

NOISE REGULATION OF THE SHALE OIL & GAS EXTRACTION AND PRODUCTION INDUSTRY

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**R. Timothy Weston
Tad Macfarlan
K&L Gates LLP
17 North Second Street, 18th Floor
Harrisburg, PA 17101
(717) 231-4500
tim.weston@klgates.com
tad.macfarlan@klgates.com**

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A. INTRODUCTION

NOISE, n. A stench in the ear. Undomesticated music. The chief product and authenticating sign of civilization.¹

Ambrose Bierce's amusing definition conveys an apt observation concerning the challenges facing the shale oil and gas sector in tackling the issue of "noise." Since the dawn of the industrial revolution, if not long before, one hallmark of civilization has been the generation, propagation, receipt and reaction to "noise"—most commonly defined as "unwanted sound." Wherever humans come together and engage in activities of life and commerce, sound is generated. At some point along the spectrum of such sound – from the outdoor coffee house conversation to the din of late night patrons leaving the pub, from the barking dog to the construction worker's hammer, from the drone of lawnmowers on a summer evening to the cacophony of a busy airport – such sound becomes unwanted, annoying, disturbing, distracting, to the point of becoming a "nuisance." Beyond mere irritation, as documented in the U.S. Environmental Protection Agency's ("EPA") seminal "Levels Document,"² sound levels in the environment may reach the point of becoming a public health and welfare concern. Noise can cause hearing loss; interfere with human activities at home and work; annoy, awaken, anger and frustrate people; disrupt communications and individual thoughts; and become a biological stressor.³

To be sure, the oil and gas industry is not the first, or even the "worst," contributor to noise within the environment. But with the development of unconventional well drilling technologies, involving longer and more intensive drilling activities, more intensive truck traffic serving well pads, and the spread of gathering, conditioning and compressor facilities across areas heretofore not impacted by oil and gas activities, increased focus has been placed by the public and regulators alike on noise associated with shale plays. This paper seeks to provide a context to, and then survey, some of the developing regulatory approaches to shale play noise management.

B. WHAT IS "NOISE"? – DEFINITION & MEASUREMENT

The sound humans hear is the result of a source inducing vibration in the air or other media, with the vibrations producing alternating bands of dense and sparse particles of air,

¹ Ambrose Bierce, in DEVIL'S DICTIONARY (1911).

² EPA, Office of Noise Abatement & Control, Information on Levels of Environmental Noise Requisite to Protection Public Health and Welfare with an Adequate Margin of Safety, EPA/ONAC 550/9-74-004 (March 1974) ("EPA Levels Document"); *see also* EPA, Protective Noise Levels, Condensed Version of EPA Levels Document, EPA 550/9-79-100 (1979) ("EPA Condensed Levels Document").

³ EPA Condensed Levels Document at 1.

spreading outward in much the same way as ripples in water. Sound pressure waves radiate in all directions of the source, and may be scattered, reflected, sometimes concentrated or deflected, over the propagation pathways toward human and animal receptors. These pressure fluctuations are in turn converted into auditory sensations by the human ear, in turn triggering various types and degrees of reaction.

Sound is generally described in terms of three variables: (1) amplitude (perceived loudness), (2) frequency (pitch), and (3) time pattern.

Sound pressure is the amplitude or measure of difference between atmospheric pressure with and without the presence of a particular sound. The basic measure of sound pressure or amplitude is the decibel (“dB”). The decibel scale is logarithmic, not linear. Thus, a sound of 30 dB involves sound pressure waves 10 times that of 20 dB. Sharply painful sound is 10 million times greater than the source pressure that is merely audible. Multiple sources of sound can lead to higher cumulative sound levels, but two separate sounds are not directly (arithmetically) additive. Thus, a sound of 70 dB added to another source of 70 dB will result in a cumulative sound of 73 dB.

The frequency (pitch) of a sound is measured based on the number of waves per second (cycles per second) of the sound. The measurement metric is referred to as Hertz (“Hz”). A frequency of 100 Hz signifies a sound with 100 cycles per second. Most humans can hear frequency from about 16 to 20,000 Hz. As a reference, the hum of an electric current is 60 Hz. Most sounds consist of a complex mixture of frequency. On the other hand, humans are more sensitive to and find more annoying sounds involving “pure” frequency – e.g., an incessant hum.

The third variable, time pattern of sound, considers the continuity, duration, fluctuation, impulsiveness, intermittency of sound. Compared to relatively constant and even sounds, impulsive noises (the hammer blow or dropped pipe) are generally more irritating to receiving humans, snatching attention, disrupting thought, interrupting sleep.

Considering these three variables, trying to measure and describe environmental noise is not easy. Back in the 1970’s, EPA developed a system of four “sound descriptors” to summarize how people hear sound and determine the impact of noise on public health and welfare. The four descriptors were: (1) A-weighted Sound Level; (2) A-weighted sound Exposure Level; (3) Equivalent Sound Level; and (4) Day-Night Sound Level. As described in the EPA Levels Document, these four descriptors are related but each is more useful for particular types of measurements.

Most literature and noise regulatory provisions refer to A-weighted Sound Level, a measurement that attempts to reflect the relative sensitivity of the human ear to sounds of various frequencies, and applies “weights” to the sound levels of different frequencies along the spectrum to come up with one number that describes the overall relative sound level. Meters have been developed that contain the A-weighting network, allowing measurements to be taken and reported in decibels A-scale (“dBA”). Such dBA levels may be alternatively measured and

expressed on an instant peak, maximum level, or steady-state level. Generally, the A-weighted Sound Level has been adopted for most regulatory efforts because it is convenient, accurate for most purposes, and used extensively across the world.⁴

To set a benchmark for some of the discussion to follow, Figure 1 provides the relative A-weighted decibel values of some typical environmental noises.

Figure 1. Comparison of Approximate Sound Pressure Levels

<i>Environmental Sound Levels</i>	<i>dBA</i>	<i>Sound Levels at a Given Distance (Meters)</i>
Threshold of Pain	135	
	130	
	125	
	120	Jet Airplane Takeoff (500 m)
	115	
Typical Rock Concert	110	
	105	
On Platform by Passing Subway Train	100	
	95	Jackhammer (15 m)
	90	Compressor (8 m)
On Sidewalk by Typical Highway	85	Heavy Truck (15 m)
	80	Average well construction site (8 m)
	75	
	70	Vacuum Cleaner (3 m) / Tank Truck (152 m)
	65	Typewriter (1 m) / Avg. Well Construction Site (152 m)
Avg. Urban Area Background/Busy Office	60	Drilling pump (152 m)
	55	Large Transformer (15 m)
Urban Residence	50	Conversation (1 m)
Small Town Residence	45	
	40	

⁴ EPA’s more tailored Sound Exposure Level, Equivalent Sound Level, and Day-Night Sound Level measures provide alternative methods for describing sound for different purposes. The Sound Exposure Level provides a summation of the energy of the momentary magnitudes of sound associated with an event, such as an airplane, train or truck. The Equivalent Sound Level provides a measure of the average environmental noise levels to which people are exposed, considering both the volume and duration of sound levels over some time period. The Day-Night Sound Level provides a means to characterize sound levels in residential areas throughout the day and night, and adds 10 dB to nighttime sounds (10 pm to 7 am) as a surrogate for the relatively increased irritation of residential recipients to night sounds. It may be noted that similar measures in other jurisdictions apply different weightings to nighttime sounds, ranging from 5–10 dBA. Compare Alberta Energy Regulator Directive 038: Noise Control (Feb. 16, 2007) at 8 (10 dBA adjustment) with Colorado Oil and Gas Conservation Commission Rule 802.b. (5 dBA adjustment).

<i>Environmental Sound Levels</i>	<i>dBA</i>	<i>Sound Levels at a Given Distance (Meters)</i>
	35	Soft Whisper (2 m)
Rural Area at Night	30	
	25	Rustling of Leaves (20 m)
Isolated Broadcast Studio	20	
	15	
Audiometric (hearing testing) Booth	10	
	5	
Threshold of Hearing	0	

C. THE OIL & GAS INDUSTRY’S NOISE ISSUES

Noise from shale play development and operations is derived from multiple sources: truck traffic, drilling and completion operations, pumps, compressors, generators, relief valves, etc. The challenge is that most shale play activities occur in relatively rural settings, where ambient noise levels are low and the nature and amplitude of noise levels generated in exploration and production (“E&P”) activities will be most noticeable to neighbors, particularly residences.

Various measurements and estimates have been made as to the sound levels produced by typical E&P operations. Some reported values (some of which are dated and may not be reliable) are reflected in the following table.

<i>Source</i>	<i>La Plata County, CO Study</i>	<i>BLM Draft EIS⁵</i>
Compressor	50 dBA (375 feet from property boundary)	89 dBA (50 feet from source) ⁶
Pumping units	50 dBA (325 feet from well pad)	82 dBA (50 feet from source)
Fuel and water trucks	68 dBA (500 feet from source)	
Crane for hoisting rigs	68 dBA (500 feet from source)	
Pump used during drilling	62 dBA (500 feet from source)	
Average well construction site	65 dBA (500 feet from source)	83 dBA (50 feet from source)
Produced water injection		71 dBA (50 feet from source)

⁵ Bureau of Land Management, *Draft RMPA/EIS for Federal Fluid Minerals Leasing and Development in Sierra and Otero Counties* (Oct. 2000)

⁶ As a note, sound attenuates in accordance with the inverse square law. See http://www.engineeringtoolbox.com/outdoor-propagation-sound-d_64.html. Thus, estimates of sound attenuation at distances greater than 50 feet can be approximated by applying a reduction of 6 dBA for each doubling of distance. Thus, 89 dBA at 50 feet would equate to 83 dBA at 100 feet, 77 dBA at 200 feet, and 71 dBA at 400 feet.

D. THE SIDE-TRACKED FEDERAL REGULATION OF NOISE

The Federal Government's foray into the field of noise regulation started out in earnest and eventually fell apart.

The Noise Control Act of 1972⁷ and the Quiet Communities Act of 1978⁸ sought to establish programs requiring the federal government to set and enforce uniform noise control standards for aircraft and airports, interstate motor carriers and railroads, workplace activities, medium and heavy-duty trucks, motorcycles and mopeds, portable air compressors, and federally assisted housing projects located in noise exposed areas. The Noise Control Act also required federal agencies to comply with all federal, state, and local noise control laws and regulations.

EPA's one time Office of Noise Abatement and Control ("ONAC") set out to implement these mandates, making substantial strides in the field of aircraft and airport noise control, noise labeling of various equipment, and certain other measures. Under this authority, EPA set noise control standards for certain construction equipment air compressors at 76 dBA.⁹ The standards for trucks over 10,000 pounds only apply to those manufactured after 1978 and range from 80 to 83 dBA depending on the model year.¹⁰

However, in 1981, the Reagan Administration concluded at the executive level that noise issues were best handled at the state or local government level. As a result, EPA shifted noise control policy to transfer the primary responsibility for regulating noise to state and local governments. ONAC's funding was phased out in 1992. The Noise Control Act of 1972 and the Quiet Communities Act of 1978, however, have never been rescinded by Congress and remain in effect today, although essentially unfunded.

E. STATE, PROVINCIAL AND LOCAL REGULATION OF NOISE FROM OIL AND GAS OPERATIONS

In the absence of a comprehensive federal regulatory regime, state and local governments have assumed primary responsibility for regulating noise in the United States.

Noise control is most often addressed via a combination of common law nuisance law and/or local codes and ordinances, which vary significantly in form from locality to locality. Historically, common law doctrines (primarily based in private and public nuisance) provided the vehicle by which neighbors and communities sought redress against noises deemed to be

⁷ P.L. 92-574, 86 Stat. 1234, Oct. 27, 1972, *as amended*, 42 U.S.C. §§ 4901–4918.

⁸ P.L. 95-609, 92 Stat. 3079, Nov. 8, 1978 (amending the Noise Control Act of 1972 and other federal statutes).

⁹ 40 C.F.R. Part 204.

¹⁰ *Id.* Part 205, Subpart B.

excessive or damaging. Common law approaches have been supplemented, and in some cases supplanted by, statutes, codes and ordinances addressing noise issues in various ways.

Municipal zoning codes indirectly control noise by establishing setbacks and relegating heavier industrial and manufacturing uses to specific zones, away from more noise-sensitive residential areas. Many local governments also enact ordinances that directly regulate noise through restrictions that are either qualitative (i.e., prohibitions on “unreasonable” or “excessive” noise) or quantitative (i.e., prohibitions on noise above defined numeric thresholds, often expressed in dBA, at particular places and times) in nature. These restrictions can apply broadly to all persons and entities within a municipality or, alternatively, they can target specific types of noise-intensive activities. In municipalities where oil and gas operations are common, local ordinances sometimes address noise from these facilities in specifically tailored oil and gas provisions.

In some states, oil and gas regulators have promulgated, or are considering whether to promulgate, noise control requirements that apply uniformly to all oil and gas operations within the state. These state-level noise regulations may or may not supersede local noise ordinances under evolving and varied preemption doctrines, which are developed by state courts as a matter of state law.¹¹ In the sections that follow, we provide a brief overview of the common law nuisance approach to noise issues, and then describe some of the notable oil and gas noise control regimes and initiatives from a sampling of important oil and gas producing states (and one Canadian province).

1. Common Law Doctrines Applicable to Noise

Long before the advent of regulatory approaches to noise, the common law doctrines of nuisance (and in some cases trespass) have been applied by the courts to provide redress for noise complaints.

The American Law Institute’s Restatement (Second) of Torts, which attempts to summarize the consensus common law position of the fifty states, defines a private nuisance as “a nontrespassory invasion of another’s interest in the private use and enjoyment of land.”¹² Under the Restatement, an otherwise lawful invasion must be (1) either “intentional” and “unreasonable”, or “unintentional and otherwise actionable” under rules relating to negligence, reckless conduct or abnormally dangerous activities,¹³ and (2) cause “significant” harm “of a

¹¹ See, e.g., *State ex rel. Morrison v. Beck Energy Corp.*, Slip Op. No. 2015-Ohio-485, 2015 WL 687475 (Feb. 17, 2015); *Huntley & Huntley, Inc. v. Borough Council of the Borough of Oakmont*, 964 A.2d 855 (Pa. 2009); *Range Resources–Appalachia, LLC v. Salem Twp.*, 964 A.2d 869 (Pa. 2009).

¹² Restatement (Second) of Torts § 821D (1979).

¹³ *Id.* § 822.

kind that would be suffered by a normal person in the community or by property in normal condition and used for a normal purpose”,¹⁴ in order to be actionable as a private nuisance. The “unreasonableness” of an invasion is determined by considering whether “the gravity of the harm outweighs the utility of the actor’s conduct,” taking into account a variety of factors, including the extent and character of the harm, the suitability of the parties’ respective uses of their property to the character of the locality, and the impracticability of preventing or avoiding the invasion.¹⁵ Under this multi-factor balancing test, courts exercise substantial equitable discretion in determining whether, under the fact-specific circumstances of each case, it would be justified to order the elimination or curtailment of an alleged noise nuisance.

As one example from a key shale play jurisdiction, the Pennsylvania Supreme Court has applied standards similar to the Restatement’s to determine whether an otherwise lawful pursuit qualifies as a nuisance on the basis of the noise that it generates. Perhaps the fullest recitation of the law on this point was provided in the following passage from *Molony v. Pounds*:

Cases of this character are governed by well settled legal principles. No one is entitled to absolute quiet in the enjoyment of his property. All that may be insisted upon is ***a degree of quietness consistent with the standard of comfort in the locality in which one dwells***[.] Persons living in a community or neighborhood must subject their personal comfort to the commercial necessities of carrying on trade and business, and where the individual is affected only in his taste, his personal comfort, or pleasures, or preferences, these must be surrendered to the comfort and preferences of the many[.] The use of property for other than residential purposes may be, and at times is, an annoyance to dwellers in the vicinity, but the mere fact of annoyance does not establish the existence of a nuisance and is not of itself a sufficient basis for an injunction against the particular use from which the alleged annoyance arises[.] Where the annoyance arises from the conduct of a business which is not a nuisance per se, a strong effort will be made to conserve the rights of all parties. ***An important question is, can the noise by any reasonable means be moderated so as to accord with the degree of quietness the plaintiff has a right to enjoy, and if it can, by what means***[.] In such cases, equity will not ordinarily interfere unless the proof shows that the injury arises either from an improper conduct of the business or from one that could be remedied[.]¹⁶

In *Molony*, applying these principles, the Court found that the operation of a restaurant in Conshohocken, Pennsylvania between the hours of 1 a.m. and 6 a.m., under appropriate conditions, did not constitute a nuisance that warranted abatement by court order.¹⁷ Amongst

¹⁴ *Id.* § 821F.

¹⁵ *Id.* §§ 826–831.

¹⁶ 64 A.2d 802, 803–04 (Pa. 1949) (emphasis added) (citations omitted).

¹⁷ *Id.* at 804.

other factors, the court noted the nature of the area, the relative frequency and duration of the noise, and the fact that the sounds did not result from “an improper conduct of the business or from one that could be remedied.”¹⁸

Another oft-quoted statement of the law in Pennsylvania originated in *Ebur v. Alloy Metal Wire Co.*, which provided:

The courts have found it difficult to lay down any precise and inflexible rule by the application of which it can be determined that a plaintiff in a given case is entitled to relief by injunction against smoke, fumes, and noises emitted in the vicinity of his residence. It has been said that a ‘fair test as to whether a business lawful in itself, or a particular use of property, constitutes a nuisance, is ***the reasonableness or unreasonableness of conducting the business or making the use of the property complained of in the particular locality and in the manner and under the circumstances of the case.***’ 46 C. J. 655. It has also been said: ‘Whether the use is reasonable generally depends upon many and varied facts. No hard and fast rule controls the subject. A use that would be reasonable under one set of facts might be unreasonable under another. What is reasonable is sometimes a question of law, and at other times, a question of fact. No one particular fact is conclusive, but the inference is to be drawn from all the facts proved whether the controlling fact exists that the use is unreasonable.’ 46 C. J. 656. No word is used more frequently in discussing cases of this kind than the word ‘reasonable,’ and no word is less susceptible of exact definition. What is reasonable under one set of circumstances is unreasonable under another....¹⁹

In *Ebur*, the Court modified what it determined to be an excessively restrictive lower court order with respect to the defendant’s wire and metal products factory, tailoring the injunction to preclude only noise and vibrations “***which are unnecessary and unreasonable under the circumstances, and which can be eliminated by the efficient operation of its plant*** and by the installation of the most effective reasonably available devices for the reduction of ... noises, and vibrations in its plant”²⁰

More recently, the Pennsylvania Commonwealth Court efficiently summarized the state of the law as follows: “***To constitute a nuisance based upon noise, the question is whether the noise is unreasonable and unnecessary considering all of the circumstances involved.***”²¹

Case law from other shale play states indicate that similar principles are applied in judging common law nuisance claims.

¹⁸ *Id.* at 804–05.

¹⁹ 155 A. 280, 282 (Pa. 1931) (emphasis added).

²⁰ *Id.* at 285 (emphasis added).

²¹ *Gray v. Barnhart*, 601 A.2d 924, 927 n. 4 (Pa. Cmwlth. 1992) (emphasis added).

For example, Ohio courts have noted that determination of a private nuisance is “a matter of degree” that turns on whether “the use to which the property is put is reasonable under the circumstances” and “whether there is an appreciable, substantial, tangible injury resulting in actual, material, physical discomfort.”²² In that regard, the “what amount of annoyance or inconvenience will constitute a legal injury, resulting in actual damages” cannot be “precisely defined” and is “dependent on varying circumstances” to be determined by the trier of fact.²³

West Virginia’s Supreme Court has likewise found that determination of a nuisance “ius incapable of an exact and exhaustive definition”, but involves “a substantial and unreasonable interference with the private use and enjoyment of another’s land.”²⁴ In the specific context of noise, West Virginia’s courts has ruled that “noise alone may create a nuisance, depending on time, locality and degree”, and where “an unusual and recurring noise is introduced in a residential district, and the noise prevents sleep or otherwise disturbs materially the rest and comfort of the residents, the noise may be inhibited by a court of equity.”²⁵

Similarly, Texas courts have noted that the amount of annoyance and inconvenience that must be produced to constitute a nuisance depends on varying facts,²⁶ including the lawfulness of the use, the result it produces, considered in the context of the locality and surrounding uses.²⁷

In sum, in order to determine whether a particular activity constitutes a noise nuisance, the question is whether the noise is *unreasonable* considering all of the circumstances. That determination requires a consideration and weighing of the circumstances, including, but not limited to, (a) the level and frequency of the noise, (b) where it occurs, (c) when it occurs, (d) the reasonable expectations of those impacted by the noise, and (e) the ability of the persons making the noise to reasonably control it.

The hallmark of the common law approach to noise involves adjudication in the judicial system of individual, often fact-intensive disputes. Such cases are expensive, time-consuming (frequently extending well beyond the timeframe of a short duration activity), and often require presentation of competing expert testimony – ultimately leading to a jury or judge determining the issues of reasonableness and necessity, and the feasibility of control.

²² *Antonik v. Chamberlain*, 78 N.E.2d 752, 759 (Ohio Ct. App. 1947).

²³ *Columbia Gas Light and Coke Co. v. Freeland*, 12 Ohio St. 392, 399 (1961).

²⁴ *Hendricks v. Stalnaker*, 380 S.E.2d 198, 199 (W.Va. 1989), quoted in *Bansbach v. Harbin*, 728 S.E.2d 533, 537 (W.Va. 2012).

²⁵ *Burch v. Nedpower Mount Storm, LLC*, 647 S.E.2d 879, 883 (W.Va. 2007) (internal quotes and citations omitted).

²⁶ *McAfee MX v. Foster*, 2008 Tex. App. LEXIS 968 (Tex. App. 2008).

²⁷ *Gose v. Coryell*, 126 S.W. 1164, 1168 (Tex. Civ. App. 1910).

2. Pennsylvania

Pennsylvania, at the center of the shale gas revolution in the Marcellus Shale region, has taken several steps forward and back with respect to regulation of noise from oil and gas facilities.

In February 2012, Pennsylvania enacted Act 13,²⁸ a comprehensive revision to the Commonwealth's Oil and Gas Act.²⁹ In an attempt to provide regulatory uniformity to the oil and gas industry, Act 13 included several provisions that broadened the scope of state preemption of municipal authority over oil and gas facilities.³⁰ Several of these preemption provisions limited the authority of local governments to regulate noise from oil and gas facilities. Specifically, Act 13 required municipalities to authorize natural gas compressor stations as a permitted use in agricultural and industrial zoning districts, and as a conditional use in all other zoning districts, if the compressor station could achieve (among other standards) a noise level of 60 dBA at the nearest property line.³¹ Similarly, the Act required municipalities to authorize natural gas processing facilities as a permitted use in industrial districts, and as a conditional use in agricultural districts, if (among other standards) the noise level of the facility would not exceed 60 dBA at the nearest property line.³² Act 13 also prohibited municipalities from imposing noise control requirements on permanent oil and gas operations that were more stringent than requirements imposed on other industrial uses in the same zoning district – effectively preventing municipalities from singling out the oil and gas industry for special, enhanced regulatory scrutiny.³³

These statewide uniformity provisions were short-lived. In December 2013, in *Robinson Township v. Commonwealth*,³⁴ the Pennsylvania Supreme Court struck down Act 13's new preemption provisions, including the noise control sections. A plurality of the Pennsylvania Supreme Court found that the preemption provisions violated the Environmental Rights Amendment of the Pennsylvania Constitution.³⁵ The plurality's opinion³⁶ found that the state

²⁸ Act of February 14, 2012, P.L. 87, No. 13.

²⁹ 58 Pa.C.S. §§ 3201–3309.

³⁰ *Id.* §§ 3301–3309.

³¹ *Id.* § 3304(b)(7).

³² *Id.* § 3304(b)(8).

³³ *Id.* § 3304(b)(3).

³⁴ 83 A.3d 901 (Pa. 2013).

³⁵ Pa. Const. Art I, § 27.

³⁶ It is critical to note that the much-discussed lead opinion in *Robinson Township* authored by then Chief Justice Castille was issued by only a three justice plurality, and hence as a legal matter the opinion does not create binding precedent. *See, e.g., Commonwealth v. Thompson*, 985 A.2d 928, 937 (Pa. 2009) (a plurality decision “is not binding authority”).

legislature had violated its constitutional duty to protect certain environmental values and to conserve and maintain the Commonwealth's public natural resources by preventing municipalities from effectively addressing the environmental consequences of oil and gas development.³⁷ The court's decision meant that municipalities would once again have greater leeway in regulating noise and other environmental effects of oil and gas development within their borders.

Following the Supreme Court's decision (and after a change in administration at the Governor's office in 2015), the Pennsylvania Department of Environmental Protection ("PaDEP") proposed new statewide noise standards for oil and gas facilities. The proposed noise controls were unveiled in an "advanced notice of final rulemaking" in April 2015,³⁸ as part of a larger package of revisions to Pennsylvania's environmental rules for oil and gas facilities that have been in development since shortly after the enactment of Act 13 in 2012.

PaDEP's April 2015 proposal would have required operators of unconventional well sites to prepare and implement a site-specific noise mitigation plan to minimize noise during well drilling, stimulation, and servicing activities.³⁹ Under the April proposal, such plans would include: (1) an assessment of background noise in the area of the well site; (2) an assessment of known and potential noise from drilling stimulation and servicing activities, taking into consideration the interests of nearby residents; and (3) a description of the operator's plans to mitigate noise, which would have to be based on a "best practices approach" to noise management.⁴⁰ Operators would then have been required to conduct regular inspections to evaluate the effectiveness of their noise mitigation plans and take corrective actions if necessary.⁴¹ The April 2015 proposed rule would also have authorized PaDEP to order the suspension of operations if it determines during drilling, stimulation or servicing activities that a plan is inadequate to minimize noise.⁴²

PaDEP's proposal was criticized by the regulated community for combining vague requirements with a stringent enforcement mechanism. The April 2015 proposal left wide open questions: what are "best practices" and what is a "best practices approach"? To take an example, if your neighbor mows his lawn on Sunday morning, is the best practice to buy an electric mower, or switch to another day or hour? With respect to noise from roads, is the best practice to instruct truck drivers to avoid using engine break shifting, or does it require erection of sound barriers all along the road (as PennDOT does in some urban areas)? For well drilling

³⁷ 83 A.3d at 978–82.

³⁸ See 45 Pa. Bulletin 1615 (Apr. 4, 2015).

³⁹ See 25 Pa. Code § 78a.41(a) (DRAFT Mar. 9, 2015).

⁴⁰ *Id.* § 78a.41(b).

⁴¹ *Id.* § 78a.41(d) & (c)

⁴² *Id.* § 78a.41(c).

rigs, does “best practices” mandate mufflers on engines, or erection of sound barriers all around the rig? PaDEP leaders had indicated that they borrowed some of the proposed concepts from the Alberta Directive 038, discussed in Section E.7 below. But the Alberta Directive’s best practices program is encouraged, not mandated; and PaDEP’s April 2015 proposal dropped all of the definitions and explanatory discussion in the Alberta Directive. A “best practices” formulation, without definition, creates a platform for challenges from well opponents arguing that there is always something “better.” A particular measure may not be reasonable or technically practicable; but if it results in marginally lower sound levels, is it “best”?

Others questioned whether the April 2015 proposal was appropriately grounded in any authorizing statute. PaDEP had cited the general nuisance-abatement provisions of Section 1917-A of Administrative Code⁴³ (not Act 13) as the statutory basis for the proposed noise controls. That provision is directed to protection of the public against “unsanitary conditions and other nuisances,”⁴⁴ and most specifically empowers PaDEP to investigate nuisances⁴⁵ and “order such nuisances including those detrimental to the public health to be abated and removed”⁴⁶ Section 1917-A does not make any reference to “noise,” nor does it imbue the PaDEP with powers to establish standards on every possible subject or activity that might, under certain circumstances, give rise to a “nuisance.” While some Pennsylvania environmental statutes, such as the Clean Streams Law and Air Pollution Control Act, provide for establishment of standards governing air and water pollution, and declare that violation of those standards constitutes a “public nuisance,” Section 1917-A does not contain such a standard setting provision.

On August 12, 2015, PaDEP issued a news release and posted a further revised “Draft Final Rulemaking” package,⁴⁷ in which it retreated from promulgating the proposed noise control provisions. In doing so, PaDEP stated: “The Department decided not to include [§78a.41] in the draft final rulemaking. Instead, given the complex nature of the technical issues surrounding noise mitigation, the Department plans to develop a best management practices guidance document which may serve as the basis for future rulemaking on the topic.” Clearly, more to come in the months ahead as the agency contemplates drafting of a “guidance document” on the noise topic.

⁴³ 71 P.S. § 510-17.

⁴⁴ *Id.* § 510-17(1).

⁴⁵ *Id.* § 510-17(2).

⁴⁶ *Id.* § 510-17(3).

⁴⁷ Available at:

<http://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/TechnicalAdvisoryBoard/2015/September%20Summary%20of%20Changes%20-%20Subchapter%20C%20Draft%20Final%20Regulation.pdf>.

3. Ohio

Unlike in Pennsylvania, Ohio’s primary oil and gas law (Ohio Revised Code Chapter 1509) explicitly provides the Ohio Department of Natural Resources (“ODNR”) with the authority to adopt regulations regarding noise mitigation with respect to (1) wells and production facilities in urbanized areas and (2) horizontal wells and associated production facilities.⁴⁸ ODNR promulgated a rule in 2005 with respect to urbanized areas providing that “[d]rilling, well servicing and well site maintenance operations in urbanized areas shall be conducted in a manner to mitigate noise, including the reasonable use of screening and appropriate mufflers on drilling and servicing equipment.”⁴⁹ “Urbanized areas” are defined to include any municipality with a population of more than 5,000 residents according to the most recent federal census.⁵⁰ ODNR has yet to promulgate noise control rules with respect to horizontal wells (the language in ORC 1509 authorizing the promulgation of noise control rules for horizontal wells was not added until 2012).⁵¹

Thus, under Ohio’s regime, the state requires all oil and gas operators with wells and production facilities in municipalities of more than 5,000 residents to mitigate noise, including the “reasonable use” of screening and “appropriate” mufflers. Ohio’s oil and gas law and regulations also establish minimum setback requirements (typically 100–200 feet) from occupied dwellings and property lines.⁵² Otherwise, noise control of oil and gas facilities is governed by the common law and local governments, to the extent not preempted by ORC Chapter 1509.⁵³

4. West Virginia

In December 2011, West Virginia enacted its Natural Gas Horizontal Well Control Act⁵⁴ in response to the recent proliferation of shale gas production activities in the state. Among its many new standards for horizontal wells, the Act established new well location restrictions requiring the center of all new horizontal well pads to be located at least 625 feet from any existing occupied dwelling.⁵⁵ To assess the adequacy of this setback restriction, the Act required

⁴⁸ ORC § 1509.03(A)(6).

⁴⁹ OAC § 1501:9-9-03(I) (emphasis added).

⁵⁰ ORC § 1509.01(Y); OAC § 1501:9-1-01(A)(51).

⁵¹ See Ohio S.B. 315 (June 11, 2012).

⁵² See ORC § 1509.021; OAC § 1501:9-1-05.

⁵³ See ORC § 1509.02; *State ex rel. Morrison v. Beck Energy Corp.*, Slip Op. No. 2015-Ohio-485, 2015 WL 687475 (Feb. 17, 2015) (holding that ORC § 1509.02 preempts five City of Monroe Falls ordinances regulating oil and gas operations).

⁵⁴ West Virginia H.B. 401, passed December 14, 2011, codified at W.Va. Code Ch. 22, Art. 6A.

⁵⁵ W.Va. Code § 22-6A-12(a).

the West Virginia Department of Environmental Protection (“WVDEP”) to report to the legislature “on the noise, light, dust, and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures[.]”⁵⁶

In response to this statutory mandate, WVDEP commissioned a study by the West Virginia University (“WVU”) School of Public Health on air, noise, and light emissions from the drilling of horizontal gas wells.⁵⁷ WVU conducted monitoring activities at seven well pads for at least six days each, obtaining one-minute and one-hour noise measurements around the well pads in various stages of development (site preparation, drilling, hydraulic fracturing, flowback, and completion). WVU’s monitoring results indicated that, while noise levels at monitored locations occasionally exceeded 85 dBA, they were below the EPA “Levels Document” guideline of 70 dBA averaged over a 24-hour period (the level necessary to prevent measurable hearing loss if experienced consistently over a lifetime).⁵⁸ However, WVU’s monitoring data also indicated that noise levels were frequently above 55 dBA, the EPA guideline for preventing outdoor activity from interfering with the ability to hear and causing annoyance.⁵⁹ The study ultimately concluded that the 625 foot setback from the center of the pad would not assure that residences would be unexposed to contaminants (including sound) from drilling site activity, but that there was no simple solution to specifying a single setback distance that would eliminate all potential exposures.⁶⁰ The final study report also identified several methods for potentially reducing noise levels, particularly with respect to truck traffic, borrowing from methods typically adopted during highway construction (such as sound barriers, vegetation, building insulation, site selection, and installation of sound meters).⁶¹

Based on the results of WVU’s study, WVDEP provided a report to the West Virginia Legislature on May 28, 2013.⁶² WVDEP’s report recounted the study’s key findings with respect to noise and indicated that WVDEP had shared the study’s recommended noise reduction practices with the regulated community.⁶³ The report indicated that WVDEP works with

⁵⁶ *Id.* § 22-6A-12(e).

⁵⁷ Air, Noise, and Light Monitoring Results For Assessing Environmental Impacts of Horizontal Gas Well Drilling Operations (ETD-10 Project), Prepared for WVDEP Division of Air Quality, Submitted by Michael McCawley, PhD, WVU School of Public Health (May 3, 2013).

⁵⁸ *Id.* at 2, 9, 18; EPA Condensed Levels Document at 17.

⁵⁹ *Id.* at 9–10, 18; EPA Condensed Levels Document at 24.

⁶⁰ *Id.* at 19.

⁶¹ *Id.* at 21.

⁶² WVDEP, Noise, Light, Dust, and Volatile Organic Compounds Generated by the Drilling of Horizontal Wells Related to the Well Location Restriction Regarding Occupied Dwelling Structures (May 28, 2013).

⁶³ *Id.* at 3.

individual operators and companies on a case-by-case basis to facilitate discussion and resolve citizen noise complaints, and that WVDEP inspectors would continue to work with operators to deploy sound mitigation measures, such as sound barriers, based on site specific circumstances.⁶⁴ WVDEP's report ultimately recommended that the legislature consider adopting a location restriction for occupied dwellings that relied on the limit of disturbance of the pad rather than its center point, and made no further recommendations with respect to noise controls.⁶⁵ Neither WVDEP nor the legislature has taken action to regulate noise from oil and gas operations as a result of the study.

5. Texas

Texas, like West Virginia, does not directly regulate noise from oil and gas operations through any statewide law or regulation. This is made clear on the Texas Railroad Commission's website, which explains: "The Railroad Commission of Texas has no statutory authority over noise or nuisance related issues. Noise and nuisance related issues are governed by local ordinances."⁶⁶ This continues to be the case even after the Texas legislature, on May 18, 2015, enacted H.B. 40, a bill intended to "expressly preempt the regulation of oil and gas operations by municipalities and other political subdivisions[.]"⁶⁷ While H.B. 40 imposes new limits on the authority of local governments to regulate oil and gas operations, it preserves municipal power to enact "commercially reasonable" ordinances governing "aboveground activity," including regulations controlling noise, light, traffic, and other quintessentially local concerns.⁶⁸

At the local level, the City of Fort Worth, Texas has adopted what some consider to be a model local ordinance concerning natural gas operations in urban areas.⁶⁹ This ordinance includes noise control provisions that apply specifically to natural gas wells and compressors.⁷⁰ In light of these natural gas-specific noise regulations, gas drilling and production operations are exempted from the City's broadly applicable noise ordinance.⁷¹

With regard to wells, the Fort Worth natural gas ordinance requires operators to submit a noise management plan, approved by the gas inspector, detailing how the equipment used in

⁶⁴ *Id.*

⁶⁵ *Id.* at 5.

⁶⁶ <http://www.rrc.state.tx.us/oil-gas/complaints/>.

⁶⁷ Texas H.B. 40, § 1 (May 18, 2015).

⁶⁸ *Id.* § 2; Tex. Nat. Res. Code § 81.0523(c).

⁶⁹ Fort Worth City Code, Chapter 15.

⁷⁰ *Id.* § 15-42(b), (d)(1).

⁷¹ *Id.* § 23-8(e)(7).

drilling, completion, transportation, and production of a well complies with specified maximum permissible noise levels.⁷² The plan must identify operation noise impacts, provide documentation establishing the ambient noise level prior to construction, and detail how impacts will be mitigated, considering (among other factors) the nature and proximity of adjacent developments, weather and wind patterns, vegetative cover, and topography.⁷³

The ordinance prohibits gas well operations that create noise, “measured at the protected use receiver’s/receptor’s property line or from the closest exterior point of the protected use structure or inside the protected use structure if access to the property is granted by the receiver/receptor,” that exceed the ambient noise level by more than:

- 5 decibels during daytime hours;
- 3 decibels during nighttime hours; and
- 10 decibels over the daytime average ambient noise level during fracturing operations (fracturing is prohibited during nighttime hours).⁷⁴

Upward adjustments of 10, 15, or 20 dBA to these noise standards “may be permitted intermittently” for short duration increases (e.g., a 10 dBA adjustment is permitted for a maximum of 5 cumulative minutes during any one hour).⁷⁵ Operators are also prohibited from creating pure tones and low frequency noises above specified levels.⁷⁶

Gas well operators must conduct and report the results of ambient noise monitoring over a 72-hour pre-drilling period to establish the background ambient noise level.⁷⁷ Then, once operations commence, operators must continuously monitor all gas wells within 600 feet of a protected use to ensure compliance with these standards.⁷⁸ The ordinance permits, but does not require, the use of acoustical blankets, sound walls, mufflers and other methods approved by the gas inspector to ensure compliance, and all soundproofing must comply with accepted industry standards and is subject to approval by the City’s fire department.⁷⁹ The City may issue citations for violations of the noise standards, but if a violation occurs while the operator is in compliance

⁷² *Id.* § 15-42(b)(1).

⁷³ *Id.*

⁷⁴ *Id.* § 15-42(b)(2)a.–b.

⁷⁵ *Id.* § 15-52(b)(4).

⁷⁶ *Id.* § 15-42(b)(2)d.–e.

⁷⁷ *Id.* § 15-42(b)(3).

⁷⁸ *Id.* § 15-42(b)(6).

⁷⁹ *Id.* § 15-42(b)(7).

with its approved noise management plan, the operator must first be given 24 hours to correct the violation.⁸⁰

With respect to compressors (both at the well site and along pipelines), the ordinance establishes the following maximum permitted sound levels, measured at the property line of the receiver/receptor:⁸¹

Industrial	75 dBA day / 65 dBA night
Commercial	65 dBA day / 55 dBA night
Residential	55 dBA day / 50 dBA night

The ordinance allows pipeline compressor operators to demonstrate that the current actual ambient noise level is above these levels.⁸² Certain allowances are also made for temporary lift compressors at well sites, while permanent lift compressors are required to comply with additional standards regarding the use of acoustical structures, such as a prohibition on the use of sound blankets.⁸³

Fort Worth's detailed oil and gas noise regulations have the benefit of establishing clear requirements for the regulated community. However, the rules also introduce potentially time-consuming and costly obligations, such as mandatory noise management plans and pre-and post-drilling ambient noise monitoring, which would be difficult to justify in less populated settings.

6. Colorado

Unlike the states discussed in the preceding paragraphs, Colorado has adopted detailed statewide oil and gas-specific noise control regulations. These noise abatement requirements appear at § 802 of the Colorado Oil and Gas Conservation Commission's ("COGCC") oil and gas rules.⁸⁴

COGCC's noise control regulations require oil and gas operations at any well site, production facility, or gas facility (defined to include all facilities that process or compress

⁸⁰ *Id.* § 15-42(b)(9).

⁸¹ *Id.* § 15-42(d)(1).

⁸² *Id.* § 15-42(d)(1)b.

⁸³ *Id.* § 15-42(d)(2)b.

⁸⁴ 2 CCR § 401-1:802 ("COGCC Rule 802")

natural gas prior to the point of transfer to a carrier for transportation)⁸⁵ to comply with the following maximum permissible noise levels:⁸⁶

ZONE	7:00 am to 7:00 pm	7:00 pm to 7:00 am
Residential/Agricultural/Rural	55 dBA	50 dBA
Commercial	60 dBA	55 dBA
Light industrial	70 dBA	65 dBA
Industrial	80 dBA	75 dBA

These noise levels may be increased 10 dBA for periods not to exceed 15 minutes in any one hour period during the daytime (7:00 am to 7:00 pm). The allowable noise level for “periodic, impulsive or shrill noises” is reduced by 5 dBA from the above levels.⁸⁷

Compliance with these noise standards is ordinarily determined through measurements taken 350 feet from the noise source. However, if an oil and gas facility is installed closer than 350 feet from an existing occupied structure, sound is measured at a point 25 feet from the structure towards to the noise source. If measurements at 350 feet would be impractical or unrepresentative due to topography, they may be taken at a lesser distance and extrapolated to 350 feet using a mathematical formula. A complainant may also request measurement at a further distance in order to obtain a more representative noise sample.⁸⁸ When low frequency noise may be an issue, the COGCC will take additional measurements 25 feet from the occupied structure towards the noise source and, if the reading exceeds 65 dBC, require the operator to obtain a low frequency impact analysis by a qualified sound expert.⁸⁹

Measurements are to be taken four feet above ground level, when wind is not more than 5 miles per hour.⁹⁰ Results are determined by averaging minute-by-minute measurements made over a minimum 15 minute sample duration (if practicable).⁹¹ Furthermore, “[i]n all sound level measurements, the existing ambient noise level from all other sources in the encompassing environment at the time and place of such sound level measurement shall be considered to determine the contribution to the sound level by the oil and gas operation(s).”⁹²

⁸⁵ COGCC Rule 100.

⁸⁶ COGCC Rule 802.b.

⁸⁷ *Id.*

⁸⁸ COGCC Rule 802.c.(1)

⁸⁹ COGCC Rule 802.d.

⁹⁰ COGCC Rule 802.c.(2)–(3).

⁹¹ COGCC Rule 802.c.(4).

⁹² COGCC Rule 802.c.(5).

The applicable land use designation is determined by COGCC in consultation with the local government, taking into account (but not definitively decided by) any local zoning designation.⁹³ However, the maximum noise level for industrial zones applies to all operations involving pipeline or gas facility installation or maintenance, the use of a drilling rig, completion rig, workover rig, or stimulation⁹⁴ (unless the operation is within certain designated setback locations, in which case the light industrial zone designation applies).⁹⁵ In remote locations where there is no “reasonably proximate” occupied structure or “Designated Outside Activity Area” (such as a playground or park),⁹⁶ “the light industrial standard may be applicable.”⁹⁷

Colorado’s rules do not dictate the use of any particular noise control practices, other than a requirement to equip non-electric engines and motors with quiet design mufflers “or equivalent” if within 400 feet of residential and commercial buildings.⁹⁸ Thus, the rules provide significant leeway to operators to decide how to achieve compliance with the applicable maximum noise level.

7. Alberta, Canada

The Canadian province of Alberta is often regarded as having one of the most comprehensive noise control regimes for the energy industry in North America. Alberta’s Directive 038, which is enforced by the Alberta Energy Regulator (“AER”), establishes noise controls for a variety of licensed energy generation activities, including operations involving oil and gas, coal, oil sands, fossil fuel fired electric generation plants and wind energy development.⁹⁹ The Directive is designed to address environmental noise, not health related impacts (such as noise-induced hearing loss), aiming to ensure that covered energy facilities do “not adversely affect indoor noise levels for residents near the facility.”¹⁰⁰

Directive 038 considers noise at the point of the receptor rather than at the property line, “allow[ing] a licensee to take maximum advantage of the normally substantial distance in rural areas between a facility and any dwellings.”¹⁰¹ The only exception is for facilities in remote

⁹³ COGCC Rule 802.b.

⁹⁴ COGCC Rule 802.b.(1).

⁹⁵ COGCC Rule 604.c.(2)A.

⁹⁶ COGCC Rule 100.

⁹⁷ COGCC Rule 802.b.(2).

⁹⁸ COGCC Rule 802.f.

⁹⁹ AER Directive 038: Noise Control, § 1.4 (Feb. 16, 2007).

¹⁰⁰ *Id.* §§ 1.1, 1.2.1.

¹⁰¹ *Id.* § 1.2.2.

areas where no receptor is present, in which case a permissible sound level of 40 dBA energy equivalent sound level (“Leq”)¹⁰² at nighttime must be met at 1.5 km.¹⁰³

For all other facilities, the permissible sound level is determined using a basic sound level (“BSL”) plus a series of potential adjustments.¹⁰⁴ The BSL (which applies during the night) ranges from 40 to 56 dBA Leq depending on the density of development in the area.¹⁰⁵ A +10 dBA Leq adjustment is made for daytime noises (from 7 a.m to 10 p.m).¹⁰⁶ “Class A” adjustments may be made based on the season (+5 dBA Leq during the winter) and the monitored ambient sound level in the area (ranging from -10 to +10 dBA Leq).¹⁰⁷ “Class B” adjustments may be made if the activity will only last for a short duration; the maximum Class B adjustment is +15 dBA Leq for an activity lasting only one day; the minimum is +5 dBA Leq for an activity lasting up to 60 days.¹⁰⁸ The Directive also recognizes that there will be some “special cases” where the permissible sound levels should be adjusted based on exceptional site-specific circumstances.¹⁰⁹

Before submitting an application for a new facility or modification to an existing facility, Directive 038 requires licensees to conduct a noise impact assessment (“NIA”) if there is a “reasonable expectation” of a continuous noise source or changes to existing noise sources.¹¹⁰ “Drilling and servicing rigs,” however, are considered to be only temporary activities that generally do not require an NIA.¹¹¹ For those oil and gas activities requiring an NIA, licensees must model the predicted sound level for the facility once put into operation.¹¹² The modeled cumulative noise level in the area (including the proposed facility) must not exceed the applicable permissible sound level.¹¹³

¹⁰² Energy equivalent sound level (Leq) “is the average weighted sound level over a specified period of time. It is a single-number representation of the cumulative acoustical energy measure over a time period interval.” *Id.* Appendix 1. The Leq concept is described in greater detail in Appendix 3 of Directive 038.

¹⁰³ *Id.* §§ 1.2.2, 2.1.

¹⁰⁴ *Id.* § 2.1.

¹⁰⁵ *Id.* § 2.1.1

¹⁰⁶ *Id.* § 2.1.2.1.

¹⁰⁷ *Id.* § 2.1.2.2.

¹⁰⁸ *Id.* § 2.1.2.3.

¹⁰⁹ *Id.* § 2.1.3.

¹¹⁰ *Id.* § 3.2.

¹¹¹ *Id.*

¹¹² *Id.* §§ 3.1, 3.5.

¹¹³ *Id.* § 3.4.

Directive 038 establishes a rigorous noise complaint investigation process to ensure that facilities are in compliance with permissible sound levels.¹¹⁴ Alternatively, if for some reason a compliance survey is not practical, a detailed “Noise Management Plan” approved by AER can be used to establish compliance.¹¹⁵

While noise from heavy truck traffic is not specifically addressed in the Directive, the Directive indicates that receipt of a complaint with regard to oil and gas-related truck traffic may require corrective action from the licensee on a site-specific basis.¹¹⁶ Oil and gas licensees are “expected to take every reasonable measure to avoid or minimize the noise impacts of heavy truck traffic and vibration.”¹¹⁷

Finally, the Alberta Directive “encourage[s],” but does not require, all licensees to adopt and incorporate a “best practices approach” to noise management.¹¹⁸ This stands in contrast to the regulations proposed by Pennsylvania in April 2015, which would have mandated operators to adopt and incorporate a best practices approach, without specifying what is included in such an approach.¹¹⁹ For its part, Directive 038 indicates that a best practices approach “may include such things as taking regular fence-line measurements to determine if there are any significant changes to sound emanating from the facility and improving notification measures to neighbours of a planned noisy event.”¹²⁰ Relatedly, the Directive also indicates that, during the noise impact assessment planning process, licensees should consider adopting “best practical technology (accounting for cost versus benefit) ... to minimize the potential noise impact to existing dwellings.”¹²¹

This brief evaluation only skims the technical aspects of determining permissible sound levels, modeling and monitoring noise levels, and investigating compliance under Directive 038. In this regard, Directive 038 is significantly more detailed than the state and local noise mitigation schemes discussed in the preceding sections of the paper. In the future, it would not be surprising if U.S. regulators considered and borrowed some of the concepts from Alberta Directive 038 for inclusion in their own regulatory programs.

¹¹⁴ *Id.* § 4; *see also id.* § 1.4.1.

¹¹⁵ *Id.* § 5.1; *see also id.* § 1.4.1.

¹¹⁶ *Id.* § 1.4.1

¹¹⁷ *Id.*

¹¹⁸ *Id.* § 1.2.4.

¹¹⁹ 25 Pa. Code § 78a.41(a)(3) (DRAFT Mar. 9, 2015).

¹²⁰ Directive 038, § 1.2.4.

¹²¹ *Id.* § 3.1.

F. CONCLUSION

Noise generation, management and mitigation is, and will remain, an ongoing challenge for the shale oil and gas sector. Development of shale plays bring oil and gas operators into the proximity of numerous communities across the nation which heretofore have had little to no contact with the industry. While many of the noise impacts of shale play surface operations are relatively temporary in nature, neighbors and communities who have been accustomed to the quietude of the rural landscape may be intolerant of even temporary intrusions. Regulatory responses to such noise issues continue to evolve, much as have evolved regulatory programs in on environmental topics. An important opportunity for the industry would be to move from a reactive to a proactive stance, formulating and advocating approaches that are flexible and adaptive to particular conditions, cost-effective and practical.