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Environmental Quality Board
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Via U.S. Mail and Electronic Mail (RegComments@pa.gov)

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INDEPENDENT REGULATORY
REVIEW COMMISSION

Re: Proposed Revisions to 25 Pa. Code Chapter 78 (Oil and Gas Wells)

Dear Environmental Quality Board:

The Environmental Integrity Project (EIP) hereby submits the following comments on the Environmental Quality Board's (EQB) proposed regulations to Chapter 78 of Title 25 of the Pennsylvania Code, relating to oil and natural gas wells. We appreciate the opportunity to provide these comments, which we submit on behalf of EIP and the following groups and Pennsylvania residents: Clean Air Council, Lower Susquehanna Riverkeeper, PennFuture, Responsible Drilling Alliance, SWPA Environmental Health Project, Robert M. Donnan, Cathy Lodge, Robert Schmetzer, and William and Angela Smith.

In submitting these comments, we first note the Pennsylvania Supreme Court's decision of December 19, 2013, which occurred after these proposed regulations were published.¹ The Pennsylvania Supreme Court's decision invalidated parts of Act 13, codified as the 2012 Oil and Gas Act, on which these proposed regulations are based in part.² Should it become necessary to further revise these regulations in compliance with the Court's ruling, the EQB is under a duty to provide opportunities for notice and comment on those revisions, and we hereby reserve the right to provide such comments.

The proposed revisions to Chapter 78 are a needed update to Pennsylvania's requirements for oil and gas development, and are particularly necessary in light of the industry's vast growth and expansion in Pennsylvania over the last decade. However, the proposed regulations also contain serious shortcomings that exempt practices too broadly, run counter to the overall goal of the rules, and ignore certain operations of the oil and gas industry.

¹ See *Robinson Twp. et al. v. Commonwealth*, 83 A.3d 901 (Pa. 2013); Marie Cusick, *Pennsylvania Supreme Court strikes down controversial portions of Act 13*, StateImpact Pennsylvania, Dec. 19, 2013, <http://stateimpact.npr.org/pennsylvania/2013/12/19/state-supreme-court-strikes-down-act-13-local-zoning-restrictions/>.

² See EQB, Notice of Proposed Rulemaking, Department of Environmental Protection, Environmental Quality Board , 25 Pa. Code Chapter 78 (Oil and Gas Wells) 2 (2013).

In these comments, we focus on two areas in particular: (1) the proposed regulations for abandoned wells, and (2) requirements for seismic testing, which the proposed regulations fail to include. First, for the requirements relating to abandoned wells, we raise three main concerns:

- The provisions for identifying abandoned wells only require operators to reference limited sources of information rather than conducting fuller or on-the-ground surveys;
- The requirements for plugging abandoned wells only apply after an operator “alters” the abandoned well, thereby failing to take needed preventive measures, and also without defining the term “alter,” which triggers the requirement; and
- The requirements only apply to wells that are hydraulically fractured, even though communication with abandoned wells is a problem that has long existed in Pennsylvania.

Second, we raise the issue that the proposed regulations include no requirements that apply to seismic testing. As it stands, blasting used for seismic testing is covered in part under the Pennsylvania Department of Environmental Protection’s (PA DEP) generic regulations for explosives, and PA DEP has no regulations or permitting for other types of seismic testing operations, such as vibroseis trucks. We provide several important elements that the EQB should include in the needed seismic testing regulations, drawn from other states’ regulations and municipal ordinances in Pennsylvania.

These are by no means our only concerns with the proposed regulations, and we endorse comments written by other groups and individuals addressing other needed improvements to the proposed regulations’ protections for Pennsylvanians and the environment. In particular, we hereby endorse the comments filed by the Clean Air Council and the comments filed by Earthjustice, Earthworks and, the Delaware Riverkeeper Network.

I. REQUIREMENTS FOR ABANDONED AND ORPHANED WELLS

The EQB’s proposed regulations with respect to identification and plugging of abandoned oil and natural gas wells add several important requirements that are needed to address the Commonwealth’s growing legacy of abandoned wells. Specifically, the proposed regulations require certain measures prior to the commencement of hydraulic fracturing, including identification of abandoned wells, the submittal of questionnaires to surrounding landowners regarding abandoned wells on their property, and the submittal of a plat of the identified abandoned wells to PA DEP.³ During and after hydraulic fracturing, the proposed regulations also require operators to monitor certain abandoned wells, notify PA DEP of any changes, take action to prevent water pollution, and in certain cases plug abandoned wells.⁴

³ EQB, Chapter 78 Proposed Regulations 15 (2013) [hereafter Proposed Regulations], available at <http://files.dep.state.pa.us/PublicParticipation/Public%20Participation%20Center/PubPartCenterPortalFiles/Environmental%20Quality%20Board/2013/August%2027%20EQB/Proposed%20Rulemaking%20-%20Ch%2078/Annex.pdf>.

⁴ *Id.* at 63.

While these proposed requirements are important steps toward addressing Pennsylvania's abandoned wells and represent improvements over the previous regulations, they need to go further in order to fully protect human health and safety, stay on par with other oil and gas states, and keep up with the growing industry.

A. Background

The issue of abandoned wells in Pennsylvania dates to 1859, with the drilling of the world's first commercial oil well.⁵ Since then, operators have drilled an estimated 325,000 oil and gas wells.⁶ The vast majority, however, were drilled prior to state permitting or registration requirements and are therefore unaccounted for.⁷ Most recently, PA DEP has estimated that there are approximately 300,000 abandoned wells in the Commonwealth.⁸ Under the Oil and Gas Act of 1984, Pennsylvania began to address the problem with the establishment of the Abandoned and Orphaned Well Plugging Program and the permit surcharges to fund the Program's search for and plugging of abandoned wells.⁹ But the Program's work has been slow-going, due to limited funding and a lack of records of older wells. In addition, the recent Marcellus shale and fracking boom has meant the development of many more wells, a greater potential for harmful interactions with abandoned wells, and more pressure to address the problem as soon as possible.

1. Human Health and Safety Issues

Unless identified and plugged, abandoned wells can lead to serious safety and human health issues when they "communicate"—that is, intersect or otherwise interact—with new oil

⁵ EQB, Summary: Proposed Regulations for Oil and Gas Surface Activities (2013), available at <http://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/PublicResources/RegulationSummary-PreCommentPeriod.pdf>.

⁶ PA DEP, *Fact Sheet: Abandoned and Orphaned Oil and Gas Wells and the Well Plugging Program I*(2012) [hereafter *Abandoned Well Program Fact Sheet*], available at <http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-91715/8000-FS-DEP1670.pdf>; Scott Detrow, *Perilous Pathways: Behind the Staggering Number of Abandoned Wells in Pennsylvania*, StateImpact Pennsylvania, Oct. 10, 2012 [hereafter *Perilous Pathways: Part 2*], <http://stateimpact.npr.org/pennsylvania/2012/10/10/perilous-pathways-behind-the-staggering-number-of-abandoned-wells-in-pennsylvania/>.

⁷ *Id.*

⁸ PA DEP, Regulatory Analysis Form: Environmental Protection Performance Standards at Oil & Gas Sites 4 (2013) [hereafter *Regulatory Analysis Form*].

⁹ *Perilous Pathways: Part 2*, *supra*; *Abandoned Well Program Fact Sheet*, *supra*, at 1.

and gas development.¹⁰ Additionally, leaks and explosions have occurred even without the involvement of new development activity.¹¹

For example, in 2012, communication between new development by Shell and an eighty-year-old abandoned well led to a thirty-foot “geyser” of water and gas.¹² In that instance, Shell began to drill a new Marcellus well that apparently “displaced shallow pockets of natural gas,” leading to a “chain reaction” in which the gas migrated until it found a conduit to the surface—through a nearby abandoned well drilled in 1932.¹³ The resulting geyser continued for a week. In addition, a cabin flooded, gas bubbled out of a nearby creek, and homes in the vicinity were evacuated due to the threat of explosion.¹⁴ Although Shell knew of the abandoned well, it assumed it had been properly plugged and continued with its own drilling.¹⁵ In the aftermath, Shell had to burn off “months’ worth” of gas at its other nearby well sites in order to reduce pressure enough to allow for plugging of the abandoned well.¹⁶

Another example of this problem occurred in Armstrong County in 2008. A vertical gas rig “hit a pocket of gas linked to an undocumented abandoned well,” displacing and mobilizing the gas and leading to the evacuation of an elementary school and several houses.¹⁷ Ultimately, the situation required “operators to vent off nearby wells in order to lower underground gas pressure” and the installation of vents on homes to prevent the dangerous accumulation of methane.¹⁸ Likewise, in 2010 and 2011, two homes in McKean County exploded, leading PA DEP to require the plugging of three abandoned wells dating from the turn of the century.¹⁹

¹⁰ Scott Detrow, *Perilous Pathways: How Drilling Near an Abandoned Well Produced a Methane Geyser*, StateImpact Pennsylvania, Oct. 9, 2012 [hereafter *Perilous Pathways: Part 1*], <http://stateimpact.npr.org/pennsylvania/2012/10/09/perilous-pathways-how-drilling-near-an-abandoned-well-produced-a-methane-geyser/>.

¹¹ *Id.*; see also *Gas Wells Cause For Concern In Versailles Boro*, WPXI, May 29, 2008, <http://www.wpxi.com/news/news/gas-wells-cause-for-concern-in-versailles-boro/nGgFf/>.

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.*

¹⁵ Scott Detrow, *Perilous Pathways: Abandoned Wells Don't Factor into Pennsylvania's Permitting Process*, StateImpact Pennsylvania, Oct. 12, 2012, <http://stateimpact.npr.org/pennsylvania/2012/10/12/perilous-pathways-abandoned-wells-dont-factor-into-pennsylvanias-permitting-process/>.

¹⁶ *Id.*

¹⁷ *Perilous Pathways: Part 1*, *supra*; Mitch Fryer, *Gas leak forces evacuation in Dayton*, Kittanning Leader-Times, March 11, 2008, available at http://triblive.com/x/leadertimes/news/s_556633.html#axzz2j3CD1wwH.

¹⁸ *Perilous Pathways: Part 1*, *supra*.

¹⁹ Scott Detrow, *Perilous Pathways: Hunting for Hidden Wells*, StateImpact Pennsylvania, Oct. 11, 2012 [hereafter *Perilous Pathways: Part 3*], <http://stateimpact.npr.org/pennsylvania/2012/10/11/perilous-pathways-hunting-for-hidden-wells/>; Press Release, PA DEP, *DEP Orders McKean County Resident to Plug Three Abandoned Wells near Recent House Explosion Site*, April 18, 2011, available at <http://www.prnewswire.com/news-releases/dep-orders-mckean-county-resident-to-plug-three-wells-near-house-explosion-site-150000000.html>.

2. Air Pollution

In addition to these issues for safety and human health, abandoned wells also cause substantial environmental impacts. One of the most apparent of these is air pollution. Left unplugged, a well will continue to emit whatever gases were previously locked in formations underground. There is no single perfect estimate of emissions from abandoned wells, simply because oil and gas formations from different regions have different production rates and lifespans and the abandoned wells may be in varying conditions, ranging from modern wellheads with functioning equipment to open holes in the ground.²⁰ In Pennsylvania, where oil and gas production has spanned over 150 years, this is especially relevant.

Although there is not yet a definitive study of exactly how much gas will leak from an average abandoned well, we have been able to use existing emissions data in two ways to make some estimates. First, assuming an abandoned wellhead has some basic equipment in place, we can use datasets that estimate leaks from various points in the natural gas extraction process. Second, assuming an abandoned wellhead has no control equipment on site—i.e., “open holes in the ground”—we can refer to datasets that look specifically at production rates from low-producing wells, known as “marginal” or “stripper” wells.²¹ That is, without control equipment in place, a well’s production rate would be equal to its emissions rate. Both approaches give a wide range of potential emissions.

First, for abandoned wells with some equipment in place, the most conservative emissions factor, from EPA’s most recent greenhouse gas inventory,²² estimates that an abandoned wellhead will annually emit 114 pounds of methane, 31.8 pounds of volatile organic compounds, and 1.2 pounds of hazardous air pollutants, such as benzene and toluene.²³ The least conservative estimate, from a recently released study by the University of Texas, estimates that an abandoned wellhead will annually emit 1.774 tons of methane, 0.4931 tons of volatile organic compounds, and 37.2 pounds of hazardous air pollutants.²⁴

abandoned-wells-near-recent-house-explosion-site-119498684.html; *see also Sen. Bob Casey wants feds to help investigate Pennsylvania house explosions*, Associated Press, March 29, 2011, http://www.pennlive.com/midstate/index.ssf/2011/03/sen_bob_casey_wants_feds_to_he.html.

²⁰ See *Perilous Pathways: Part 2*.

²¹ See Don Hopey, *Decades-old oil and gas wells dot the state, sometimes causing controversy*, Pittsburgh Post-Gazette, June 14, 2009, available at <http://www.post-gazette.com/neighborhoods-south/2009/06/14/Decades-old-oil-and-gas-wells-dot-the-state-sometimes-causing-controversy/stories/200906140148>.

²² EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011* (2013).

²³ *Id.* To reach the figures for VOC and HAP emissions from the estimated methane emissions, we applied EPA’s estimate that the gas stream in “production” phases (i.e., during production and processing) will have a ratio of 0.278 VOC:Methane and 0.0105:1 HAP:Methane. See Memorandum from Heather P. Brown, P.E., EC/R Incorporated, to Bruce Moore, EPA, *Re: Composition of Natural Gas for use in the Oil and Natural Gas Sector Rulemaking* 10 Tbl. 6 (July 28, 2011) (on file with EIP).

²⁴ See David T. Allen et al., *Measurement of methane emissions at natural gas production sites in the United States*, 110 Proc. Nat'l Acad. of Sciences 17,768 (2013).

Second, for abandoned wells with no equipment in place, the estimates come from two datasets of production rates for low-producing wells: PA DEP's 2011 production data for conventional (non-Marcellus) wells and a 2010 study by the Interstate Oil and Gas Compact Commission (IOGCC) of state-by-state production from marginal wells in 2009.²⁵ The most conservative emissions factor—using the first quantile production rate of the PA DEP 2011 production data—estimated that an abandoned wellhead with no equipment would annually 10.1 tons of methane, 2.8 tons of volatile organic compounds, and 0.11 tons of hazardous air pollutants.²⁶ The least conservative factor—the IOGCC Marginal Wells Report's estimate of the average marginal well in Pennsylvania—estimated that an abandoned wellhead with no equipment would annually 375.4 tons of methane, 104.3 tons of volatile organic compounds, and 3.9 tons of hazardous air pollutants.²⁷

Although the ranges of emissions are wide, they provide an examination of wholly different potential scenarios—as well as a demonstration of how little we know for sure about emissions from abandoned wells and how bad the problem could be. Overall, these figures show that the air pollution from Pennsylvania's abandoned wells is a significant environmental and human health issue that must be taken seriously.

B. The EQB's Proposed Regulations for Abandoned Wells Contain Shortcomings and Exemptions that Require Revision

The proposed revisions to the Chapter 78 regulations take steps in the right direction. As discussed above, the revisions would add several requirements, including that an operator identify any abandoned wells within 1,000 feet of the new well bore prior to hydraulic fracturing, report the location of those wells to PA DEP, visually monitor any such abandoned wells during hydraulic fracturing activities, and plug any abandoned wells that the hydraulic fracturing activities alter.²⁸ But the proposed revisions fall short in several important ways.

1. The Proposed Regulations Should Include More Stringent Requirements for Identifying Abandoned Wells

First, 25 Pa. Code § 78.52a of the proposed regulations provides requirements for the identification of abandoned wells prior to the commencement of hydraulic fracturing.²⁹ However, under these new requirements, an operator need not physically survey the surrounding

²⁵ See PA DEP, Production Report Jan. - Dec. 2011: Annual O&G, without Marcellus [hereafter PA DEP 2011 Production Report],

https://www.paoilandgasreporting.state.pa.us/publicreports/Modules/DataExports/ExportProduct ionData.aspx?PERIOD_ID=2011-0 (last visited March 13, 2014); IOGCC, *Marginal Wells: Fuel for Economic Growth* (2010), available at

<http://iogcc.publishpath.com/Websites/iogcc/images/2010marginalwell.pdf>.

²⁶ See PA DEP 2011 Production Report, *supra*.

²⁷ See IOGCC, *Marginal Wells: Fuel for Economic Growth*, *supra*.

²⁸ Proposed Regulations, *supra*, at 15, 63.

²⁹ Proposed Regulations, *supra*, at 15.

land for the abandoned wells. Rather, the proposed regulations only require that the operator conduct the survey by:

- (1) A review of the Department's orphaned and abandoned well database;
- (2) A review of applicable farm line maps, where accessible; and
- (3) Submitting a questionnaire on forms provided by the Department to landowners . . .
regarding the precise location of orphaned and abandoned wells on their property.³⁰

By limiting the identification requirements to just these “paper” surveys, the proposed regulations do not go far enough and inevitably will result in abandoned wells being missed. For example, by PA DEP’s own admission, its orphaned and abandoned well database covers only a small fraction of abandoned wells—less than 9,000 wells, compared to the 300,000 estimated to exist statewide—and plat maps are often inaccurate.³¹

In fact, even PA DEP takes a more comprehensive approach when conducting its own searches for abandoned wells: for example, using databases of aerial photographs.³² And other states’ regulations do not let applicants off the hook by limiting the identification requirements to certain sources of data, like the proposed regulations. For example, Colorado, North Dakota, Ohio, and West Virginia all require the applicant to submit a plat that shows all wells within a certain area, including abandoned wells, with no limitations to the sources of data from which the applicant draws.³³

Specifically, Colorado requires a “plat showing the area involved, together with the well or wells, including drilling wells, dry and abandoned wells located thereon, all properly designated.”³⁴ North Dakota requires a “plat depicting the area of review, (one-quarter-mile [402.34-meter] radius) and detailing the location, well name, and operator of all wells in the area of review. The plat should include all injection wells, producing wells, plugged wells, abandoned wells, drilling wells, dry holes, and water wells.”³⁵ Ohio requires “a map or maps showing and containing the following information: . . . [t]he geographic location of all wells penetrating the formation proposed for injection, regardless of status, within the area of review.”³⁶ And West Virginia requires “[a]ll wells within the scope of the plat, whether active, drilling, or abandoned.”³⁷ In each case, the state regulations do not provide the minimum sources the applicant must consult; it is simply the applicant’s duty that the plat be accurate.

³⁰ *Id.*

³¹ See *Perilous Pathways: Part 2, supra*; *Perilous Pathways: Part 3, supra*; Regulatory Analysis Form, *supra*, at 4.

³² *Perilous Pathways: Part 3, supra*.

³³ See 2 Colo. Code Regs. § 404-401(b)(1); N.D. Admin. Code 43-02-05-04(1)(i); Ohio Admin. Code 1501:9-5-05(D); W. Va. Code R. § 35-4-9.2.j.

³⁴ 2 Colo. Code Regs. § 404-401(b)(1).

³⁵ N.D. Admin. Code 43-02-05-04(1)(i).

³⁶ Ohio Admin. Code 1501:9-5-05(D).

³⁷ W. Va. Code R. § 35-4-9.2.j.

Given the vastness of the problem, the EQB should require drillers to conduct physical, on-the-ground surveys for abandoned wells prior to hydraulic fracturing and/or otherwise require that the applicant gather full and accurate information without limits on sources. Not only would this better ensure safety and protect against pollution, but it would accomplish two additional goals: (1) protecting the investments of the new wells' owners and operators, since communication with abandoned wells often requires expensive remediation and flaring of marketable gas; and (2) bolstering PA DEP's underfunded Abandoned and Orphaned Well Plugging Program with needed manpower and information.

2. The Proposed Regulations Should Require Operators to Plug Abandoned Wells, and Not Just Those That the Operator "Alters"

Second, 25 Pa. Code § 78.73(d) of the proposed regulations require new operators to plug nearby orphaned and abandoned wells, but only if the operator "alters an orphaned or abandoned well by hydraulic fracturing."³⁸ Otherwise, the proposed regulations provide no plugging requirement. This is a shortcoming for several reasons.

For one, and most significantly, the requirement is not preventive; rather, it waits until after a problem occurs before requiring a solution. This is more or less the same dysfunctional system that exists in Pennsylvania today. As discussed above, recent history has shown that plugging abandoned wells after communication occurs is not a safe or effective solution. Before the affected abandoned well can be plugged, gas must be flared or vented from nearby active wells to reduce pressure, sometimes for days or longer. And during that time, the incident may cause water and air pollution, contaminate groundwater supplies, fill buildings with explosive and poisonous gases, and require evacuations of nearby residents.

Indeed, an independent review by the "non-profit, multi-stakeholder organization" State Review of Oil and Natural Gas Environmental Regulations, Inc. (STRONGER) found this gap to be an issue, particularly as it related to groundwater contamination.³⁹ STRONGER urged that Pennsylvania "require operators to identify and eliminate the potential pathways" prior to fracking.⁴⁰ Similarly, Colorado's oil and gas regulations require that the applicant "include information regarding the need for remedial action on wells penetrating the injection zone within one-quarter (1/4) mile of each injection well and a plan for the performance of any such remedial work."⁴¹ The EQB should amend the proposed regulations to include such preventive measures.

In addition to this broader issue, the plugging requirement is premised on a term—"alters"—that the proposed regulations do not define.⁴² Given that this term is the trigger for the

³⁸ Proposed Regulations, *supra*, at 63.

³⁹ STRONGER, *Pennsylvania Hydraulic Fracturing State Review* 16 (2010), <http://67.20.79.30/sites/all/themes/stronger02/downloads/PA%20HF%20Review%20Print%20Version.pdf>.

⁴⁰ *Id.*

⁴¹ 2 Colo. Code Regs. § 404-401(b)(1).

⁴² Proposed Regulations, *supra*, at 15, 63.

important plugging requirement, the EQB should ensure that the term is clearly defined. Without such a clear definition, even the best oil and gas operators may be unsure of their responsibilities, and more delinquent operators may use the ambiguity to avoid full compliance. While the far superior course is for the EQB to require plugging of all nearby abandoned wells prior to fracking, in the event that the EQB retains the current provision, it must include a clear definition of the triggering event.

3. The Proposed Regulations' Abandoned Well Requirements Should Apply to All New Wells, Not Just Those That are Hydraulically Fractured

Third, the proposed regulations under 25 Pa. Code § 78.52a and 25 Pa. Code § 78.73(c)-(d) only apply to operators of wells that use hydraulic fracturing.⁴³ While wells completed with hydraulic fracturing do have a higher chance of communicating with abandoned wells, history has shown that even non-hydraulically fractured wells can cause problems.⁴⁴ And the costs of the abandoned well requirements are fairly low; the EQB has estimated that identification and monitoring of abandoned wells will cost a well operator \$2,000 total.⁴⁵ Compared to other costs estimated by the EQB, such as \$7,000 to \$50,000 for freshwater impoundment fencing, \$3,500 for determining the seasonal high groundwater table, and \$7,000 for installing tank valves and access lids, the identification and monitoring cost is on the low end.⁴⁶ And it is a particularly reasonable cost when compared against the long and intensive remediation measures needed when an abandoned well is not properly identified or monitored.

In the alternative, if the EQB's proposed exemption of non-hydraulically fractured wells from these requirements is an attempt to lower regulatory and cost burdens on smaller operators, this can easily be done by imposing reduced requirements. For example, the proposed regulations already require less of an identification and monitoring distance for vertical wells (within 500 feet of the well bore) than for horizontal wells (within 1,000 feet of the entire length of the horizontal well bore).⁴⁷ A smaller identification and monitoring distance could easily be required for non-hydraulically fractured wells.

Overall, the EQB's proposed regulations for abandoned wells represent a first step in the right direction. Pennsylvania has a long and continuing legacy of abandoned wells, and it will not be solved overnight. With the addition of regulations such as these and the necessary corrections to their gaps discussed above, the EQB can make substantial progress to ending this legacy, ensuring the health and safety of Pennsylvanians, and protecting their air and water.

⁴³ *Id.* at 15.

⁴⁴ See PA DEP, Stray Gas Migration Cases (2009), available at http://www.dep.state.pa.us/dep/subject/advcoun/oil_gas/2009/Stray%20Gas%20Migration%20Cases.doc.

⁴⁵ See Regulatory Analysis Form, *supra*, at 14.

⁴⁶ *Id.* at 15.

⁴⁷ Proposed Regulations, *supra*, at 15.

II. REQUIREMENTS FOR SEISMIC TESTING OPERATIONS FOR OIL AND GAS

PA DEP currently has specific permitting requirements and regulations for an operator to develop oil and gas deposits, including for well drilling, erosion and sedimentation, and excavation in a wetland, stream, or other waterbody. Yet there are no specific requirements for seismic testing of these same gas and oil deposits, despite the potential threats that such exploration poses to safety, infrastructure, and natural resources of the Commonwealth. Instead, PA DEP permits seismic exploration of shale gas and oil under its generic and outdated blasting regulations and with no apparent regulations to address the use of other equipment, such as vibroseis—or “thumper”—trucks.

The proposed revisions to Chapter 78 are an ideal opportunity for the EQB to remedy this situation and finally promulgate specific regulations for seismic blasting, vibroseis trucks, and other seismic testing practices. Without regulatory action, the EQB has left the burden to act on the townships and municipalities that are facing seismic testing companies for the first time. And where these local governments have made attempts to set reasonable ordinances, the seismic companies have sued to overturn the ordinances and otherwise have taken advantage of the resulting confusion. The EQB needs to step in and set the baseline.

A. Background

Oil and gas exploration companies use explosive charges and vibroseis trucks to locate, survey, and map deposits. Each mapping project typically spans several counties and uses tens of thousands of explosive shots, each containing three to five pounds of explosive, and each placed in holes thirty feet deep or more.⁴⁸ The vibrations travel from the shot point or truck through the ground, reflect off the strata, and return to be measured by geophones on the surface. The geophones record the “seismic echo,” and create maps of the physical qualities of the underlying formation.⁴⁹

When using explosives is not possible—due to location, geography, or landowner permission—or in conjunction with explosives, companies use vibroseis trucks positioned on roadways. The trucks use a large plate positioned on the ground to send a vibration into the formations below, which then reflects back upward and delivers mapping information.⁵⁰ The

⁴⁸ See, e.g., Rachel Morgan, *The ins, outs and reverberations of seismic testing*, Shale Reporter, March 7, 2013, http://www.shalereporter.com/industry/article_fa61c9de-8730-11e2-88f3-0019bb30f31a.html.

⁴⁹ James D. Decker, *Selected Technical and Legal Issues Arising From Seismic Exploration*, 8th Annual Advanced Oil, Gas and Mineral Law Course C-1; Howard R. Williams & Charles J. Meyers, *Manual of Oil and Gas Terms* 457-458 (10th ed. 1997).

⁵⁰ Rachel Morgan, *Seismic testing company sues W.Pa. towns*, Shale Reporter, Aug. 20, 2013, http://www.shalereporter.com/industry/article_d8a08e6a-0995-11e3-98fb-001a4bcff6878.html; Rachel Morgan, *The ins, outs and reverberations of seismic testing*, *supra*; Timothy Puko, *Movers, shakers of shale: Seismic testing adapts to Western Pa.*, Pittsburgh Tribune-Review, Nov. 23, 2013, available at <http://triblive.com/business/headlines/5063407-74/seismic-gas-testing#axzz2vgwlZv6yvir>.

companies either conduct these surveys on behalf of oil and gas production companies or sell this information to such companies, who then use the maps and information to determine location for oil and gas development.⁵¹

Despite modern advances in seismic testing, Pennsylvania's regulations and permits have not kept pace. Current state regulations governing the use of explosives are not specific to seismic testing for oil and gas and fail to account for the environmental consequences of repeated testing on unstable lands or older infrastructure.

Specifically, PA DEP currently regulates seismic blasting under the Chapter 211 of Title 25, which governs the storage, handling, and use of explosives.⁵² By design, the Chapter 211 regulations are meant to apply generally, and do not have specific provisions for blasting that is conducted for oil and gas seismic testing or any provisions for the use of vibroseis trucks. In fact, the regulatory and permitting authority under Chapter 211 is PA DEP's Bureau of Mining and Reclamation, not the Office of Oil and Gas Management. PA DEP recently confirmed that currently there is no PA DEP permit required for seismic testing using vibroseis trucks.⁵³

For this reason, a number of townships have attempted to fill this regulatory gap by adopting their own ordinances to regulate and permit seismic testing within their boundaries.⁵⁴ As discussed below, these ordinances contain substantive requirements for permitting of seismic operations, location and minimum setbacks, notice to surrounding landowners, and surety bonds.⁵⁵ And PA DEP has seemingly been comfortable with this regulatory landscape, given that it has not opted to include any updated seismic testing requirements—particularly for vibroseis trucks—in its revisions and has advised in the meantime that operators “may be subject to local municipal ordinances.”⁵⁶

While this might have been a workable arrangement for those municipalities that have seismic testing ordinances in place, the seismic operators have hit back hard with a series of lawsuits to enjoin and prevent the enactment of such ordinances. For example, in August 2013, a seismic operator sued Hopewell and Potter Townships to block their ordinances that regulated seismic testing on local roads.⁵⁷ The court granted the order in September 2013 and followed up in January of this year with an order preventing Hopewell from communicating with or giving

⁵¹ Timothy Puko, *Movers, shakers of shale: Seismic testing adapts to Western Pa.*, *supra*.

⁵² See 25 Pa. Code § 211.102(a).

⁵³ Rachel Morgan, *Court order blocks Pa. town from interfering in seismic testing*, Shale Reporter, Feb. 12, 2014, http://www.shalereporter.com/government/article_76cc2208-93f6-11e3-ba6e-0017a43b2370.html.

⁵⁴ See, e.g., Robinson Twp., Pa., Ordinance No. 63-10 (2010) [hereafter Robinson Twp. Seismic Ordinance].

⁵⁵ See Part II.C, *infra*.

⁵⁶ Rachel Morgan, *Court order blocks Pa. town from interfering in seismic testing*, *supra*.

⁵⁷ *Id.*

instructions to residents regarding the seismic testing.⁵⁸ Hopewell has appealed the latter order to the Pennsylvania Supreme Court.⁵⁹

In additional cases, the same seismic testing company sued three other municipalities that had rescinded or never properly adopted seismic testing ordinances and won a preliminary order prohibiting them “from enforcing and applying seismic regulations either by resolution or agreement to petitioner’s survey operations and from arbitrarily and unreasonably prohibiting petitioner’s use of the municipality’s respective roads.”⁶⁰ And just this week, those three municipalities won a procedural victory when the Pennsylvania Commonwealth Court found it did not have jurisdiction over the municipalities’ actions.⁶¹

Week by week and locality by locality, the regulation of seismic testing in Pennsylvania is in flux, and operators are taking advantage of this confusion to complete their testing as quickly and with as few controls as possible. It is vital that the EQB step in and provide clear, baseline regulation in order that the rules and permits governing seismic testing are straightforward statewide.

B. Issues for Safety, Human Health, and the Environment

Seismic testing via blasting and vibroseis trucks can have major safety issues and cause damages to buildings, infrastructure, and drinking water wells. For example, there are a number of recorded instances in Pennsylvania and other oil and gas states in which landowners have discovered cracks in walls and foundations of their residences in the aftermath of seismic testing operations.⁶² Just last month, a resident of Hopewell Township discovered cracks in the wall and

⁵⁸ *Id.*

⁵⁹ Hopewell Township, Commonwealth Court Order RE: Seitel Data, Ltd. v. Hopewell Township, Feb. 10, 2014, <http://www.hopewelltwp.com/news/view-commonwealth-court-order-re-seitel-data-ltd-v-hopewell-township/> (last visited March 14, 2014); Kelly Knaub, *Pa. Town In High Court Fight To Warn Locals Of Seismic Test*, Law360, March 10, 2014, <http://www.law360.com/energy/articles/516755/pa-town-in-high-court-fight-to-warn-locals-of-seismic-test>

⁶⁰ Rachel Morgan, *Court order blocks Pa. town from interfering in seismic testing*, *supra*.

⁶¹ Zack Needles, *Act 13 Narrows Commonwealth Ct. Jurisdiction*, The Legal Intelligencer, March 13, 2014, <http://www.thelegalintelligencer.com/home/id=1202646613687/Act%202013%20Narrows%20Commonwealth%20Ct%20Jurisdiction?mcode=1202615324169&curindex=0&slreturn=20140213091000>

⁶² See Rachel Morgan, *Pa. resident says seismic testing damaged his home*, Shale Reporter, Feb. 14, 2014, http://www.shalereporter.com/industry/article_7e54f0d6-9586-11e3-be9b-0017a43b2370.html; David Singer, *Seismic Testing for Marcellus Shale Drilling Worries Residents*, Canon-McMillan Patch, May 9, 2012, <http://canon-mcmillan.patch.com/groups/politics-and-elections/p/seismic-testing-for-marcellus-shale-drilling-worries-residents>; Bruce Finley, *Seismic surveying rattles Colorado homeowners*, Denver Post, March 16, 2013, available at http://www.denverpost.com/ci_22803371/seismic-surveying-rattles-colorado-homeowners.

floor of his home and garage, as well as leaks from a broken water line, after a seismic operator conducted vibroseis testing on a road forty feet from his residence.⁶³

Damage to public infrastructure such as roads, water lines, and sewer lines is also a serious issue, particularly given that many of Pennsylvania's municipalities rely on historic and aging infrastructure that was not designed to withstand blasting or vibroseis.⁶⁴ For example, sewer infrastructure in an Ohio courthouse ruptured, flooding a document storage room with sewage, after five vibroseis trucks conducted testing activity on the adjacent street.⁶⁵ And in October 2013, two municipal water authorities in Pennsylvania sued to prevent local seismic testing operations on the basis that the testing could damage water infrastructure beneath certain roads.⁶⁶

Seismic testing may also damage or destroy private drinking water wells. This is a serious issue for Pennsylvania, as over three million Pennsylvanians rely on well water in rural areas, including many of the areas that have been selected for seismic testing.⁶⁷ For example, in Colorado, which also has extensive seismic operations, landowners found that their sixty-foot-deep water well collapsed in the aftermath of seismic testing and stopped giving water.⁶⁸

Other safety issues have arisen with the intersection of seismic testing and certain high-hazard areas. For example, in 2013, residents of LaBelle, Pennsylvania, discovered that a seismic testing company had illegally set over one hundred explosive charges at a mine reclamation and coal ash disposal site adjacent to the town.⁶⁹ PA DEP and the Mine Safety and Health Administration ordered the operator to remove the explosives, but the operator appealed the order, claiming that its PA DEP blasting permit had not specifically prohibited testing in the high-hazard area.⁷⁰

⁶³ See Rachel Morgan, *Pa. resident says seismic testing damaged his home*, *supra*.

⁶⁴ See Rachel Morgan, *The ins, outs and reverberations of seismic testing*, *supra*.

⁶⁵ See Sam Shawver, *Vibrations blamed for court sewer leak*, Marietta (Ohio) Times, July 12, 2012, available at <https://www.mariettatimes.com/page/content.detail/id/545346/Vibrations-blamed-for-court-sewe---.html>.

⁶⁶ Rachel Morgan, *Court order blocks Pa. town from interfering in seismic testing*, *supra*.

⁶⁷ See Bryan R. Swistock et al., *Water quality and management of private drinking water wells in Pennsylvania*, 75 J. Envtl. Health 60 (2013); see also Elizabeth W. Boyer, Ph.D. et al., Ctr. for Rural Pa., *The Impact of Marcellus Gas Drilling on Rural Drinking Water Supplies* 5 (2011) (on file with EIP).

⁶⁸ See Bruce Finley, *Seismic surveying rattles Colorado homeowners*, *supra*.

⁶⁹ See Don Hopey, *Firm appeals restraint on seismic testing in Pittsburgh region*, Pittsburgh Post-Gazette, June 4, 2013, available at <http://www.post-gazette.com/local/marcellusshale/2013/06/04/Firm-appeals-restraint-on-seismic-testing-in-Pittsburgh-region/stories/201306040142>.

⁷⁰ *Id.*

In addition to these significant issues for health and safety, seismic testing can also result in a variety of environmental impacts.⁷¹ The major environmental risks associated with seismic exploration stem from the physical process of seismic testing itself, which includes vibrations from explosions, dust, degradation of water supplies, landslides, and sinkholes.⁷² Physical blasts can release rocks and debris, causing damage to nearby land, people, or property.⁷³ The blasts may also release gases trapped in the type of rock commonly found in Pennsylvania or in the more than 3,800 abandoned mines throughout the state.⁷⁴

In 1997, the Pennsylvania Office of Mineral Resource Management (OMRM) released a Public Advisory warning residents about the health threats of carbon monoxide, released during seismic exploration.⁷⁵ While the surveying companies denied causation, the OMRM advised that the blast had forced the gas outwards through utility lines and existing fractures in the rock and into homes.⁷⁶

In addition, the unique issues stemming from Pennsylvania's geographic instability make the state particularly vulnerable to repeated explosions. The sheer number of explosions—tens of thousands per seismic testing project—may affect structurally vulnerable areas near abandoned or active coal mines or quarries, causing landslides or sinkholes. Landslides and sinkholes are common in Pennsylvania because of the ubiquity of shale, limestone, and dolomite, the proliferation of surface mining, and the number of heavily excavated underground mines.⁷⁷ Repeated vibrations from blasting affect plant growth, cause soil compaction and surface erosion, and disturb soil layers, ultimately creating instability and resulting in these geological hazards.⁷⁸

⁷¹ Yousif K. Kharaka et al., *The energy-water nexus: potential groundwater-quality degradation associated with production of shale gas*, 7 Procedia Earth & Planetary Sci. 420 (2013).

⁷² PA DEP, Bureau of District Mining Operations, http://www.portal.state.pa.us/portal/server.pt/community/bureau_of_district_mining_operations/20764 (last visited March 14, 2014).

⁷³ Nancy Saint-Paul, 1 *Summers Oil and Gas* § 45:3 (3d ed. 2012).

⁷⁴ Jeff Skousen, W. Va. Univ., *Remining In Pennsylvania and West Virginia Costs and Water Quality Changes*, Green Lands, Summer 1997, available at <http://www.wvu.edu/~agexten/landrec/remining.htm>; see also E. Pa. Coal. for Abandoned Mine Reclamation, Abandoned Mine Land Program Fact Sheet, http://epcamr.org/storage/Abandoned_Mine_Land_Pgm_Fact_Sheet.pdf.

⁷⁵ PA DEP, Office of Mineral Res. Mgmt., Public Advisory: Carbon Monoxide Poisoning from Blasting Activities, Office of Mineral Resource Management (1997), available at http://www.portal.state.pa.us/portal/server.pt/community/blasting_and_explosives/20881/public_advisory/1150248.

⁷⁶ *Id.*

⁷⁷ Pa. Dep't of Conservation and Natural Res., Geologic Hazards in Pennsylvania, <http://www.dcnr.state.pa.us/topogeo/hazards/index.htm> (last visited March 14, 2014).

⁷⁸ PA DEP, What causes a sink hole?, http://www.portal.state.pa.us/portal/server.pt/community/sinkholes/10637/what-causes-a-sinkhole_554362 (last visited March 14, 2014).

Overall, Pennsylvania is particularly vulnerable to the ill-effects of unregulated seismic exploration, both in terms of the impacts to human health and safety—such as buildings, drinking water wells, and infrastructure—and environmental impacts to the land, air, and water.

C. The EQB Must Promulgate Specific Regulations to Cover and Permit Oil and Gas Seismic Testing Operations

In order to fully and specifically address these issues, the EQB should promulgate regulations for seismic testing operations under Chapter 78. Based on a review of other states' regulations and local ordinances, Pennsylvania's new regulations and permitting scheme should cover at least three basic areas: pre-testing notice to landowners, municipalities and other relevant parties; limits and setbacks for seismic testing locations; and surety bonding. Additionally, the regulations and permitting scheme should make clear that approval under applicable local ordinances is necessary before testing commences.

First, it is important that the new regulations contain requirements that the company notify surrounding landowners and relevant state and local governments before the commencement of testing. Under the current regime, there is often no notice provided to landowners before testing commences or even before seismic operators' employees enter and leave equipment on private property.⁷⁹

For example, Robinson Township's seismic testing ordinance requires that a company provide written notice by U.S. Mail or in-person delivery to landowners within 250 feet of testing at least ten working days before commencing operations. The notice must provide the start date of operations, the type of operations (i.e., blasting or vibroseis), and an offer to provide proof of the company's insurance information to the landowner.⁸⁰ For landowners within 400 feet of blasting or 125 feet of vibroseis, the company must also provide ten working days' notice, in which it offers to provide free pre- and post-operations testing of water wells.⁸¹ Additionally, the company must publish an ad in the local newspaper for at least two weeks and provide notice to the relevant township official at least three working days prior to the commencement of operations.⁸²

Other states with seismic testing regulations have similar requirements. For example:

⁷⁹ See John Paul, *Seismic Mapping: Devices Left In People's Yards Causing Alarm In Aliquippa & Hopewell*, Beaver Countian, Feb. 11, 2014, <http://beavercountian.com/content/daily/seismic-testing-begins-devices-peoples-yards-causing-alarm-aliquippa-hopewell>; Amanda Gilloly, *Cecil: Seismic Testing Company 'Willfully Violated' Ordinance*, Canon-McMillan Patch, July 10, 2012, <http://canon-mcmillan.patch.com/groups/politics-and-elections/p/cecil-seismic-testing-company-willfully-violated-ordinance>.

⁸⁰ Robinson Twp. Seismic Ordinance, *supra*, § 6(a).

⁸¹ *Id.* § 6(b).

⁸² *Id.* §§ 4, 6(c).

- Colorado requires operators to notify the local government at the same time it applies to the state regulatory authority and consult all surface owners of lands in the area;⁸³
- North Dakota requires operators to apply for a seismic exploration permit at least three days before commencing operations and inform the state commission twenty-four hours before actually commencing operations;⁸⁴ and
- West Virginia requires operators to provide notice to “Miss Utility of West Virginia Inc.” and to “all surface owners, coal owners and lessees, and natural gas storage field operators” on whose property the testing will occur at least three days prior to commencing operations. The notice also must contain a reclamation plan.⁸⁵

Second, the new regulations should contain location provisions, including setback distances, prohibitions, and other special considerations for certain areas. For example, the Robinson Township seismic testing ordinance contains a minimum setback for vibroseis operations of 150 feet from any building and a minimum setback for blasting operations of 300 feet from any building, water well, or underground hazardous waste storage site.⁸⁶ For seismic blasting occurring within 600 feet of any occupied building, the operator must also provide monitoring.⁸⁷

Similarly, Colorado requires that blasting “be kept a safe distance from a building unit, water well or spring, unless by special written permission of the surface owner or lessee,” according to minimum setback distances set by the weight of the explosive charge. For charges between two and five pounds, for example, the setback distance is 300 feet, with distances increasing to as much as one quarter-mile for charges exceeding 20 pounds.⁸⁸ North Dakota prohibits seismic blasting operations within 600 feet of water wells, buildings, cisterns, pipelines, and flowing springs, and prohibits non-explosive operations such as vibroseis within 300 feet of such structures and resources.⁸⁹

Additionally, certain state regulations contain restrictions for seismic testing in environmentally fragile areas. For example, Maryland specifically restricts permitting of seismic testing in areas where it “poses a substantial risk of causing environmental damage.”⁹⁰ Alaska does not grant exploration permits on land with an active permit for coal exploration.⁹¹ And Louisiana does not grant seismic testing permits for exploration of “unsuitable” lands, including fragile or historic lands, lands where exploration could result in a substantial loss or reduction of productivity of water supply, or natural hazard lands, such as areas subject to frequent flooding or of unstable geology.⁹²

⁸³ 2 Colo. Code Regs. § 404-333(a), (b).

⁸⁴ N.D. Admin. Code 43-02-12-04(1), (2).

⁸⁵ W. Va. Code R. § 22-6A-10(j).

⁸⁶ Robinson Twp. Seismic Ordinance, *supra*, § 10(b).

⁸⁷ *Id.*

⁸⁸ 2 Colo. Code Regs. § 404-333(c)(2).

⁸⁹ N.D. Admin. Code 43-02-12-05.

⁹⁰ Md. Code Regs. § 26.19.01.03(3)(b).

⁹¹ Alaska Stat. § 38.05.132.

⁹² La. Rev. Stat. Ann. § 30:922(A)(3).

Third, bonding requirements are critical to insuring that all seismic operations are conducted safely and that any necessary remediation efforts are at least partially funded. Robinson Township requires a bond of \$100,000, which must be valid for a period of two years from the date of permit issuance.⁹³ Additionally, the Township requires that the operator possess liability insurance with minimum coverage of \$1 million per person, \$3 million per occurrence, and \$1 million for property damage.⁹⁴

Colorado requires a bond of \$25,000, provided however that the operator will be responsible for plugging seismic exploration holes whether or not the cost exceeds the bond.⁹⁵ And North Dakota requires a bond of \$50,000 for blasting operations and \$25,000 for any other type of seismic operations.⁹⁶ Any subcontractor must also obtain a bond of \$10,000.⁹⁷

Finally, the regulations or permitting scheme should make clear that approval under applicable local ordinances is also necessary before testing commences. As discussed above, certain municipalities in Pennsylvania have made great strides in enacting detailed, substantive ordinances to govern seismic testing within their borders.⁹⁸ And while PA DEP has attempted to instruct operators that local requirements are necessary, certain operators have been hostile to such ordinances. In light of these important requirements and the recent Pennsylvania Supreme Court ruling reaffirming municipalities' ability to enact such ordinances,⁹⁹ the EQB should make clear in the regulations and permitting scheme that seismic operators must also be sure to obtain local approval before commencing operations and abide by such requirements throughout.

While it is unfortunate that the EQB has not included requirements for seismic testing in its proposed revisions to Chapter 78, it still has the opportunity to do so. As with the other practices and effects of Pennsylvania's shale boom, seismic testing in the Commonwealth is expanding rapidly, moving into areas that have never seen the practice and causing major impacts to residences, infrastructure, and the environment. Fortunately, certain of Pennsylvania's townships and other states have laid much of the groundwork for such regulations, and the EQB should build on these sources to promulgate substantive seismic testing regulations for the benefit of Pennsylvanians and their environment.

III. CONCLUSION

We appreciate the opportunity to comment on the EQB's proposed regulations under Chapter 78 and commend the EQB for taking this important step to modernize and update these necessary requirements. At the same time, the proposed regulations contain important gaps and

⁹³ Robinson Twp. Seismic Ordinance, *supra*, § 11(a).

⁹⁴ *Id.* § 11(b).

⁹⁵ 2 Colo. Code Regs. §§ 404-705, 404-320.

⁹⁶ N.D. Admin. Code 43-02-12-03(2).

⁹⁷ *Id.*

⁹⁸ See Part II.A, C, *supra*.

⁹⁹ See *Robinson Twp. et al. v. Commonwealth*, 83 A.3d 901 (Pa. 2013).

shortcomings that exempt certain oil and gas industry practices and in some cases ignore important subsets of the industry.

Oil and gas development in Pennsylvania is booming, increasing its technological advances, and expanding to areas of the Commonwealth that are almost entirely new to the industry. It is important that the EQB properly revise its regulations to keep up with the industry, fully address its impacts, and better protect Pennsylvanians and the Commonwealth's resources.

If you have any questions in regard to these comments, please do not hesitate to contact me at (202) 263-4451 or akron@environmentalintegrity.org. Thank you for your attention to these important issues.

Sincerely,



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