments follow for §98.236 where INGAA recommends deleting the item from the list of reported parameters or including the parameter in the GHG Monitoring Plan required under §98.3(g)(5) rather than including the information in the annual report.

- §98.236(c)(9) – Blowdown venting: Item (i) should not be required or could be reported in the GHG Monitoring Plan. Item (ii) is not applicable as the compressor is driven equipment and not the driver. Item (iii) should be clarified to indicate the volume associated with particular systems that could be released through the vent, and this parameter is more appropriately documented in the GHG Monitoring Plan.
- §98.236(c)(11) – Tank emissions identified with optical gas imaging instrument: The first five parameters – i.e., (i) through (v) are input parameters associated with E&P Tanks software emission calculations (i.e., see item (c)(10) list of parameters) and should be deleted from the Rule. These parameters are not relevant when performing tank *vent* measurements from malfunctioning scrubber dump valves.
- §98.236(c)(17) – Centrifugal compressor wet seals: As noted in Comment IV.C, compressor throughput is not readily available and reporting this parameter would add significant burden. EPA has not identified why these data are needed. It is imperative that item (iii) is deleted.
- §98.236(c)(18) – Reciprocating compressor rod packing venting: As noted in the Comment V.D and the previous bullet, compressor throughput is not readily available and reporting this parameter would add significant burden. It is imperative that item (i) is deleted. In addition, item (ii) should be revised and reconciled with revisions recommended by INGAA above that address multi-mode test requirements. Furthermore, items (iii) through (v) should be deleted from this section and included in the GHG Monitoring Plan rather than including the information in the annual report.
- §98.236(c)(19) – Fugitive emission sources using EFs: Item (i) should be clarified so that appropriate "counts" are reported and unnecessary documentation is avoided. For example, as written, item (i) could be interpreted to mean that all components must be counted and reported even if the EF is "leaker" based. Item (i) could be clarified by adding (i)(A) and (i)(B) as follows:

  > **"(A)** Component count for each fugitive emissions source **where component population is reported for population emission factors, or**
  >
  > **(B) Component count for each fugitive emissions source where the number of leaking components are reported for leaker emission factors**."

  If EPA intended to require total component counts for leak surveys that use leaker EFs, INGAA recommends deleting that requirement. Considerable burden is added to complete a total component count, and transmission sector personnel with expertise to complete detailed facility-wide component counts are very limited.
- §98.236(d): The requirement for "minimum, maximum and average throughput for each operation" in the natural gas transmission and storage segments is not clear. This requirement should be deleted or these terms should be specifically defined. If this is intended to require gas throughput values for compressor stations, INGAA recommends that the requirement be deleted because such information is not readily available for many

facilities. The implications from deleting this requirement is not evident due to the lack of clarity in the requirement.

- §98.236(f): To avoid confusion and for consistency with requirements elsewhere in Subpart W, this section should specifically identify the affected portable equipment based on the following revision:

  "(f) Report emissions separately for **production wellhead** portable equipment…".

C. Optical Gas Imaging Instrument Video Records are Business Confidential and Should Not Be Available via a FOIA Request

For the optical imaging leak screening, the preamble indicates that video records are required and §98.237(b) specifies that the operator must retain, "Results of all emissions detected and measurements." EPA should clarify in the rule text whether video records are required for compliance with §98.237(b).

INGAA understands that EPA still plans to propose amendments to Subpart A to address Confidential Business Information (CBI). If that action is completed on a timely basis, it should identify leak survey video records as CBI. If the Subpart A amendments to address CBI are not finalized prior to Subpart W promulgation, this issue should be addressed in the Subpart W Final Rule.

EPA discusses the CBI rulemaking in the October 2009 Final Rule for GHG Mandatory Reporting. At 74 FR 56287, EPA indicates,

> "Through a notice and comment process, we will establish those data elements that are ''emissions data'' and therefore will not be afforded the protections of CBI. As part of that exercise, in response to requests provided in comments, we may identify classes of information that are not emissions data, and are CBI."

Due to security concerns associated with national industrial operations and energy infrastructure, it is imperative that facility video records from optical camera leak surveys are afforded protection as CBI. Optical camera video records should be considered CBI and should not be available through a Freedom of Information Act (FOIA) request.

XI. Rule Principles and Natural Gas Sector Implementation Costs

These comments indicate a willingness to accept many of the measurement and monitoring methods in the Proposed Rule, with refinements required in many cases. However, INGAA remains concerned that Proposed Rule requirements exceed what is needed to furnish EPA with a reasonably complete and accurate understanding of national GHG emissions patterns, or information to support GHG policy development. With many new measurement and monitoring requirements for natural gas operations, it is apparent that Subpart W imparts significant burden on this sector.

In addition, if EPA has a predisposition to consider an anomalous event a key emission source, it is unlikely that additional data gathered through Subpart W reporting will dissuade that opinion. For example, Subpart W requires monitoring and measurement of compressor station condensate tank emissions. This requirement is likely based on **voluntary** reporting under the EPA Natural Gas STAR program that indicates a faulty scrubber dump valve seal can result in vented emissions through the condensate tank vent during a system malfunction. For future policy decisions, EPA may still be concerned with this potential emission source based on STAR program reporting, regardless of its prevalence (or inclusion) in Subpart W reporting. Thus, an operating practice to address valve seating would likely be considered for that policy action regardless of new data provided under Subpart W.

INGAA is concerned that measurement and monitoring requirements for natural gas operations, including anomalous events informed through **voluntary** participation in the Natural Gas STAR program, result in more stringent requirements for this sector. These measurement and monitoring requirements are new for the vast majority of natural gas transmission and storage operators since such programs for vented and fugitive sources are not mandated and have only been implemented at select facilities (typically on a one-time basis). INGAA respectfully submits that the approach of imposing such requirements under Subpart W could cause EPA to collect data that will ultimately not prove useful, while imposing significant cost to regulated entities.

INGAA is also concerned that universal, consistent data quality and accuracy objectives have not been implemented, resulting in regulatory inequities across affected industries. For example, Subpart W will require INGAA members to conduct a leak survey for the entire facility. This includes a subset of components in vibration and heat-cycle service that are more prone to leak over time, and many other components in non-vibration service in the compressor building and throughout the station yard that are less prone to leak. In considering the "80/20" rule, where EPA is intending to capture 80% of the emissions (e.g., see preamble discussion at 75 FR 18614), Subpart W could survey a subset of the facility and capture components that comprise the majority of fugitive emissions, rather than completing a full facility survey.

In contrast, under Subpart C, INGAA comments on the April 2009 Proposed Rule requested the use of equipment-specific methane and N_2O emission factors for combustion exhaust as an alternative to the default factors published in the Rule. This would promote consistency with inventories already developed by operators, and would generally be expected to provide more accurate emission estimates. For example, methane emissions in combustion exhaust of a low-NOx reciprocating engine will be higher than the default EF; thus, for facilities with reciprocating engines, the combustion methane emissions would be underestimated. In response to the comment, EPA precluded the use of more accurate EFs and required the default EFs. For some compressor stations, that inaccuracy in the facility inventory will be larger than the emissions reported from the "leak survey" of yard piping and/or the vast majority of facility components. This example demonstrates that there does not appear to be a consistent data quality or accuracy objective universally applied in defining sector-specific rule requirements. Rather, it implies that decisions are compartmentalized and are likely driven by familiarity with a particular topic, as opposed to consistently applied goals for data

accuracy and emissions coverage, as well as equitable application of these principles across all industries and sources subject to the reporting rule.

INGAA recommends that EPA more clearly define data quality objectives and equitably apply such principles across all affected industry sectors. INGAA requests that EPA consider the relative burden imparted on natural gas operations under the Proposed Rule when evaluating the entirety of these comments., as well as INGAA's comments regarding flexibility, rational phased approaches, and reasonable limits and scheduling for monitoring and measurement. Additional discussion regarding Proposed Subpart W cost is provided in the following section.

A. Discussion of Implementation Costs

Based on information provided in EPA's Economic Impact Analysis (EIA), the annual cost per affected facility for measurement and monitoring in subsequent years (i.e., after the first year of reporting) is approximately $16,000. This total includes stationary combustion source reporting that will be required upon Subpart W promulgation. For small to average-size facilities without complicated measurements, INGAA generally agrees with the estimated subsequent year costs. However, the EPA cost analysis did not adequately account for all required and potential costs, including the following:

- Additional first-year reporting costs. First-year per-facility costs presented in the EIA are only about $1,700 more than subsequent year per-facility costs. Additional first-year tasks would be required, including a more detailed assessment of applicability and requirements; monitoring plan development, including standard operating procedures for measurements; equipment calibrations; measurement criteria definitions; identification of vent access measurement issues and sample port installations; calculation and recordkeeping documentation development (e.g., spreadsheets and database support); operator and technician training; data review/QA-QC procedures; reporting tool development and integration with EPA's pending web-based reporting system; and, additional management oversight. INGAA understands that some tasks would be company-wide and shared by numerous facilities. However, implementing a program to comply with a rule of this breadth and complexity would likely entail costs an order of magnitude or more greater than EPA's estimate for the initial reporting year.
- Three-mode testing costs for reciprocating compressors. As discussed in Comment V, emission measurements must be conducted for each compressor in each of three operating modes that occurs within the year, including operating, standby-pressurized, and not operating-depressurized. This requirement will be considerably more complex than simply testing each compressor in a single as-found condition. One approach would be to cycle each compressor through the three modes during a test team visit. However, this would complicate compressor station operation (i.e., coordination with dispatch), possibly disrupt gas transmission service, and would most likely create an unnecessary venting event for each compressor that requires a blowdown which wastes product and increases GHG emissions. Alternatively, a test team could be placed on standby while each compressor naturally cycles through the three modes or could revisit the compressor station numerous times; or, operators could be trained to perform measurements when the opportunity arises. Each of these

approaches creates its own complications and expense. It does not appear that the EPA analysis accounts for the costs associated with the complexities of three-mode testing.

- Testing complexity for "inaccessible vents". Many compressor vents, such as reciprocating rod packing and centrifugal wet seal oil degassing, are located above rooflines since facilities were not constructed with vent access in mind. Such vents would be deemed "inaccessible" in many cases under typical LDAR programs. Accessing these vents to measure flowrates typically requires a manlift and could require assessment and implementation of additional safety precautions (e.g., by-passing high-pressure gas lines, avoiding personnel exposure to an emergency blowdown event, etc.). These requirements will add time and expense to measurements, especially for three-mode testing of reciprocating compressors.
- Small facility testing to validate non-reporting status. If a method to screen facilities for rule applicability (i.e. 25,000 metric ton CO_2e threshold) is not defined or if the screening method is too conservative, then the number of facilities required to conduct first year measurements will increase. For the 25,000 metric ton threshold, EPA estimates that 1,145 of 1,944 transmission compressor stations and 133 of 397 natural gas storage facilities will be required to report GHG emissions. Without an accurate applicability screening method, first-year testing costs could increase significantly – and may encompass all facilities – to confirm emissions from facilities required to report and validate status of smaller facilities not subject to the rule.

XII. Implementation Schedule Should Be Delayed or Phased In

As noted in several comments above and discussed below, significant rule implementation challenges exist. INGAA strongly recommends deferring implementation for one year, or, alternatively, a three year phase in period for reporting vented and fugitive sources that require measurement or leak surveys.

INGAA is very concerned with the limited time to implement Subpart W, especially if inter-related items discussed in comments above are not reconciled. For example, comments related to implementation logistics and schedule result in the need for an applicability screening method, alternatives to three-mode testing of reciprocating compressors, evaluation of vent accessibility and related safety concerns, availability of service providers and trained technicians to complete leak surveys and vent measurements, and availability of required technology – e.g., optical cameras.

Even if INGAA comments are addressed to reconcile some of the complexity and conflicts in the Proposed Rule, operators will still be challenged to complete all of the required activities to meet the March 31, 2012 deadline for reporting 2011 emissions. These activities include gathering necessary data, developing internal reporting systems, identifying and installing measurement access points, and completing the required measurements and leak surveys. In the October 2010 Final Rule on Mandatory Reporting, EPA provided the option to use "best available information" at the inception of year one. For Subpart W, there is considerable additional complexity due to measurement and monitoring requirements that have not previously existed for natural gas transmission and storage. These extensive reporting criteria, compared to gathering relatively accessible information such as fuel-use estimates

for combustion emission estimates, support an implementation schedule that allows the use of "best available information" for some sources during the initial reporting year. Alternatively, operators should be afforded the ability to phase in reporting of Subpart W emissions over multiple years.

Unlike other industry sectors, such as electricity-generating facilities, the natural gas transmission sector is being required to monitor and measure GHG emissions by implementing new procedures that have not been previously required under the Clean Air Act. Most of INGAA's members lack: the necessary equipment to implement leak detection and measurement on the scale required; trained personnel to operate that equipment; data management systems to collect, archive, interpret and transmit emissions information; and/or QA-QC procedures to ensure the integrity and completeness of emissions information. Contractors qualified to perform the detection and measurements are also in short supply, and are likely to remain so for at least the initial few years.

As discussed in Comment II above, EPA estimated significant demand for mandated measurement and monitoring, but underestimated the full implications. EPA estimates that there are approximately 1,944 gas transmission facilities in the US. As noted in Comment II, all would have to conduct vent measurement and fugitive monitoring to determine Subpart W applicability. With an estimate of approximately two facilities monitored per week, at least 972 crew-weeks would be required to monitor all facilities within a year. Accounting for the added complexity of addressing reciprocating compressor modal testing, multiple site visits for the same facility would be required in some cases during a year.

While fewer emission sources require direct measurement in the current Proposed Rule as compared to the 2009 version, three-mode reciprocating compressor testing and additional insight into vent access issues offset those benefits in terms of time to complete facility tests. The availability of experienced company staff or outside contractors with sufficient knowledge to implement provisions related to vent measurement, leak surveys, and associated QA/QC and data development for reporting is very limited. With the addition of monitoring requirements for distribution and onshore production, this shortage is exacerbated. In addition, the time required to develop a properly trained in-house or service provider work force should not be underestimated. Another time-consuming logistical issue will be providing safe access points for roofline vent measurements and some condensate tank vent measurements. These vents would be considered inaccessible under typical LDAR programs and safety concerns associated with these measurements need to be addressed. Collectively, these issues pose huge challenges for rule implementation, especially in the near-term.

Ideally, INGAA recommends postponing the first year of reporting for one year, with 2012 emissions for Subpart W sources to be reported in March 2013. Alternatively, if EPA is unwilling to accept deferring all reporting, INGAA requests that EPA consider alternatives that will facilitate rule implementation. INGAA recommends the following alternative:

- Allow a more limited subset of sources to be reported for 2011 with phase-in of all vented and fugitive sources over three years. INGAA recommends that emissions from combustion, event-based blowdown venting, and pneumatic devices be included in the

initial reporting year for all affected facilities in the gas transmission compression and underground storage segments. To facilitate implementation of vent measurement and fugitive leak screening, emissions reporting for these vented and fugitive sources would be phased in over three years, with each company incrementally reporting at least one third of their affected facilities in each of the first three reporting years.

Under this scenario, at least one third of the *facilities* would report all required emission sources in year 1, at least two thirds would report all required emissions in year 2, and all facilities would report all required emissions in year 3. To address potential concerns regarding facility selection for this phased approach, each company would rank its facilities by size based on the streamlined screening method discussed in Comment II and report the largest third of facilities in year 1, middle third in year 2, and balance in year 3. Thus, since only a subset of emissions are deferred to the second and third reporting years, the vast majority of emissions for these segments would be captured in the initial reporting year.

To address unique sampling issues and safety concerns for vent measurement at larger facilities on the "year one" list (e.g., vents are especially difficult to access or an alternative sample location is not readily available), operators must be allowed to defer select "larger" facilities to a later year. In this case, the safety and accessibility issues would be documented, and the annual "one third" facility criteria would be met by replacing that facility with the next largest facility on the company list.

Due to safety concerns and vent measurement implementation complexity, INGAA strongly recommends, per the discussion above, deferring implementation for all facilities or the phased approach in the previous bullet.

If EPA has concerns with a one year deferral or the 3 year phase in recommendation, INGAA requests additional dialogue to resolve this issue prior to Final Rule promulgation. For discussion purposes, additional examples are provided of implementation phasing, including the following:

- Phase in the facilities that report under Subpart W over multiple years. Sources under Subpart W that are required to report 2010 combustion emissions could be first to report emissions from Subpart W sources (i.e., facility applicability in year one is based solely on combustion emissions), with facilities that are subject due to combustion plus vented and fugitive emissions phasing in reporting in over two additional years. Similar to the discussion in the previous bullet, larger facilities would be able to defer year 1 reporting if vent accessibility issues complicated near-term implementation.
- Allow "best data" for some vented and fugitive sources in year one based on published emission factors. INGAA prefers the previous options over this approach because this exercise would result in year one facility methane emissions that differ from subsequent reporting years based solely on emission estimation methods. This could cause confusion to outside reviewers of the information.

A phased approach for reporting fugitive and vented emissions will not compromise program integrity. In addition, possible data quality and operator safety impacts will not be

compromised due to a rush to address rule requirements. Even if issues identified in other comments are addressed (e.g., an alternative to three-mode testing; an applicability screening method), INGAA still strongly believes that additional time is justified to properly implement the Rule. If the related INGAA comments that discuss scheduling complexity and logistics are not reconciled in the Final Rule, the schedule is infeasible and it is highly unlikely that all Petroleum and Natural Gas Systems facilities will be able to adequately address all requirements in the allotted time.

XIII. Miscellaneous Comments – Recommended Revisions to Definitions, Citations, and Erroneous Text

This section itemizes a number of relatively minor comments on clarifications or flawed rule text associated with definitions, rule section citations, and questionable grammar (i.e., poorly worded text).

- References to "portable" equipment: It is apparent that EPA expects emissions from portable equipment at production wellheads to be reported, but not portable equipment from other segments or applications. §98.230(a)(2) includes portable equipment for onshore production and §98.231(b) indicates emissions should be reported for portable equipment stationed at a wellhead. For clarity and to avoid confusion with underground natural gas storage wells, INGAA recommends revising §98.231(b) indicate, "You must include combustion emissions from portable equipment that cannot move on roadways under its own power and drive train and that is stationed at a**n onshore production** wellhead…".

- Flare combustion definition: The Proposed Rule includes additional and revised definitions in §98.6. The definition of "flare combustion" is poorly worded because CO_2 and N_2O are not "unburned hydrocarbons" or products of incomplete combustion. INGAA recommends the following revision:

  "*Flare combustion* means **emissions from combustion of gas in flares** ~~unburned hydrocarbons~~ including CH_4, CO_2, **and** N_2O emissions~~ resulting from the incomplete combustion of gas in flares~~."

- §98.233(r) references to §98.232(e)(6) and (f)(4) should be deleted: Low bleed pneumatic devices are identified as a source for gas transmission compression in §98.232(e)(6) and the emission estimation method is appropriately detailed in §98.233(b). This estimate uses population-based EFs from Table W-3. However, §98.233(r) also indicates that the estimation method in that paragraph applies to §98.232(e)(6). Since §98.233(b) already addresses estimates for this source type, any further delineation in §98.233(r) would be duplicative. It is apparent that the reference to "(e)(6)" in §98.233(r) is an error and "(e)(6)" should be deleted from the list of emission sources in §98.233(r).

  In addition, the reference to "(f)(4)" as an emission source in §98.233(r) is inappropriate and should be deleted. Similar to the discussion above, §98.232(f)(4) identifies low bleed pneumatic devices as a source for underground storage and the estimation method is already addressed under §98.233(b).

- Leaker versus population emission factors for underground storage: For natural gas underground storage, fugitive emissions are identified as an emission source in §98.232(f)(5). Based on Table W-4, emission estimates employ population EFs for storage wellhead components and leaker EFs for the balance of station components. Thus, §98.232(f)(5) is cited in both §98.233(q) for leak surveys and leaker EFs and §98.233(r) for population EF-based estimates. To avoid confusion on which EFs are used, which portion of the facility requires leak survey, and potential double counting, additional clarity is desired. This could be addressed by adding the following to the end of §98.233(q)(4):

  "…For underground storage facility components in storage wellhead service, population emission factors apply under §98.233(r) and a leak survey is not required."

- §98.234(a)(1) text clarification: The text in §98.234(a)(1) should be revised to read, "…§60.18(i)(1) and (2) **of the** Alternative Work Practice…".
- Equations should be reviewed for accuracy, clarity and engineering unit consistency: Several comments included in this document (e.g., for blowdown vents) note errors or lack of clarity (e.g., engineering units not provided) related to equations in the Proposed Rule. While a few specific recommendations are provided in these comments, INGAA recommends that EPA closely review all equations for accuracy and consistency (e.g., reference conditions, consistent engineering units for related data, proper application of molar/volume ratio for methane and CO_2 content of natural gas), as it is evident that there are additional errors such as engineering units not being provided for all equations. This review is particularly important for equations that are frequently referenced, such as Equation W-20 and Equation W-21 in §98.233(t).
- Equation time basis should be based on operating hours: In many cases, time is (or should be) a variable in the emission calculation. In some cases, it appears that EPA presumes 8,760 hours of operation or source service. INGAA recommends that calculations that assume continuous operation be revised to allow the relevant annual operating hours or time in service to be used to calculate annual emissions.

XIV. Conclusions

INGAA and its members share EPA's desire to collect accurate, reliable and reasonably complete data on GHG emissions from the natural gas sector. INGAA's members also acknowledge EPA's desire to improve the quality of data on vented and fugitive emissions of methane at compressor stations along natural gas transmission pipelines. INGAA acknowledges and supports several changes in this Proposed Rule, as compared to the original Subpart W proposal in April 2009, including a focus on primary emission sources for each industry segment, expanded application of emission factors, and less direct measurement.

However, INGAA still has considerable concerns, and strongly urges EPA to thoughtfully consider and address issues identified in these comments. INGAA's comments detail a number of concerns and recommended solutions, including the following key issues:

- Additional time is needed to fully implement Subpart W and INGAA recommends deferring implementation for a year. If reporting of 2011 emissions is required, reporting should be phased in over 3 years for vented and fugitive GHG sources that require measurement or leak screening to estimate emissions;
- An applicability screening method must be provided for Subpart W sources;
- Clarification is required regarding limitations in segment-specific source reporting;
- For reciprocating compressor rod packing vents, alternatives to annual three-mode testing are required;
- Prescriptive methods and technology requirements should be replaced with more flexible approaches;
- Subpart W emission factors should be moved to a separate EPA document that is incorporated into the rule by reference;
- Vent measurement on a continuous basis should be allowed as an operator option;
- Safety must not be compromised; and
- Clarity and unambiguous criteria must be reflected in Subpart W.

Consistent with its past work with EPA on GHG issues and other Clean Air Act rulemakings, INGAA has a demonstrated history of working constructively and cooperatively to address regulatory issues. INGAA offers its assistance to reconcile the issues herein, and facilitate the development of viable Subpart W requirements for natural gas transmission and storage facilities.

ATTACHMENTS

Attachment A: Applicability Screening Method – Basis for Emission Threshold

Attachment B: Compilation of INGAA Recommended Revisions to Proposed Subpart W Text

Attachment A:

Applicability Screening Method – Basis for Emission Threshold

Introduction and Background

As discussed in Section II of the INGAA Comments on Proposed Subpart W, a streamlined applicability screening method is needed for natural gas transmission and storage facilities to preclude monitoring and measurement at facilities that will be below the applicability threshold. At present, the GHG Mandatory Reporting Rule would require smaller Subpart W facilities to conduct measurement and leak screening to document that emissions are less than the 25,000 metric tons CO_2e applicability threshold for reporting.

An alternative, calculation-based screening method is necessary to ensure compliance certainty, avoid vagueness in determining Rule applicability, and eliminate unnecessary measurement and monitoring for facilities that are below the applicability threshold. In assessing costs associated with Proposed Subpart W in its economic impact analysis, EPA did not include costs associated with measurement and leak surveys at facilities that are below the applicability threshold. Thus, costs are underestimated and such costs would be incurred without meaningful benefit.

To preclude unnecessary measurement and leak surveys, the screening method should establish an emission threshold based on sources that can be estimated with reasonable accuracy using readily available data, independent of additional measurement and monitoring requirements at the facility. Thus, INGAA recommends a facility screening threshold based on emissions from *combustion sources* and *station event-based blowdown venting*. These emissions would be estimated based on methods provided in Subpart C for combustion and Subpart W for event-based blowdown emissions for which data are generally available to complete the emission estimates.

To determine applicability, facilities would assess actual facility emissions for the applicable reporting year based on combustion emissions (determined according to Subpart C) and station event-based blowdown emissions (determined from engineering calculations and vent logs consistent with Subpart W) and compare those facility emissions to the threshold reporting value. As discussed below, INGAA recommends a screening threshold based on combustion and event-based blowdown venting of **15,000 metric tons CO_2e annually**. This attachment provides the technical basis for determining this threshold – based on typical emissions from combustion and event-based blowdowns for a facility with total GHG emissions of approximately 25,000 metric tons CO_2e annually.

Technical Approach and Analysis for Establishing the Screening Method Emission Threshold

The objective of the screening procedure is to provide a streamlined method to efficiently determine applicability of small- to mid-sized facilities. In evaluating rule applicability for the range of typical natural gas transmission and storage facilities, it becomes clear that a larger compressor station where equipment is utilized is likely to trigger the 25,000 metric ton CO_2e threshold based on combustion emissions alone. For example, approximately 12,600 hp at a site with 50% utilization would emit about 25,000 metric tons CO_2e from combustion. If facility utilization is higher, the horsepower capacity at the applicability threshold would decrease linearly (e.g., at 100% utilization, approximately 6,300 hp would emit 25,000 metric tons CO_2e from combustion).

An effective applicability screening method should:

- Provide reasonable assurance that facilities with emissions above the 25,000 metric tons CO_2e threshold are captured and report as required;

- Be based on an emissions threshold from sources that can be estimated with reasonable accuracy using readily available data – and not depend on any new or additional measurement and monitoring requirements at the facility;
- Consider that combustion, vented, and fugitive emissions all contribute to natural gas transmission and storage facility emissions, and that fugitive emissions and some vented emissions are difficult to estimate;
- Identify an emission threshold from select facility sources that have an established relationship to the 25,000 metric ton CO_2e facility threshold; and,
- Consider the relative emissions from facility sources and address facility types that will be covered.

To identify an appropriate emission threshold from combustion and station event-based blowdown venting, a conservative estimate of the contribution from *other* GHG emission sources needs to be backed out of the 25,000 metric ton CO_2e threshold. Table 1 lists the sources and emission factors (EFs) that were included in this analysis for fugitive and vented sources. EFs are based on published data commonly applied for company-specific inventories and the national inventory developed by EPA. Table 2 presents combustion emission factors from 40 CFR Part 98, Subpart C.

The rule applicability screening method presented in Equation 1 below conservatively estimates potential emissions from Subpart W transmission facilities as follows:

- Fugitive EF for reciprocating compressors addresses a broader range of components than the list in §98.232(e)(7) such as valve covers, variable valve pocket, doghouse cover, lube oil vent, etc. These fugitive emissions are included in the published EF, but not identified fugitive sources under §98.232. Thus, on average, the emission factor is conservative.
- Estimates for pneumatic devices include an EF based on relatively high emitting continuous bleed devices.
- For determining station blowdowns emissions in the estimate of a "typical" 25,000 metric ton CO_2e facility, the EF is based on the EPA/GRI study and a related Canadian Study. Since this EF is an "average" of all facility types (i.e., includes larger facilities), it provides a conservative estimate for the small- to mid-sized facilities that will be below the threshold. Note that this EF is used in the analysis discussed herein to define the appropriate threshold. For the actual applicability determination, operators will use actual data from vent logs and/or engineering calculations to assess actual facility emissions.
- Combustion emission estimate consistent with 40 CFR Part 98, Subpart C of the Mandatory Reporting Rule.

Table 1 presents natural gas transmission station sources and corresponding EFs relied upon to determine the screening level applicability threshold. Table 2 presents Subpart C combustion emission factors.

Table 1. **Natural Gas Transmission Station GHG Reporting Threshold Determination – Source Inclusion and Corresponding Emission Factor for Vented and Fugitive Emissions.**

Source Type	Source	Includes	EF Tier	EF (units)	Reference
Vented	Station Blowdown	compressor blowdowns, compressor starts, pressure relief valve (PRV) lifts, emergency shutdown (ESD) activation, and other venting sources	3	2,131 Metric tons CO_2e/station-yr	INGAA Guidelines/ Combined data from GRI/EPA study (1996) and 1995 Canadian Emissions Inventory (Radian, 1997)
	Station Control Loop		3	8 Metric tons CO_2e/station-yr	INGAA Guidelines/ GHGCalc™
	Station Isolation Valve	intermittent devices that emit gas only during actuation: piston valve operators, pneumatic/hydraulic valve operators, and turbine valve operators	3	76 Metric tons CO_2e/device-yr	INGAA Guidelines/ GHGCalc™
	Natural Gas High Bleed Pneumatic Device	vent gas when the device actuates and also from a pilot bleed when the device is on standby; devices are typically associated with control loops	3	187 Metric tons CO_2e/device-yr	INGAA Guidelines/ GRI/EPA study, Vol. 12 /GHGCalc™
	Pneumatic hydraulic valve operator		3	2 Metric tons CO_2e/device-yr	INGAA Guidelines/ GHGCalc™
Fugitive	Station	yard piping and components	3	1,292 Metric tons CO_2e/station-yr	INGAA Guidelines/ GHGCalc™
	Reciprocating compressor[A]	compressor components	3	2,386 Metric tons CO_2e/device-yr	INGAA Guidelines/ GHGCalc™

[A] Reciprocating compressor emissions have historically been categorized as "fugitive" emissions. However, in the Proposed Subpart W, reciprocating compressor vented volumes are measured such that these sources are considered vented emissions.

Table 2. Emission Factors for Combustion Emission Estimates (from 40 CFR Part 98, Subpart C).

Source Type	Source	EF (units)	Reference
Combustion	Natural Gas CO_2 emissions	53.02 kg CO_2/MMBtu	EPA Mandatory GHG Reporting Rule, Table C-1
	Natural Gas CH_4 emissions	1.00 E-03 kg CH_4/MMBtu	EPA Mandatory GHG Reporting Rule, Table C-2
	Natural Gas N_2O emissions	1.00 E-04 kg N_2O/MMBtu	EPA Mandatory GHG Reporting Rule, Table C-2
	Total	53.1 kg CO_2e/MMBtu	EPA Mandatory GHG Reporting Rule

The discussion of derivation of the proposed ***applicability screening threshold*** that includes only combustion and station event-based blowdown emissions follows. The emissions "backed out" of the 25,000 metric ton CO_2e applicability threshold include fugitive sources and vented sources other than event-based blowdowns. For discussion purposes, the event-based blowdown EF is also provided below so that the relative facility contribution from combustion can be assessed.

Table 1 emission factors were utilized to develop the "backed-out" metric tons of CO_2e as follows:

$$\text{ScreeningThreshold}\left(\frac{tonne\,CO2e}{yr}\right)=\left[25{,}000\left(\frac{tonne\,CO2e}{yr}\right)-(Fugitive+nonBlowdownVented)\left(\frac{tonne\ CO2e}{station\text{-}\,yr}\right)\right] \quad \text{Eqn. 1}$$

Where:

Screening Threshold = Metric tons per year attributable to combustion and blowdown venting;

25,000 = Metric tons CO_2e Mandatory Reporting Rule threshold;

Fugitive = Emissions determined from the EFs and assumptions below; and

nonBlowdown Vented = Vented emissions from sources other than event-based blowdowns determined based on the emission factors and assumptions below.

To assess the appropriate Screening Threshold, the EFs from Table 1 are applied for the fugitive and vented sources *excluded* from the screening threshold emissions. Since some EFs are based on compressor counts, and pneumatic devices are related to prime mover / compressor counts, a general assessment needs to be completed to reach a conservative conclusion regarding the number of engine drivers / compressors located at the small- to mid-size facility that would apply the screening method. This review using available EFs indicates that facilities with five or more compressors would have emission contributions from fugitive and vented sources that consume a large portion of the available 25,000 metric ton CO_2e threshold. For example, the *fugitive emission factor* for a single reciprocating compressor is 2,386 metric tons CO_2e per year. Thus, the fugitive contribution from 5 units consumes nearly half of the total 25,000 metric ton CO_2e threshold. When the related facility horsepower and utilization factors are considered for the "five unit" scenario, it is evident that the related horsepower capacity to remain below the 25,000 metric ton CO_2e threshold is far too low.

An iterative review of vented emissions, compressor counts and related fugitive emissions, as well as combustion emissions (as a function of utilization) indicates that two or three units located at a given

facility is the appropriate basis for the screening analysis. To be conservative in defining a streamlined screening method, **THREE** reciprocating compressor units are assumed. It is also assumed that the facility includes one continuous high bleed pneumatic device per engine. Additional assumptions and related emissions for the various contributors to facility emissions include:

- Fugitive and vented emissions that are **NOT** included in the Applicability Screening Method (i.e., those emissions subtracted from 25,000 metric tons CO_2e to determine the combustion and blowdown based threshold):

  561 metric tons CO_2e per year (187 metric tons CO_2e per device-year = natural gas high bleed pneumatic device vented EF). Assumes three compressor engines and one high bleed pneumatic device per engine

  76 metric tons CO_2e per station-year (station isolation valve vented EF)

  8 metric tons CO_2e per station-year (station loop vented EF)

  6 metric tons CO_2e per year (2 metric tons CO_2e per device-year = pneumatic hydraulic valve operator vented EF). Assumes three compressor engines and one pneumatic hydraulic valve operator device per engine

  7,158 metric tons CO_2e per year (2,386 metric tons CO_2e per device-year = reciprocating compressor fugitive EF). Assumes three compressors engines and one compressor per engine

  1,292 metric tons CO_2e per station-year (station fugitive yard piping and component EF).

- The remaining balance is **15,899 metric tons CO_2e per year** from station event-based blowdowns and fuel combustion. For discussion, blowdown versus combustion emissions can be considered based on a blowdown emission factor:

  2,131 metric tons CO_2e per station-year (station blowdown EF from Table 1). This tier 3 EF (223,758 lbs methane per station-year or 2,130 metric tons CO_2e per station-year) is taken from GRI GHGCalc™ and a 1995 Canadian Emissions Inventory, and includes compressor blowdowns, compressor starts, pressure relief valve (PRV) lifts, emergency shutdown (ESD) activation, and other venting sources. This EF is marginally higher than the Blow and Purge emission factor from the 1996 EPA GRI study (Volume 7) of 1,763 metric tons CO_2e per station-year)

  the balance equals:

  13,768 metric tons CO_2e from facility combustion emissions

This analysis indicates that an appropriate screening threshold is on the order of 15,900 metric tons CO_2e. To add additional conservatism, INGAA suggests a threshold of 15,000 metric tons CO_2e from combustion and event-based blowdown emissions, which provides an additional 6 percent "safety margin".

For discussion purposes, facility capacity can be assessed based on combustion emissions. Using the 40 CFR Part 98, Subpart C emission factors from Table 2, combustion emissions of 13,000 metric tons per year of CO_2e corresponds to approximately 4,380 hp of facility capacity, assuming a heat rate of 8,500 Btu per hp-hour (higher heating value-based) operating 6,570 hours per year (i.e., 75% utilization). For natural gas transmission and storage, this is indicative of 2 to 3 compressor engines at a small- to mid-sized compressor station.

Attachment B:

Compilation of INGAA Recommended Revisions to Proposed Subpart W Text

INGAA comments on Subpart W, the Proposed Rule for Mandatory Reporting of Greenhouse Gases from Petroleum and Natural Gas Systems (Proposed Rule) include recommendations for resolving issues identified in the INGAA comments. In some cases, INGAA offers recommended Proposed Rule text revisions. **This attachment summarizes INGAA recommended revisions to Proposed Rule text to facilitate EPA review.**

These recommendations do not encompass all issues identified by INGAA or indicate priority issues. In many cases, INGAA recommendations were offered when straightforward resolution was apparent. Additional rule revisions not addressed by this Attachment are warranted based on the INGAA comments. INGAA has endeavored to provide constructive recommendations in its comments, and there are several reasons why recommended rule text revisions are not provided for additional issues, including a lack of clarity regarding Proposed Rule intent and text complexity from inter-related revisions. INGAA offers its assistance to work with EPA on developing additional rule text to address concerns expressed in INGAA's comments.

The recommended rule revisions are presented below following the section order in the Proposed Rule. Recommended revisions indicate new text as **bold underlined text** while deleted text is shown as ~~strikethrough~~. The relevant INGAA comment is noted.

- As discussed in Comment XIII regarding §98.6, INGAA recommends revisions to the definition of "flare combustion" in §98.6 to the following:

  "*Flare combustion* means **emissions from combustion of gas in flares** ~~unburned hydrocarbons~~ including CH_4, CO_2, **and** N_2O emissions~~ resulting from the incomplete combustion of gas in flares~~."

- As discussed in Comment XIII regarding §98.231(b), to clarify portable equipment applicability and avoid confusion regarding production wells versus underground natural gas storage wells, INGAA recommends revising §98.231(b) to the following:

  "(b) You must include combustion emissions from portable equipment that cannot move on roadways under its own power and drive train and that is stationed at a**n onshore production** wellhead…".

- As discussed in Comment II.A and II.B regarding §98.232(a), INGAA recommends the following revisions to §98.232(a) to clarify the applicable *industry segment* under Subpart W and *segment-specific source reporting requirements*:

  "(a) You must report CO_2 and CH_4 emissions from each industry segment specified in paragraph (b) through (i) of this section**, and only those sources specified for the industry segment shall be reported for an applicable facility under this subpart**.

  (i) The industry segment specified in paragraph (b) through (i) shall be based on the primary NAICS code reported under §98.3(c)(10)(i).

(ii) When the NAICS code includes multiple industry segments from paragraph (b) through (i) of this section, the basis and determination for the industry segment shall be documented in the facility GHG Monitoring Plan required under §98.3(g)(5).”

If the Subpart A amendments regarding NAICS code reporting are not finalized for reference in the Final Rule, the language provided in (a)(i) above could be revised to delete reference to Subpart A, but still provide similar criteria.

- As discussed in Comment II.B regarding §98.232(j), INGAA recommends the following revisions to §98.232(j) to clarify applicability of flare emissions reporting:

  “(j) **Where flare emissions reporting is required in paragraph (b) through (i) of this section, y**~~Y~~ou must report the CO_2, CH_4, and N_2O emissions~~ from each flare~~.

- As discussed in Comment IV.B regarding §98.233(h) and (i), INGAA recommends the following revisions to §98.233(h) and (i) to correct errors to subsection organizational hierarchy. The recommended revisions to the erroneous “§98.233(h)(i) – (iii)” text from 75 FR 18640 include:

  ~~(i)~~**(1)** Calculate natural gas volumetric emissions at standard conditions using calculations in paragraph (t) of this section.

  ~~(iii)~~**(2)** Both CH4 and CO2 volumetric and mass emissions shall be calculated from volumetric natural gas emissions using calculations in paragraphs (u) and (v) of this section.

  ~~(iii)~~**(i)** *Blowdown vent stacks*. Calculate blowdown vent stack emissions as follows:

- As discussed in Comment IV.B regarding §98.233(i), blowdown vent calculations should be revised. For blowdown venting, INGAA comments include recommendations to correct equations used to calculation blowdown volume and correct the volume to standard conditions. Those equations are not repeated here and Comment IV.B should be referenced for those INGAA recommendations.

- As discussed in Comment V.B regarding §98.233(p)(4), requirements related to operating mode for reciprocating compressor rod packing venting measurement should be revised, and INGAA recommends the following revision to §98.233(p)(4):

  “(4) Conduct one measurement for each compressor in ~~each of the operational modes that occurs during a reporting period~~ **its as-found operational mode. Document which of the three modes was tested**:

  (i) Operating~~.~~**;**

  (ii) Standby pressurized~~.~~**; or**

  (iii) Not operating, depressurized.”

- As discussed in Comment XIII regarding §98.233(q)(4), to clarify requirements regarding application of leaker- versus population-based emission factors for underground natural gas storage and related leak screening requirements, INGAA recommends adding the following to the end of §98.233(q)(4):

  "…For underground storage facility components in storage wellhead service, population emission factors apply under §98.233(r) and a leak survey is not required."

- As discussed in Comment VII regarding §98.233, INGAA recommends providing the option for operators to elect to continuously monitor manifolded vent lines in lieu of other required emission estimation methods. INGAA recommends text for a new §98.233(aa) to provide this option:

  "**(aa)** ***Alternative Continuous Monitoring of Common Vent Lines.*** **In lieu of the methods defined in §98.233, the owner or operator can elect to continuously monitor a vent line or lines that includes emissions from one or more sources identified in §98.232 for the industry segment, including common or manifolded vents lines that combine more than one source. The following requirements apply.**

  (iv) **The GHG Monitoring Plan and annual report shall identify the §98.232 sources addressed. The GHG Monitoring Plan shall describe the venting system, measurement basis, and data acquisition system.**

  (v) **The meter shall meet the requirements of §98.3(i).**

  (vi) **Annual emissions shall be reported based on continuous monitoring throughout the year or upon facility startup with the exception of the initial reporting year, when continuous monitoring must be initiated no later than October 1 with annual emissions estimated based on three months of continuous monitoring data."**

- As discussed in Comment XIII regarding §98.234(a)(1), a grammar error should be corrected in §98.234(a)(1) as follows:

  "…§60.18(i)(1) and (2) **of the** Alternative Work Practice…"

- As discussed in Comment VIII.B regarding §98.234(a), to allow alternatives to the optical camera technology, INGAA recommends adding §98.234(a)(2) [currently reserved] to include the following:

  "(2) In addition to the optical gas imaging instrument, alternative technologies may be used to conduct annual leak detection of fugitive emissions in accordance with industry standard practices, consensus-based standards, or manufacturer recommendations. These include, but are not limited to, organic vapor analyzers, portable hydrocarbon gas detectors, ultrasonic leak meters, ultrasonic acoustic detectors, and soap solution."

- As discussed in Comment IX.A regarding §98.233(e)(3), to clarify the emission source for vented emissions from a malfunctioning scrubber dump valve that pass through the condensate tank vent, INGAA recommends that §98.232(e)(3) be revised to the following:

  "(3) Transmission **condensate** storage tanks **venting due to scrubber dump valve malfunction**."

- As discussed in Comment IX.B regarding §98.233(k), the emissions calculation should be clarified for condensate tank venting from a malfunctioning dump valve. For these vented emissions, INGAA comments include recommendations to add an equation that clarifies the calculation methodology. The equation is not repeated here and Comment IX.B should be referenced for the INGAA recommendation.

- As discussed in Comment X.B regarding component count reporting under §98.236(c)(19) for leaker- versus population-based emission estimates, to clarify component count reporting requirements for fugitive sources, INGAA recommends revising §98.236(c)(19)(i) by adding (i)(A) and (i)(B) as follows:

  "(A) Component count for each fugitive emissions source **where component population is reported for population emission factors, or**

  (B) Component count for each fugitive emissions source where the number of leaking components are reported for leaker emission factors."

- As discussed in Comment X.B regarding §98.236(f), to avoid confusion and for consistency with requirements elsewhere in Subpart W, INGAA recommends revising §98.236(f) to the following:

  "(f) Report emissions separately for **production wellhead** portable equipment…"