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Interstate Natural Gas Association of America

June 30, 2014

Environmental Quality Board
Rachel Carson
State Office Building
16th Floor
400 Market Street
Harrisburg, PA 17101-2301

Re: Pennsylvania Department of Environmental Protection Proposed Rule, *Additional RACT Requirements for Major Sources of NOx and VOCs*, PA Bulletin, Vol. 44, No. 16 (April 19, 2014)

Dear Environmental Quality Board:

The Interstate Natural Gas Association of America (INGAA), a trade association of the interstate natural gas pipeline industry, respectfully submits these comments regarding the Pennsylvania Department of Environmental Protection (PA DEP) Proposed Rule, *Additional RACT Requirements for Major Sources of NOx and VOCs* (Proposed Rule)¹. INGAA members operate natural gas transmission compressor stations in Pennsylvania, which use natural gas-fired reciprocating internal combustion engines (RICE) and turbines to drive compressors. The requirements of the Proposed Rule would affect many of these RICE and turbines.

INGAA member companies transport more than 85 percent of the nation's natural gas, through some 190,000 miles of interstate natural gas pipelines. Pipelines operate in a highly competitive market, which affects service offerings and prices, including competition between gas supply basins, competition among pipelines, and increased competition with firm shippers that can sell their excess capacity on a secondary market. INGAA member companies operate over 6,000 stationary natural gas-fired spark ignition RICE and over 1,000 stationary natural gas-fired combustion turbines installed at compressor stations along the pipelines to transport natural gas to local gas distribution companies, industrials, gas marketers, and gas-fired electric generators.

In the past two decades, INGAA and its members have worked extensively with U.S. Environmental Protection Agency (EPA) and various states as they develop Reasonably Available Control Technology (RACT) rules and other NOx regulations, such as the Federal NOx SIP Call Phase 2 Rule, RICE and turbine New Source Performance Standards (NSPS), and RICE and turbine National Emission Standards for Hazardous Air Pollutants (NESHAPs). The efforts of the natural gas transmission industry have also included the development of substantive technical documents on emissions and technology performance, cooperative research projects, and control technology development to address air emissions concerns. For example, slow speed RICE, common in natural gas transmission, are unique to this application.

¹ *Additional RACT Requirements for Major Sources of NOx and VOCs*, 25 PA Code, Chapters 121 and 129; Pennsylvania Bulletin, Vol. 44, No. 16 (April 19, 2014).

Industry conducted intensive research and development (R&D) programs to develop technology solutions, which resulted in low emission combustion (LEC) technology that significantly reduces NOx and other emissions from these units.

INGAA recommends revisions to the Proposed Rule to address key issues including PA DEP's underestimate of the number of affected units and associated costs, feasibility of proposed volatile organic compound (VOC) emission limits, the turbine applicability threshold, and a compliance schedule that avoids unintended negative consequences. INGAA recommendations strive to achieve the PA DEP objective of reducing the paperwork burden associated with alternative, case-by-case RACT requests.

Based upon the enclosed comments, INGAA believes the current regulatory analysis does not provide adequate support for adoption of the proposed NOx and VOC RACT regulations as they are currently formulated. Thus, INGAA recommends that the Environmental Quality Board return the Proposed Rule to PA DEP to allow development of a regulatory analysis that clearly demonstrates that any presumptive RACT limits established for existing natural gas-fired RICE and turbines are achievable based upon currently available, cost effective retrofit technology.

INGAA appreciates your consideration of these comments and welcomes additional dialogue. Please contact me at 202-216-5935 or lbeal@ingaa.org if you have any questions. Thank you.

Sincerely,



Lisa Beal

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

cc by email: Kirit Dalal, Chief, Division of Air Resource Management, PA DEP
Krishnan Ramamurthy, Chief, Division of Permits, PA DEP

EXECUTIVE SUMMARY

The Interstate Natural Gas Association of America (INGAA), a trade association of the interstate natural gas pipeline industry, respectfully submits these comments regarding the Pennsylvania Department of Environmental Protection (PA DEP) Proposed Rule, *Additional RACT Requirements for Major Sources of NO_x and VOCs* (Proposed Rule). INGAA members operate natural gas transmission and storage facilities in Pennsylvania, which use gas-fired reciprocating internal combustion engines (RICE) and turbines to drive compressors. The Proposed Rule requirements would affect many of these units.

INGAA and its members share PA DEP's desire to reduce the burden associated with case-by-case RACT analysis, but a number of issues must be addressed to achieve that objective.

Primary issues include:

(1) The Proposed Rule significantly under-estimates the number of affected units that would require installation of NO_x or VOC control technology. Approximately 150 units operated by natural gas transmission companies would be affected by the rule; this exceeds the PA DEP estimate for all affected units statewide. Thus, the rule would have significant impact on natural gas transmission company operations, including many requirements to install control technology and associated costs that are significantly under-estimated by PA DEP.

(2) The compliance schedule in the Proposed Rule is not feasible. The schedule requires compliance within one year, with an option to request an extension that allows up to three years. Due to the large number of affected units, there are significant scheduling implications, which could affect the reliability of gas delivery. An implementation timeline of more than three years is necessary to comply. Instead of a hard three-year deadline, operators should be allowed to provide a plan, for PA DEP review and approval, that establishes the compliance schedule for an operator's affected equipment.

(3) The proposed VOC emission standards should be deleted or replaced with compliance requirements based on good combustion practices. PA DEP relies on support documentation that inappropriately assumes that VOC emission controls would not be required, and it fails to assess implications. The proposed VOC emission standards would accomplish minimal reductions at a very high cost.

(4) The applicability threshold for turbines required to comply with emission standards should be revised to 6,000 horsepower (hp). If not, an entire class of turbines would be required to request case-by-case alternative RACT because retrofit emission control is not available for smaller turbines.

(5) INGAA supports including emissions averaging in the Proposed Rule, but that compliance option should be accessible at the discretion of the operator rather than requiring operators to first demonstrate that emission limits cannot be met for affected units.

INGAA believes that emission reductions can be achieved, but PA DEP must revise the Proposed Rule to consider technical and economic feasibility, and to define reasonable schedules. INGAA recommends that the Environmental Quality Board withdraw the proposed regulation until PA DEP can address these comments and prepare a revised Regulatory Analysis Form. INGAA offers its assistance to reconcile the issues herein and facilitate the development of viable, effective, and reasonable RACT requirements for natural gas-fired reciprocating engines and turbines.

DETAILED COMMENTS

1. The Proposed Rule significantly under-estimates the number of affected units that would require installation of NO_x or VOC control technology.

INGAA has preliminarily assessed the number of affected units at natural gas transmission and storage facilities that would *require installation of emission controls*² based on initial information received from five companies. This indicates over 40 facilities with over 150 affected units, including approximately 25 turbines and 130 RICE, would require installation of emission controls. These figures compare with PA DEP projections from the Regulatory Analysis Form (RAF) of approximately 141 affected units at 192 facilities for all affected facilities.

Since many other types of equipment and industries are affected by the Proposed Rule, it is clear that PA DEP's analysis significantly under-estimates the number of affected units and the corresponding cost impact of the Proposed Rule.

The number of affected units in natural gas transmission has significant implications for INGAA members and rule implementation. The recommendations discussed in comments below strive to remedy important issues. For example, as discussed in Comment 2, company planning and coordination to install emissions controls on dozens of units at multiple facilities has scheduling and gas transmission reliability implications. As discussed in Comment 3, if VOC issues are remedied, the number of affected units would significantly decrease because many units would meet the proposed NO_x limits and only require VOC control.

2. The Proposed Rule compliance schedule is not feasible and could affect the reliability of natural gas delivery. Operators should be allowed to provide a plan, for PA DEP review and approval, that establishes the compliance schedule for each operator's affected equipment.

The compliance schedule in the Proposed Rule is not feasible. The schedule requires compliance within one year, with the ability to request an extension that allows up to three years. With well over 100 units potentially affected, scheduling could impact the reliability of gas delivery, and more than three years would be necessary to achieve compliance. To avoid unnecessary paperwork associated with requesting extensions, PA DEP should revise the Proposed Rule to accommodate a logical, planned schedule for implementing controls.

A. Scheduling limitations and requirements

INGAA members would be required to address control requirements for multiple units across multiple facilities. Many factors impact project schedule, including technology availability (i.e., vendor supply limitations), integrating downtime into schedules to avoid service interruption, consideration of budget cycles and integration with other pipeline projects, state and federal permitting, and the time necessary to commission and debug the control technology. Natural gas compressors must be available during the winter heating seasons, as well as spring and fall injection/withdrawal seasons. This limits the amount of time a unit can be taken out of service for installation of retrofit controls because natural gas delivery cannot be constrained due to equipment outages. In addition, site operating requirements often limit out-of-service equipment to one unit per site at any given time.

² This review did not include affected units that currently meet the proposed emissions standards – i.e., permitting and compliance obligations would need to be addressed for those units, but additional emission controls would not be required.

Most of the affected units are lean burn RICE that would require retrofit of LEC technology to reduce NOx emissions. These large bore, slow speed engine (power side) and compressor (driven equipment) share a common crankshaft, thus these are referred to as “integral” units. Integral engines are unique to gas compression service, and were designed specifically for natural gas pipeline applications. Due to the unique nature of the equipment, the pipeline industry conducted a multi-million dollar research and development program over more than a decade to develop LEC technology for slow speed integral units. R&D and technology commercialization was developed with support from service providers experienced with this equipment, and there are a limited number of LEC retrofit service providers for integral engines. As an example of supply limitations, turbocharger installation or upgrade service, which is needed to address combustion air requirements for LEC, is available from only two suppliers for slow speed integral engines.

If a compliance schedule of three years or less is required, operators would have no other alternative than to remove natural gas transmission and storage compressor drivers from service during the demand season. At this time, the implication of this potential loss of system horsepower has not been assessed, but the reliability of natural gas deliveries could be impacted. This scenario would impact prices and infringe upon other regulatory requirements governing pipeline operations that are administered by the Federal Energy Regulatory Commission.

INGAA member companies’ previous experience with NOx RACT implementation in Pennsylvania and other states, where fewer affected units were involved, demonstrates a need for a longer compliance period to complete installation and certify compliance. For example, compliance with PA DEP’s mid-1990s NOx RACT regulation required over three years to address multiple RICE at one facility. This timeframe did not include added complexities of planning, managing, and coordinating projects at multiple facilities and competing with other companies for limited resources from service providers. In addition, the project did not require Prevention of Significant Deterioration (PSD) or nonattainment New Source Review (NSR) permits, which would introduce significant additional time to the process.

Operators’ efforts to comply with the Proposed Rule may coincide with other pipeline projects (e.g., expansion to address growing markets associated with development of the Marcellus Shale resource), so PSD permitting will likely be required in some cases. Compounding facility- or company-specific schedule challenges is the fact that the Proposed Rule would potentially affect over 100 natural gas transmission RICE and turbines. All of these units would need to be taken off-line to install and commission emission controls, and this is simply not practical within three years. A serious impact could result from simultaneous shutdown of multiple engines and turbines at one facility, along a single pipeline route, or along multiple pipelines serving a similar market, and widespread natural gas delivery problems could occur with a compliance schedule of three years or less.

Finally, the Proposed Rule requires that operators request a schedule extension within 6 months. A longer time frame is needed to provide a detailed plan that accommodates significant project planning and budgeting to implement controls for the many affected units.

B. Recommended alternative for defining compliance schedules

PA DEP should revise the Proposed Rule to accommodate an approach where a reasonable schedule could be approved for each company. Operators should be allowed to provide a plan, for PA DEP review and approval, that establishes a reasonable compliance schedule and considers company, facility, and unit-specific challenges.

INGAA recommends these specific changes to the Proposed Rule:

- Within 6 months, the company submits a notification that identifies the affected equipment and facilities, and the applicable emission limits.
- Within 18 months, the company submits a detailed plan for all affected equipment and facilities. This plan would include details regarding all of the affected units, controls to be implemented, and implementation schedule. The plans would be developed with an understanding that PA DEP desires commissioning of emission controls as soon as practical.
- Within 3 months of plan submittal, PA DEP approves the plan or responds with questions or comments.

This approach avoids the unnecessary paperwork associated with an initial extension request, acknowledges that company specific challenges may vary (e.g., number of affected units, integration with other pipeline projects), and provides a path to compliance that includes reasonable schedules that will not compromise the reliability of natural gas delivery.

3. The proposed VOC emission limits should be deleted or replaced with compliance requirements based on good engineering practices.

The Proposed Rule support documentation does not adequately address the proposed VOC limits. The preamble and RAF focus on NO_x reductions and devote minimal discussion to the implications of VOC controls. Not only does PA DEP provide limited information to support VOC limits, but the minimal information provided is inaccurate. For example, the RAF indicates that no additional controls would be required to meet VOC limits – thus implying no additional costs. This is *not* accurate. Many lean burn RICE at compressor stations would be affected by the Proposed Rule, and most of these units would require installation of an oxidation catalyst to meet the proposed VOC limit of 0.4 grams per brake horsepower-hour (g/bhp-hr).

Gas transmission companies would incur significant costs to comply with VOC limits with minimal reductions. VOC controls are not cost effective. INGAA recommends deleting VOC limits from the rule. If PA DEP does not delete these limits, then the agency should document the basis for the standards and assess the corresponding cost implications. For example, it is unlikely that oxidation catalysts are economically feasible. At most, VOC requirements should be addressed by following good engineering practices consistent with the requirements in §129.97(c), as explained further in this comment.

A. Basis for RICE and turbine emission standards

For rich burn RICE, units would comply using non-selective catalytic reduction (NSCR) and the proposed VOC standard of 1.0 g/bhp-hr is consistent with technology performance. For example, this standard is consistent with the emission limit for reconstructed or modified RICE in the Federal NSPS (Subpart JJJJ).³ PA DEP does not explain the basis of the VOC emission standards for natural gas-fired turbines and lean burn engines. For turbines, VOC emissions are very low, little data is available, and VOC standards are not common. PA DEP should document the basis for the concentration-based turbine standard.

³ Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. 40 CFR, Part 60, Subpart JJJJ.

For lean burn RICE, the standard is not consistent with Subpart JJJJ and would require an oxidation catalyst. As discussed below, this is not a cost effective control strategy. Thus, PA DEP can expect dozens, or perhaps hundreds, of requests for a case-by-case RACT determination from natural gas transmission companies. Those requests will demonstrate that the proposed limit is economically infeasible. INGAA recommends alternatives below. If these alternatives are not accepted, PA DEP should provide background documentation to support the VOC standard, and prepare for the burden of case-by-case analysis.

B. Proposed alternatives for VOC emissions and case-by-case RACT implications

If PA DEP believes that VOC emissions must be addressed in the rule, then an alternative approach is recommended. Over 100 lean burn RICE may require installation of VOC controls. This impact was not considered in the Proposed Rule support documentation, which presumes no additional control would be required. In addition, PA DEP's analysis does not indicate whether a meaningful environmental benefit would be derived from VOC reductions. INGAA agrees that additional VOC controls should *not* be required, and recommends deleting the VOC emission limits from the rule to achieve that objective.

Of the approximately 125 engines affected by the Proposed Rule, more than half would likely meet NOx requirements, but cannot meet the VOC limits and would thus be affected units. If revisions eliminate the need for VOC alternative RACT determinations, the number of affected units from gas transmission would decrease by more than half.

In addition, the proposed VOC limits will cause submittal of alternative RACT requests for most, if not all lean burn engines. Since affected RICE should typically be able to comply with NOx (i.e., either emission limits or emissions averaging), about 100 or more alternative case-by-case VOC RACT requests could be eliminated.

Standard based on good engineering practices

If VOCs emission standards are retained in the rule, PA DEP should base the requirement on good combustion practices, consistent with the requirements for smaller units defined in §129.97(c). In this scenario, §129.97(c)(2) for turbines and §129.97(c)(3) for RICE would be revised to address units of all sizes rather than include the thresholds in the Proposed Rule. In addition, since *manufacturer* specifications may not be available for some existing units or units may have been upgraded (e.g., LEC control) with third party technology, the text in §129.97(c) should be revised as follows:

“...shall comply with the following presumptive RACT requirement, which is the installation, maintenance and operation of the source in accordance with **operator-defined or manufacturer's** specifications and good engineering practices: ...”

Alternative VOC standards

If PA DEP retains VOC emission standards, additional support documentation is needed to justify the limits. For Subpart JJJJ, formaldehyde is excluded when calculating VOC emissions (see subsection D). The proposed rich burn engine standard is consistent with Subpart JJJJ if formaldehyde is excluded and is achievable with NSCR technology. The proposed standards for natural gas-fired lean burn engines and turbines are not supported. For turbines, INGAA does not have VOC data readily available, and PA DEP should document the basis for the standard.

For lean burn engines, the Subpart JJJJ rulemaking record includes technical documentation that justifies an emission standard of 1.0 g/bhp-hr, with formaldehyde excluded when calculating VOC emissions. This standard is based on LEC technology that provides NO_x reductions and acceptable VOC emissions. Additional add-on controls (i.e., oxidation catalyst control) is not warranted because it is not cost effective (see subsection C). INGAA recommends a VOC emission limit for lean burn engines of 1.0 g/bhp-hr, with formaldehyde excluded from the calculation. A 1.0 g/bhp-hr emissions limit that excludes formaldehyde is not re-defining VOCs, but rather establishing a standard indicative of emissions performance as measured by common test methods (see subsection D).

C. VOC control cost effectiveness

For lean burn RICE, oxidation catalyst control for CO, VOCs, or HAPs has previously been reviewed during development of the Federal NSPS (i.e., Subpart JJJJ) and NESHAP (Subpart ZZZZ).⁴ Technical challenges include a lower characteristic exhaust temperature for lean burn engines with LEC control. Exhaust temperatures are lower for 2-stroke lean burn (2SLB) engines than 4-stroke lean burn (4SLB) engines, and 2SLB integral engines are common in natural gas transmission. Thus, there are technical feasibility issues that need to be considered, and addressing those challenges can increase costs (e.g., larger catalyst with higher noble metal loading). There is no reasonable basis to conclude that a VOC limit of 0.4 g/bhp-hr is achievable either with or without catalyst controls. Even if technical feasibility can be demonstrated, cost effectiveness analysis would conclude that catalytic control is not economically feasible.

Costs for retrofit installation of catalysts can result in significantly higher costs than for a new unit, where the catalyst can be incorporated into the design of new equipment. Example costs include addressing space limitations that may include significant re-plumbing of exhaust ducts, foundation requirements to accommodate additional weight for the reconfigured exhaust, exhaust silencer (i.e., “muffler”) replacement, and other exhaust re-design required to manage back-pressure and avoid operational problems (e.g., back-pressure is an important consideration for 2SLB engines).

If technical challenges can be addressed, the resulting VOC reductions will be limited. For example, as indicated by Subpart JJJJ emission limits, retrofit lean burn engines can typically meet NO_x limits of 3.0 g/bhp-hr and VOC limits of 1.0 g/bhp-hr without an oxidation catalyst. With actual emissions less than 1.0 g/bhp-hr, only nominal reductions would be achieved by reducing VOC emissions to the Proposed Rule limit of 0.4 g/bhp-hr.

The RAF indicates a VOC cost effectiveness benchmark of \$5,000 per ton. Examples discussed in the RAF focus on NO_x reductions, and the Proposed Rule assumes that additional VOC controls would not be required. This is not the case, and costs will be incurred. A detailed analysis is not provided here, but an example VOC cost effectiveness analysis was completed using standard procedures from EPA’s Control Cost Manual and assumptions from previous analysis. An example based on a 2,100 hp lean burn engine, actual emissions of 0.75 g/bhp-hr that are reduced to 0.4 g/bhp-hr, and 40% utilization (which is an approximate “average” value for gas transmission equipment) resulted in a VOC reduction cost effectiveness of \$33,000 per ton and VOC reductions less than 3 tons per year. If full utilization is considered (i.e., 8,000 operating hours per year), the costs effectiveness is \$14,400 per ton with 6.5 tons of VOC reductions. These examples exceed the \$5,000 per ton VOC cost benchmark from the RAF.

⁴ National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. 40 CFR, Part 63, Subpart ZZZZ.

Additional details and an analysis that includes incremental costs associated with exhaust design challenges discussed above can be provided if desired.

PA DEP should consider an alternative to the proposed VOC emission limits. The VOC limits should either be replaced with work practices that require good engineering practices or revised for consistency with NSPS limits. This revision is necessary to avoid the burden of numerous alternative RACT requests while pursuing minimal VOC reductions.

D. Test methods and formaldehyde emissions

Methods for measuring VOC emissions from natural gas-fired combustion equipment are typically based on measuring hydrocarbons and excluding methane and ethane from the total. For example, EPA Method 25A measures total hydrocarbons (THC), with methane and ethane measured using EPA Method 18 and subtracted from the THC value. Formaldehyde is a VOC and a component of RICE exhaust, but specialized methods are required to measure formaldehyde accurately. As a result, most VOC emissions data from engine manufacturers and in the literature are based on test results that exclude formaldehyde. For this reason, EPA excluded formaldehyde from the VOC limits in Subpart JJJJ, as noted in 40 CFR, §60.6241(h), where EPA specifically stated,

“For purposes of this subpart, when calculating emissions of volatile organic compounds, emissions of formaldehyde should not be included.”

Unless it is clearly indicated otherwise (e.g., based on test methods used), it should be assumed that VOC data reported for gas-fired RICE excludes formaldehyde. Due to historical data and test method challenges, it is appropriate to exclude formaldehyde from the compliance determination for VOC emissions. This approach does not re-define VOC to exclude formaldehyde. Rather, it defines a compliance method indicative of the data used to establish the standard, and avoids the need for complex, costly formaldehyde testing.

For the purposes of demonstrating compliance with VOC emission limits, the Proposed Rule should be revised for consistency with Subpart JJJJ, and a section similar to Subpart JJJJ, §60.4241(h) should be added to the PA DEP rule.

E. If emissions standards are retained, VOC averaging should be allowed

The Proposed Rule includes compliance flexibility using emissions averaging. INGAA supports emissions averaging and offers several recommendations in Comment 5. If VOC emissions limits are retained in the rule, the flexibility provided for NO_x emissions should also be offered for VOC emissions, and VOC emissions averaging should be added to the rule.

4. For turbines required to comply with an emission standard, the applicability threshold should be increased to 6,000 horsepower.

PA DEP should revise the applicability threshold for turbines required to comply with emission standards to 6,000 hp. If not, an entire class of turbines will be required to submit a request for case-by-case alternative RACT, because retrofit NO_x emission control is not available for smaller turbines. The higher threshold is commensurate with applicability thresholds in EPA and other state's rules, and similar to the threshold for other combustion units in the Proposed Rule with similar or higher emissions.

PA DEP proposes an appropriate NO_x limit of 42 ppmv for natural gas-fired turbines that can retrofit NO_x emission controls. The technology basis is replacement of a standard, diffusion flame combustor with lean premixed combustion. The technical basis for this standard is documented in the 2006 revision to the Turbine NSPS⁵ (Subpart KKKK), which includes a 42 ppmv NO_x standard for reconstructed and modified turbines with a heat input rating from 50 MMBtu/hr to 850 MMBtu/hr. In its response to comments for Subpart KKKK, EPA acknowledges that the 42 ppmv limit is not appropriate for units 50 MMBtu/hr and smaller because lean premixed technology is not available.⁶ The NSPS support documentation also concludes that other technologies are not feasible. Solar Turbines Incorporated is a primary manufacturer of turbines in this size range, and their comments from the Subpart KKKK rulemaking provide additional details.⁷

In addition to Solar units, other manufacturers, including Westinghouse and Dresser Clark, marketed similar sized units that are in the Pennsylvania fleet of existing turbines. As with the small Solar units, these small industrial turbines do not have a retrofit NO_x control option. To accommodate these small turbines that would otherwise require a case-by-case alternative RACT analysis, INGAA recommends increasing the applicability threshold for gas-fired turbines subject to a 42 ppmv NO_x standard to 6,000 hp. For consistency within the Proposed Rule, the threshold in §129.97(c)(2) associated with units required to follow good engineering practices should also be revised from 1,000 hp to 6,000 hp.

In addition to consistency with technology limitations, a 6,000 hp threshold is also similar to the applicability threshold in §129.97 for other combustion units with similar or higher emissions than small natural gas-fired turbines. In §129.97(g)(1), a 50 MMBtu/hr threshold applies to process heaters and other combustion units, including units that fire natural gas or other fuels. This heat input-based threshold is similar to a 6,000 hp threshold for turbines. Small gas-fired turbines will have similar levels of emissions as small gas-fired process heaters / combustion units and will have lower emissions than liquid or solid fueled process heaters / combustion units. Thus, a 6,000 hp threshold for gas-fired turbines addresses inequities that would otherwise exist in the rule.

5. INGAA supports including emissions averaging, but the Proposed Rule should be revised so that operators can elect to use emissions averaging without first demonstrating that unit-specific emission limits cannot be met.

INGAA supports including emissions averaging in the Proposed Rule. However, as explained in the preamble, the Proposed Rule includes a compliance hierarchy where emissions averaging is an option if the subject source cannot meet the emission limits. INGAA supports including emissions averaging as a compliance option that is used at the discretion of the operator rather than requiring operators to first demonstrate that emission limits cannot be met.

Emissions averaging is included in other PA DEP, EPA, and state rules, as discussed below. Since operators will build conservatism into averaging plans to ensure that emissions obligations are achieved, emissions averaging will provide equivalent or greater reductions than complying with prescribed

⁵ Standards of Performance for Stationary Combustion Turbines. 40 CFR, Part 60, Subpart KKKK.

⁶ Docket Document No. EPA-HQ-OAR-2004-0490-0322. EPA Memorandum: Response to Public Comments on Proposed Standards of Performance for Stationary Combustion Turbines, Section 1.1 (July 2006).

⁷ Docket Document No. EPA-HQ-OAR-2004-0490-0185. Solar Turbines Incorporates Comments on Proposed Turbines NSPS (April 19, 2005).

emission limits. PA DEP should revise the Proposed Rule to allow operators to elect to comply with the emissions limits or by using emissions averaging.

A. PA DEP and other rules use emissions averaging

INGAA members currently are complying with existing PA DEP rules through use of emissions averaging. Although the current RACT rule prefers use of Continuous Emissions Monitoring Systems (CEMS), §129.94(b)(5) allows alternative options based on periodic testing, and averaging has been approved and successfully implemented. Similarly, §145.111-113 addresses requirements for engines regulated in response to the NOx SIP Call Phase 2 Rule, and §145.113(c)(2)(ii)-(iii) allow periodic testing and/or parameter monitoring as the basis for determining actual emissions. These same principles should apply for the new RACT proposal, and operators should be allowed to implement averaging on a facility level or company level basis.

The EPA and other states also allow emissions averaging. Following the release of the NOx SIP Call Phase 2 Rule, EPA developed and released a model rule as state guidance. The EPA model rule includes averaging provisions that were adopted in part by many U.S. states subject to this SIP Call. For example, Illinois used the EPA model rule when developing and adopting its regulations that addressed RACT requirements and fulfilled obligations of the SIP Call. The rule includes emissions averaging and requires operators to submit an averaging plan that defines the compliance approach and monitoring used to assure compliance. Similarly, West Virginia regulations allow averaging on a facility level or company level basis and use periodic emission tests.

These examples show that emissions averaging is an effective compliance tool in Pennsylvania and other states. Similar access to emissions averaging should be included in this RACT rulemaking.

B. Emissions averaging should not include a 10% penalty and averaging computations should include engineering units consistent with the applicable emission standard.

The Proposed Rule includes an equation for calculating the NOx RACT emissions limitation for averaging in §129.98(e). The equation requires ten percent “over-control” and presents emission rates in pounds per million British thermal unit (lbs/MMBtu). These criteria are not consistent with emissions averaging currently used for the PA DEP rules discussed in the previous subsection and should be revised for consistency with current rules.

A 10% penalty is not included in the current RACT rule, which applies in nonattainment counties, or in the §145.111-113 NOx rules for large engines. A penalty or mandatory over-control should not be included in this rule, and is not necessary because conservatism will be built into company compliance plans.

For natural gas transmission operations, compressor utilization can vary over time depending on customer demand and evolving markets. Because averaging includes a reconciliation of emissions based on actual operations (e.g., actual fuel usage), utilization projections are inherent to an averaging plan. Thus, averaging plans will include an emissions margin to allow operational flexibility and avoid compliance concerns from small operational perturbations. This will inherently result in lower emissions when using averaging than would occur if complying with prescriptive limits on every unit. Thus, a buffer is inherent when complying with emissions averaging and the penalty in the Proposed Rule adds an additional and unnecessary margin. The “0.9 multiplier” should be deleted from the averaging equation.

The averaging equation should also be generalized to allow operators to use engineering units consistent with the type of equipment. For RICE, the emissions obligation is based on a g/bhp-hr emission limit, and those engineering units should be allowed rather than lb/MMBtu. In this case, equipment usage should be based on engine size (hp) and an efficiency conversion (brake-specific fuel usage or Btu/bhp-hr) provided by the operator based on engine specifications. Calculations using “g/bhp-hr” are used for existing PA DEP rules discussed above and should be allowed for this rule. This adds consistency within the rule and consistency with other PA DEP rules.

C. Emissions averaging should be reconciled annually rather than using a 30-day rolling average and common methods (e.g., periodic testing) should be allowed.

INGAA recommends using annual emissions averaging reconciliation rather than a 30-day rolling average. The Proposed Rule reconciles emissions based on a 30-day rolling average, which is unnecessarily restrictive and much more stringent than the PA DEP, EPA, and other state regulatory examples discussed above for emissions averaging for industrial RICE and turbines. While a 30-day rolling average may be relevant in regulations for electric utilities and larger boilers, it is far too burdensome and costly for natural gas transmission operations. The associated implications include higher costs, emissions averaging infeasibility, and the need for additional alternative case-by-case RACT determinations. INGAA recommends relying on established procedures in Pennsylvania regulations, the EPA model rule, and other state rules. These examples rely on annual emissions averaging reconciliation and/or ozone season reconciliation. For natural gas transmission and other industrial sources, the Proposed Rule should be revised to require annual reconciliation, and/or ozone season reconciliation.

The 30-day averaging period may be premised on a scenario applicable for large boilers with other regulations that require CEMS and compliance assurance on this time frame. CEMS are not used at gas transmission facilities, yet emissions averaging is already being effectively implemented in Pennsylvania and other states. The monitoring requirements are relatively standard, and based on periodic testing occasionally with parameter monitoring, such as quarterly NO_x tests and monitoring of fuel usage. The PA DEP regulations cited above include example regulatory language for calculation and recordkeeping requirements, and similar provisions should be added to the Proposed Rule.

If needed, INGAA can provide additional examples of monitoring requirements for emissions averaging for gas transmission. Periodic testing, typically using portable analyzers is common. This approach is appropriate for the affected equipment because combustion-based NO_x controls will be used for lean burn engines and turbines. The emissions performance is inherent to equipment operation, and emissions will not deviate significantly because technology is designed into the system. Emission controls cannot be turned off or by-passed, as is the case for post-combustion emissions control. Portable analyzers are commonly applied for these tests, and in recent years, portable analyzer testing has been added to a number of EPA rules for natural gas-fired RICE and turbine regulations. Examples include the engine NSPS, turbine NSPS, and RICE NESHAP. In addition to portable methods cited in those rules (e.g., ASTM Method D6522), the January 2013 RICE NESHAP amendments include a portable method as Appendix A⁸ (for CO measurements required by Subpart ZZZZ). Periodic portable analyzer tests are a reasonable basis to demonstrate emissions levels for the purposes of emissions averaging.

⁸ 78 FR 6674 – 6724

6. Emission limits should consider technology limitations at reduced load, consistent with federal regulations.

The Proposed Rule includes NO_x emission limits that are based on specific technologies, including NSCR for rich burn RICE, LEC for lean burn RICE, and lean premixed combustion for turbines. The engineering units used for emission standards are important when considering emissions performance across the operating envelope (e.g., at reduced load). For example, mass emissions to the atmosphere (e.g., pounds per hour) may not increase, but emission rates (e.g., g/bhp-hr) may increase at reduced load. For this reason, the Proposed Rule should define the operating requirements (or limitations) for compliance tests, and applicability of emission standards should be limited to those conditions. Recent NSPS provide the technical background that defines these limitations, and the Proposed Rule should be revised to reflect these limitations.

For turbines, lean premixed combustion functions at higher loads, but as load is decreased, combustion characteristics change to maintain combustion stability. For example, a pilot flame may be used to enhance combustion stability at reduced load, and NO_x concentration will increase while the mass rate (lbs/hr) may not. Subpart KKKK did not address this issue in the proposed rule, but EPA received comments and responded appropriately. The July 2006 final rule added requirements that limit applicability of the 42 ppmv limit to 75% or higher load and require a single, high load compliance test. A higher emission limit (150 ppmv) applies at lower load.

Subpart JJJJ includes a similar requirement for lean burn engines, with compliance tests completed at 100% ±10% of maximum load or the highest achievable load. Acknowledgement of this phenomenon is sometimes reflected in permits. There are examples in PA DEP permits for RICE where a nominally higher g/bhp-hr emission rate is allowed at partial load.⁹

The Proposed Rule should be revised to reflect limitations associated with engineering units used for emission standards and associated control technology limitations. Federal NSPS standards should be used as a basis to define these technical limits, with turbine limits applicable at 75% of rated load and higher, and lean burn RICE limits applicable at 90% of rated load and higher.

7. PA DEP should strive to achieve consistency with federal regulations that address the same types of equipment, such as affected source definitions.

The Proposed Rule should strive for consistency with federal regulations for the same types of affected equipment, where appropriate. Examples discussed above include technical documentation from NSPS and NESHAPs that support emissions limits, applicability thresholds, and compliance monitoring tools. For example, federal RICE and turbine rules provide justification for rule requirements such as a higher applicability threshold for turbines subject to a 42 ppmv NO_x standard, and appropriate VOC standards for lean burn engines.

Another example is definitions. INGAA recommends the use of common definitions for federal and state rules to eliminate confusion and provide a common compliance framework. Section 121.1 of the Proposed Rule includes a revised definition, shown here with strikethrough and bold underline text to show the proposed changes:

⁹ For example, PA DEP permit for Cooper-Bessemer lean burn engines at Columbia Gas Transmission Corporation Renovo Compressor Station.

Stationary internal combustion engine – ~~For purposes of § 129.203 (relating to stationary internal combustion engines), an~~ **An** internal combustion engine of the reciprocating type that is either attached to a foundation at a facility or is designed to be capable of being carried or moved from one location to another and is not a mobile air contamination source.

This definition is not consistent with federal regulations such as NSPS, NESHAP that differentiate mobile and stationary source engines. Under federal rules, portable / transportable engines are subject to mobile source “nonroad engine” regulations and not NSPS or NESHAP standards. The Proposed Rule revision broadly applies this “stationary engine” definition to PA DEP rules and would cause implementation confusion. PA DEP should use a definition consistent with federal rules. For example, the Subpart JJJJ definition includes, “...Stationary ICE differ from mobile ICE in that a stationary internal combustion engine is not a nonroad engine as defined at 40 CFR 1068.30...”. The nonroad definition in 40 CFR , §1068.30 includes portable and temporary engines, and nonroad engines include units that are, “...portable or transportable, meaning designed to be and capable of being carried or moved from one location to another. Indicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.” Thus, transportable engines are not stationary engines under federal regulations, and this conflicts with the §121.1 definition above, where an engine that can be moved is considered stationary.

Equipment definitions and other requirements should comport with federal requirements whenever possible. PA DEP should not define stationary engines differently than federal rules.

8. The Proposed Rule intends to reduce paperwork associated with case-by-case RACT determinations, but that objective will not be achieved unless emission limits, compliance options, and scheduling issues discussed in these comments are addressed.

The previous PA DEP RACT rule required case-by-case review for affected units, resulting in significant burden for both the agency and affected sources, as well as EPA. The Proposed Rule includes emission limits and emissions averaging to reduce that burden. However, as discussed in these comments, a significant paperwork burden will still occur unless revisions are completed. For example, under the Proposed Rule, PA DEP will need to review potentially 100 or more alternative RACT determinations for VOC emission limits, alternative NOx RACT determinations for small gas-fired turbines without access to retrofit lean premixed combustion control, determinations that emissions averaging can be implemented because prescribed limits are not achievable, and finally, schedule extension requests (up to 3 years) for all natural gas transmission facilities that require installation of controls. As discussed in Comment 2, three years is inadequate to complete emissions control implementation when multiple facilities and dozens of units are affected, so there would also be additional petitions required to extend schedules beyond the 3-year maximum allowed by the rule.

INGAA supports efforts to develop a rule that provides flexibility and minimizes the need for case-specific determinations. Therefore, INGAA recommends the revisions discussed in these comments, which would accomplish this goal by reducing the paperwork burden for both PA DEP and operators.

9. PA DEP should clearly indicate that the Proposed Rule only applies to pollutants that exceed the major source threshold.

The Proposed Rule applies to affected units at facilities that exceed the NOx or VOC major source threshold (e.g., for attainment areas, NOx above 100 TPY or VOCs above 50 TPY). PA DEP should

clarify that the rule only applies to the pollutant that exceeds the major source threshold. Thus, standards could apply for VOC, NO_x, or both pollutants, depending on whether an individual pollutant or both exceed the major source threshold. To avoid implementation confusion, this should be clearly indicated in the preamble to the final rule.

10. The Proposed Rule preamble and RAF include limited information and make erroneous conclusions.

PA DEP should provide additional support to justify the need for the Proposed Rule. Throughout this document, INGAA has addressed the lack of support for PA DEP's conclusions in the Proposed Rule. In summary, PA DEP's proposal significantly under-estimates the number of affected units, relies on limited information regarding the basis for proposed emission limits, and makes erroneous conclusions regarding whether VOC reductions would require new control technology. The PA DEP's proposal lacks a basis for estimates of total reductions in NO_x or VOCs and does not accurately assess the costs and benefits resulting from rule implementation. Finally, the PA DEP should consider the applicability of emissions control technology and technology performance for various types of affected equipment.

INGAA recommends that PA DEP revise the analysis and support documentation in the preamble and RAF. PA DEP should provide additional support and analysis to justify the regulation and requirements applicable to each equipment category. In some cases, INGAA may be able to provide additional information associated with emissions, control technology performance, and retrofit control costs associated with RICE and turbines. INGAA welcomes additional dialogue on these topics.

CONCLUSIONS

INGAA believes that emission reductions can be achieved, but PA DEP must revise the Proposed Rule to consider technical and economic feasibility, and to define reasonable schedules. The RAF should be revised to more adequately reflect the number of affected units, assess whether emissions control would be required to meet proposed standards, assess the technical and economic feasibility of installing retrofit controls on existing equipment, and investigate schedule implications. INGAA offers its assistance to reconcile the issues herein and facilitate the development of viable, effective, and reasonable RACT requirements for natural gas-fired reciprocating engines and turbines.

**Proposed Revisions to 25 PA Code, Chapters 121 and 129, PA Bulletin, Vol. 44, No. 16 (April 19, 2014),
Additional RACT Requirements for Major Sources of NO_x and VOCs (Proposed Rule)
Summary of Comments By the Interstate Natural Gas Association of America**

Comments submitted by the Interstate Natural Gas Association of America (INGAA), a trade association of the interstate natural gas pipeline industry, address the proposed requirements for control of nitrogen oxides (NO_x) and volatile organic compound (VOC) emissions from stationary natural gas-fired reciprocating internal combustion engines (RICE) and turbines. INGAA members operate natural gas transmission and storage facilities in Pennsylvania, which use RICE and turbines to drive compressors. The requirements in the proposed Pennsylvania Department of Environmental Protection (PA DEP) rule would affect many of these units.

INGAA and its members share PA DEP's desire to reduce the burden associated with case-by-case RACT analysis, but a number of issues must be addressed to achieve that objective. Primary issues include:

(1) The Proposed Rule significantly underestimates the number of affected units that would require installation of NO_x or VOC control technology. Approximately 150 units operated by natural gas transmission companies would be affected by the rule; this exceeds the PA DEP estimate for all affected units statewide. Thus, the rule would have significant impact on natural gas transmission company operations, including many requirements to install control technology and associated costs that are significantly under-estimated by PA DEP.

(2) The compliance schedule in the Proposed Rule is not feasible. The schedule requires compliance within one year, with an option to request an extension that allows up to three years. Due to the large number of affected units, there are significant scheduling implications, which could affect the reliability of gas delivery. An implementation timeline of more than three years is necessary to comply. Instead of a hard three-year deadline, operators should be allowed to provide a plan, for PA DEP review and approval, that establishes the compliance schedule for an operator's affected equipment.

(3) The proposed VOC emission standards should be deleted or replaced with compliance requirements based on good combustion practices. PA DEP relies on support documentation that inappropriately assumes that VOC emission controls would not be required, and it fails to assess implications. The proposed VOC emission standards would accomplish minimal reductions at a very high cost.

(4) The applicability threshold for turbines required to comply with emission standards should be revised to 6,000 horsepower (hp). If not, an entire class of turbines would be required to request case-by-case alternative RACT because retrofit emission control is not available for smaller turbines.

(5) INGAA supports including emissions averaging in the Proposed Rule, but that compliance option should be accessible at the discretion of the operator rather than requiring operators to first demonstrate that emission limits cannot be met for affected units.

INGAA believes that emission reductions can be achieved, but PA DEP must revise the Proposed Rule to consider technical and economic feasibility, and to define reasonable schedules. INGAA recommends that the Environmental Quality Board withdraw the proposed regulation until PA DEP can address these comments and prepare a revised Regulatory Analysis Form. INGAA offers its assistance to reconcile the issues herein and facilitate the development of viable, effective, and reasonable RACT requirements for natural gas-fired reciprocating engines and turbines.