



GROUP AGAINST SMOG & POLLUTION

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May 14, 2012

Via Electronic Mail

Alan Binder

Air Quality Program
Pennsylvania Department of Environmental Protection
400 Waterfront Drive
Pittsburgh, PA 15222

Re: National Fuel Gas Supply Corp. Plan Approval No.: PA-63-00955B

Dear Mr. Binder,

Clean Air Council (the Council) and the Group Against Smog and Pollution (GASP) hereby submit the following comments in response to the Pennsylvania Department of Environmental Protection's (PA DEP) notice of receipt and intent to issue Plan Approval No. PA-63-00955B for the installation of a natural gas-fired, simple cycle combustion turbine in Buffalo Township, Washington County, Pennsylvania that will aid in moving and compressing natural gas.

Plan Approval No. PA-63-00955B contains plans for two Solar Turbines Taurus 70 model gas turbine. Plan Approval No. PA-63-00955B is set to incorporate two previously authorized lean burn natural gas-fired compressor engines rated at 2,370 bhp. These turbines and the compressor engines are known as the Buffalo Compressor Station.

The Council is a non-profit environmental organization headquartered at 135 S. 19th St., Suite 300, Philadelphia PA 19103. The Council has members throughout Pennsylvania. For more than 40 years, the Council has fought to improve the air quality across Pennsylvania. The Council's mission is to protect everyone's right to breathe clean air.

GASP is a non-profit environmental organization based in Pittsburgh at 5135 Penn Avenue, Pittsburgh PA 15224. For over 40 years, GASP has served as a watchdog, educator, litigator, and policy-maker, with a focus on air quality in southwestern Pennsylvania.

Background/Introduction:

On August 25, 2011, PA DEP received Plan Approval Application No. PA-63-00955B from the National Fuel Gas Supply Corp. (Buffalo Compressor Station Plan Approval). PA DEP published the intent to issue the Buffalo Compressor Station Plan Approval in the April 14,

2012, *Pennsylvania Bulletin*. On April 24, 2012, the Commenters sent a “Request to Review Files,” via email to the Southwest Regional PA DEP Office to review the Buffalo Compressor Station Plan Approval. Comments for this Plan Approval are due May 14, 2012. The date made available to the Commenters to review the files was May 4, 2012.

Comments:

The Commenters urge PA DEP to require National Fuel Gas Supply Corp. to install proven and commercially available control technology and undertake best management practices.

Oil and gas operations, including exploration, production, and processing operations, consist of many pieces of equipment and practices that release air pollutants known to be harmful to public health and welfare. The impact on air quality includes emissions of volatile organic compounds (VOCs), nitrogen oxide (NO_x), particulates and hazardous air pollutants. VOCs and NO_x mix with air and sunlight to produce ground-level ozone, which causes a variety of respiratory problems, while exposure to hazardous air pollutants is linked to elevated levels of cancer and neurological health issues.

The impacts of oil and gas development on air quality are by no means insignificant. Areas of the country that have more fully developed their shale plays are experiencing significant effects from the cumulative impacts of oil and gas production:

- A 2009 Southern Methodist University study found summertime emissions of smog-forming pollutants from the oil and gas sector in the Dallas-Fort Worth area exceed emissions from motor vehicles.¹
- A 2008 analysis by the Colorado Department of Public Health and Environment concluded that smog-forming emissions from Colorado's oil and gas operations exceed vehicle emissions for the entire state.²
- In 2009, for the first time in the state's history, Wyoming failed to meet federal health-based standards for air pollution. According to the Wyoming Department of Environmental Quality, emissions from the state's growing oil and gas sector are to blame.³

¹ Al Armendariz, Emissions from Natural Gas Production in the Barnett Shale Area and Opportunities for Cost-Effective Improvements (Jan. 26, 2009), *available at*:
http://www.edf.org/documents/9235_Barnett_Shale_Report.pdf.

² Colorado Dept. of Public Health & Environment, Air Pollution Control Division, Oil and Gas Emission Sources Presentation for the Air Quality Control Commission Retreat (May 15, 2008) at pages 3-4.

³ WYDEQ, Technical Support Document I for Recommended 8-Hour Ozone Designation For the Upper Green River Basin, WY, p. viii (Mar. 26, 2009), *available at*:
http://deq.state.wy.us/out/downloads/Ozone%20TSD_final_rev%203-30-09_jl.pdf.

- In northeastern Utah, unprecedented ozone levels in the Uintah Basin were recorded last year, and the Bureau of Land Management has identified the multitude of oil and gas wells in the region as the primary cause of the ozone pollution.⁴

The Commenters urge PA DEP to perform a thorough review of best management practices and control technologies and set requirements that will reduce these harmful effects to the greatest extent possible. The following issues are considerations that PA DEP must undertake as part of the Best Available Technologies (BAT) analysis.

High-amplitude, combustor pressure oscillations:

Solar Turbine units reduce NO_x emissions by operating with lower combustor flame temperatures. These lower temperatures may cause flame instability inside the combustor unit.⁵ This instability can lead to combustor pressure oscillations (CPOs) that resonate at frequencies similar to the combustor liner or the fuel system.⁶ When CPO resonance frequencies match in such a way, it can cause severe damage to those pieces of the engine. Over time, such damage can cause inefficient burning and operation, causing the engine to operate outside of the parameters of its permit. This problem requires site and engine specific maintenance, as well as plans to avoid catastrophic failure. Further, as changes in uprates and fuel content are made, these CPOs may reemerge despite having been previously quashed.⁷ As part of the BAT analysis for this particular compressor engine, PA DEP should consider requiring the National Fuel Gas Supply Corp. (NFG) to specify the exact steps it will take to maintain permitted conditions in light of the potential for CPOs. Further, PA DEP should require NFG to list potential changes in operation as well as any maintenance required under them to prevent CPOs from damaging the compressor engine.

Monitoring frequency:

Currently, Buffalo Compressor Station Plan Approval requires emissions testing at least once every two years. Recently, PA DEP agreed to emissions testing once every 2,500 hours of operation for a much smaller compressor station in the Northcentral region (See Attachment 1). Buffalo Compressor Station contains much larger pieces of equipment on a natural gas transmission pipeline. Additionally, the plan approval is incorporating two smaller reciprocating compressor engines. This particular plan approval will also be part of a Title V permit for greenhouse gases. Because of the Buffalo Compressor Station's role as part of a major emission source and known maintenance issues with this type of compressor engine, PA DEP should consistently apply monitoring requirements and place a condition requiring emissions testing on Buffalo Compressor Station Plan Approval every 2,500 hours of operation.

Monitoring methods:

⁴ Scott Streater, [Air Quality Concerns May Dictate Uintah Basin's Natural Gas Drilling Future](http://www.nytimes.com/gwire/2010/10/01/01greenwire-air-quality-concerns-may-dictate-uintah-basins-30342.html?pagewanted=1), N.Y. Times, Oct. 1, 2010, available at: <http://www.nytimes.com/gwire/2010/10/01/01greenwire-air-quality-concerns-may-dictate-uintah-basins-30342.html?pagewanted=1>.

⁵ Kenneth O. Smith and James Blust, *Solar Turbines' Experience*, in COMBUSTION INSTABILITIES IN INDUSTRIAL GAS TURBINE ENGINES 30 (2005).

⁶ *Id.*

⁷ *Id.*

A recent technical journal has identified severe problems with tabulating NO_x emissions at engines involving lean-burn technology with oxidation catalysts. Oxides of nitrogen (NO_x) are emitted from stationary sources in two main forms—nitric oxide (NO) and nitrogen dioxide (NO₂) and are characterized in a variety of ways under EPA rules and guidance. Some methods for testing for different criteria pollutants—including NO_x—are promulgated under 40 CFR § 60 and are generally part of the New Source Performance Standards.⁸ EPA lists these approved methods and supplies state agencies with significant guidance on their use and application.⁹ Approved methods for characterizing NO_x emissions at new stationary sources include Methods 7, 7A, 7B, 7C, 7D, 7E, and 20.¹⁰

PA DEP's Source Testing Manual Revision 3.3 lists the EPA Methods it prefers for characterizing NO_x emissions from stationary sources.¹¹ Under section 3.1.3., PA DEP's preferred EPA Methods for characterizing NO_x emissions includes 7E and 20 for NO₂. For NO, Methods 7, 7A, 7B, 7C, 7D, 7E, and 20 are acceptable, but 7D, 7E, and 20 are preferred.

Some of these methods rely on chemiluminescence, which involves the measuring of light produced in chemical reactions. Depending on the intensity of the reaction, the amount of NO_x emitted can be detected as it reacts with various reagents, giving the tester a portrayal of the level of NO_x coming out of the stationary source. A 2010 technical paper from the *Journal of the Air and Waste Management Association* shows that NO_x emission detection methods involving chemiluminescence may be inaccurate when applied to lean-burn natural gas engines equipped with oxidation catalysts.¹² According to this paper, NO₂-to-NO ratios can vary widely in newer engines equipped to run as ultralean or with oxidation catalysts, especially since NO_x detection methods involving chemiluminescence were developed prior to engine technology involving lean-burn, ultralean, or oxidation catalysts. Chemiluminescent detectors cannot directly detect NO₂; NO₂ must first be converted to NO via an inefficient catalyst that ultimately fails to convert all NO to NO₂.¹³ The end result can be a discrepancy between actual emissions and detected emissions when employed chemiluminescence-based NO_x detection methods.

The SoLoNO_x technology employed by Solar Turbines should be evaluated for its likelihood to give rise to similar problems in tabulating NO_x emissions. SoLoNO_x technology involves lean-burn-type methods, which may cause similar discrepancies in the NO₂-to-NO ratio seen in smaller engines. PA DEP should evaluate what EPA Method used by the manufacturer to determine what the potential NO_x emissions. Should that method potentially give rise to a discrepancy between recorded emissions and actual emissions, PA DEP should gather emissions data through another more accurate method which will not give rise to the same emissions discrepancy.

⁸ 42 U.S.C.S. 7403 (2008).

⁹ Available at <http://www.epa.gov/ttn/emc/promgate.html>. (last visited February 2, 2012).

¹⁰ *Id.*

¹¹ Source Testing Manual Revision 3.3 (DEP ID: 274-0300-002) (November 11, 2000).

¹² Daniel B. Olsen, Morgan Kohls, & Greg Arney, *Impact of Oxidation Catalysts on Exhaust NO₂/NO_x Ratio from Lean Burn Natural Gas Engines*, 60 J. AIR & WASTE MANAGE. ASSOC. 867 (2010).

¹³ *Id.* at 870-1.

Commenters support greenhouse gas reporting requirements.

Commenters support the requirement that NFG supply DEP with data on GHG emissions from the turbines,¹⁴ despite the fact that DEP does not have full authority to request GHG emissions themselves.¹⁵ Commenters likewise support the legally-required incorporation of annual reporting requirements in Condition 9.¹⁶ Commenters stress that the final permit should make clear that because annual reports must contain information necessary for DEP to complete its emission inventory, GHG emissions must be included.¹⁷

NFG must show that it will not violate NAAQS.

The purpose of Pennsylvania's air quality regulations is to ensure that new sources do not violate the NAAQS.¹⁸ In furtherance of this purpose, applicants for a plan approval must show that the source "will not prevent or adversely affect the attainment or maintenance of ambient air quality standards when requested by" DEP.¹⁹ It follows from this that DEP must have some basis for deciding not to request a demonstration that a source will not interfere with the attainment or maintenance of the NAAQS.²⁰ Air quality modeling is one way to meet this requirement.²¹

DEP does not appear to have requested that NFG demonstrate that the installation of the turbines would not affect attainment of the NAAQS, and it is unclear how DEP concluded that it was unnecessary to seek additional information from NFG. The only relevant information that NFG provided is a conclusory statement in the plan approval application that the "proposed minor (i.e., 'area') source turbines will not contribute significantly to an ambient air concentration of any pollutant that will cause an exceedence of the NAAQS."²² Similarly, although DEP's application form asks NFG to provide information "necessary to thoroughly evaluate compliance with all the applicable requirements of [DEP's air quality regulations] and . . . the Clean Air Act," which would include the requirement not to violate the NAAQS, NFG simply refers to the previous document.²³ NFG also attaches a site layout, which can be used for the modeling of air quality impacts.²⁴ It is not clear how or if DEP used this information to make the necessary determination.

Washington County, where the turbines are proposed to be built, is currently designated as out of attainment with the 1997 eight-hour ozone NAAQS.²⁵ Although EPA has recently determined

¹⁴ Review Memo at 15 (Condition 8).

¹⁵ *Id.* at 5.

¹⁶ *Id.* at 16. Condition 9 references 25 Pa. Code § 135.5, but appears to borrow language from 25 Pa. Code § 135.3.

¹⁷ 25 Pa. Code § 135.4.

¹⁸ *Id.* § 127.1.

¹⁹ *Id.* § 127.12(a)(6).

²⁰ See *Baughman v. Pennsylvania Dep't of Env'tl. Resources*, No. 77-180-B, 1979 WL 4559, at *12 (EHB Jan. 26, 1979) ("We believe that [DEP] abuses its discretion when it has no way of knowing whether or not a source will affect the attainment or maintenance of air quality yet does not request the source to make a showing of same.")

²¹ *Id.*

²² NFG Plan Approval Application for Unit #3 and Unit #4, Buffalo Compressor Station ("NFG Application"), at 6 (Aug. 2011).

²³ NFG Application, App'x A ("Application Form") at 19 ("See Narrative attached to air permit application.")

²⁴ See *id.* at 21 ("If modeling (estimating) of ambient air quality impacts is needed, attach a site plan with buildings and their dimensions and other obstructions.")

²⁵ DEP, Attainment Status by Principal Pollutants, available at

<http://www.dep.state.pa.us/dep/deputate/airwaste/aq/attain/status.htm> (last visited May 9, 2012).

that the Pittsburgh Area, which contains Washington County, had attained the 1997 NAAQS,²⁶ the recentness of the attainment determination suggests that there is a significant risk that additional sources of ozone precursors in that area could threaten the area's maintenance with the NAAQS. DEP has determined that the turbines have a potential to emit 44.6 tons per year ("tpy") of NO_x,²⁷ an ozone precursor.²⁸ In light of these emissions and the fact that the Pittsburgh Area has only recently attained the 1997 ozone NAAQS, it is hard to understand how DEP determined that the addition of the turbines would not affect attainment and maintenance of the NAAQS.

DEP continues to evaluate whether a source is "major" for purposes of NA NSR or PSD by misinterpreting federal law.

The CAA requires stringent preconstruction procedures for "major" sources—sources that have the potential to emit large quantities of criteria pollutants—that it does not require of minor ones.²⁹ The CAA specifies what qualifies as a "major source" for the purposes Non-Attainment New Source Review, Prevention of Significant Deterioration, and Title V, making that definition a matter of federal law.³⁰ Although it is relatively straightforward to determine the boundaries of a source such as a refinery, it is not as simple to do so in the natural gas context, where a facility may comprise several elements that are physically separated.

Commenters have previously taken issue with the manner in which DEP determines whether multiple pieces of natural gas equipment actually comprise a single source, called "aggregation analysis", and will not go into further detail here.³¹ Commenters simply wish to note that DEP continues to mistakenly rely on proximity as the "primary factor" in determining whether two sources are "adjacent" enough to be considered a single facility for purposes of aggregation.³² This approach allows DEP to avoid a more searching analysis of whether the relationship between the two sources makes them part of the same facility. This approach differs from EPA's own understanding of the CAA. EPA's comments on DEP's guidance document for performing single-source determinations reflect this:

While EPA believes whether or not air emission sources are on "close-by" properties may be instructive in an aggregation analysis, it cannot be dispositive without a reasoned case-by-case analysis considering relevant facts in a specific case.

...

²⁶ Determination of Attainment for the Pittsburgh-Beaver Valley 8-Hour Ozone Nonattainment Area, 76 Fed. Reg. 31,237, 31,237 (May 31, 2011).

²⁷ Review Memo at 10.

²⁸ EPA, Nitrogen Dioxide, available at <http://www.epa.gov/air/nitrogenoxides/> (last visited May 9, 2012).

²⁹ 42 U.S.C. § 7475(a) (Prevention of Significant Deterioration); *id.* § 7502(c) (Nonattainment). We refer to sources covered by PSD or NA NSR as "major sources", although PSD covers "major emitting facilities."

³⁰ *Id.* §§ 7479(1), 7602(j).

³¹ See Clean Air Council, Petition to the Administrator to Make a Finding That Pennsylvania Is Failing to Implement Its State Implementation Plan; To Make a Determination That Pennsylvania Is Not Adequately Administering and Enforcing Its Clean Air Act Title V Permitting Program; and to Apply Sanctions Against Pennsylvania for These Failures (Feb. 16, 2012), available at http://cleanair.org/program/outdoor_air_pollution/marcellus_shale/clean_air_council_petitions_epa_find_pa_dep_filing_pr.

³² Review Memo at 8.

EPA disagrees with the interim guidance to the extent it is determining that aggregation should never occur where there are ‘expansive operations’ or where sources are spread over an undefined ‘large geographical area.’ Adding such further requirements on sources with respect to proximity would be contrary to federal law. EPA has stated in several source determinations that proximity is one factor to be considered and may be dispositive where supported with a reasoned decision given all circumstances of a particular case.³³

While the aggregation analysis in the Review Memo appears more thorough and transparent than has been the case in other natural gas permitting actions in Pennsylvania, it is impossible to say whether it was done properly, because DEP simply stops its analysis after examining the relationship between the Buffalo Compressor Station and the nearest stationary air contamination source.³⁴ Commenters urge DEP to conduct a more complete review that accords with EPA’s understanding of the law.

The Buffalo Compressor Station qualifies as a “support facility,” and thus satisfies the “same industrial grouping” requirement for aggregation even if it and associated natural gas production wells are not part of the same SIC Major Group.

National Fuel Gas Supply Corp.’s consideration of the “same industrial grouping” requirement in their aggregation analysis is incomplete.³⁵ National Fuel Gas’ plan approval application states that because the SIC code for the Buffalo facility is 4922: “Natural Gas Transmission,” and the SIC code for natural gas production wells and processing plants is 1311: “Oil and Gas Extraction,” these pollutant emitting activities belong to different SIC Major Groups (i.e., have different first two digits in their SIC codes) and therefore do not satisfy the “same industrial grouping” requirement.³⁶ Even if SIC code 4922 is the appropriate classification for the Buffalo Compressor Station, the “same industrial grouping” factor would still be satisfied because the Buffalo facility functions as a “support facility” and is thus deemed to share a SIC code with the industrial activity it supports. In the 1980 PSD preamble, EPA noted:

Each source is to be classified according to its primary activity, which is determined by its principal product or group of products produced or distributed, or services rendered. Thus, one source classification encompasses both primary and support facilities, even when the latter includes units with a different two-digit SIC code. Support facilities are typically those which convey, store, or otherwise assist in the production of the principal product.³⁷

In the case of the Buffalo facility and production field emission units, the “principal product” is natural gas. The compressor station is primarily engaged in compressing and transmitting natural gas from nearby wells and thus fits the definition of a “support facility.” Therefore, even

³³ EPA Comments on PADEP Technical Guidance on Air Aggregation in Oil and Gas Industries (Nov. 21, 2011), available at <http://www.cleanair.org/sites/default/files/EPA%20Aggregation%20Comments.pdf>.

³⁴ See Review Memo at 7-8.

³⁵ National Fuel Gas Plan Approval Application for Unit #3 and Unit #4, Buffalo Compressor Station (Aug. 2011), at 13 (see discussion on “Industrial Grouping”).

³⁶ *Id.*

³⁷ 45 Fed. Reg. 52676, 52695.

if the Buffalo facility is properly categorized under SIC code 4922, the SIC code factor of the three-part PSD aggregation test is still satisfied.³⁸

Additionally, it should be noted that Pennsylvania's NSR definition of "facility" does not include the "same industrial grouping" requirement; the only relevant considerations for NSR purposes are whether sources are under common control and are contiguous or adjacent.³⁹ Thus, the SIC code discussion here is irrelevant for NSR permitting purposes.

³⁸ See, e.g., Letter from William B. Hathaway, EPA Region 6, to Allen Eli Bell, Tex. Air Control Bd., PSD Applicability Request, Valero Transmission Company (Nov. 3, 1986), available at <http://www.epa.gov/region07/air/nsr/nsrmemos/valeroco.pdf>.

³⁹ 25 Pa. Code § 121.1 (see definition of "facility"); Pennsylvania Dep't of Env'tl. Prot., *Guidance for Performing Single Stationary Source Determinations for Oil and Gas Industries* (Oct. 12, 2011), Doc. No. 270-0810-006, available at <http://www.e-library.dep.state.pa.us/dsweb/Get/Document-85786/270-0810-006.pdf>.