

The Task Force on Leasing Church Property for Gas Drilling

Advisory Report

**Beaver-Butler Presbytery
June 27, 2012**

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**Section IV – Session Considerations Related to Leasing Church Property
for Gas Drilling**

- **For the use of sessions considering the leasing of church property for gas drilling**
- **For the general use of congregations in studying and discussing issues related to gas drilling**

**Members of the Task Force: Jason Bell, Vivas Macoskey,
Rev. Deane Lavender, Ed McCready, Rev. James Campbell, Martha Somers,
Rev. Dr. A. Gary Angleberger, Covener**

SECTION I – INTRODUCTION

Biblical Introduction:

“You may say to yourself, ‘My power and the strength of my hands have produced this wealth for me.’ But remember the Lord your God, for it is he who gives you the ability to produce wealth, and so confirms his covenant, which he swore to your ancestors, as it is today.” Deuteronomy 8:17-18

The above Scripture was not cited when the presbytery was asked to vote in January to approve the gas drilling lease entered into by one of its churches. The verse, however, represents the concern at that time among a number of commissioners for a thoughtful and biblical consideration of the leasing of church property for drilling. An ensuing motion instructed the Coordinating Team to appoint a Task Force to study the matter of gas drilling leases by churches. The Coordinating Team appointed the following persons to the Task Force on Church Leasing for Gas Drilling which first met in March, 2012:

Jason Bell, West Sunbury (now attending Calvin Presbyterian Church, Zelienople) The Rev. James Campbell, Honorably Retired The Rev. Deane Lavender, Honorably Retired and Supply Pastor, Conway Presbyterian Church Vivas Macoskey, Covenant United Presbyterian Church, Butler Ed McCready, The Galilean Church, New Galilee (service interrupted by heart surgery) Martha Somers, Glade Run Presbyterian Church, Valencia The Rev. Dr. A. Gary Angleberger, Honorably Retired (Convener of the Task Force)

In consultation with the Coordinating Team, the Task Force was advised to prepare “An Advisory Report” for the sessions of the presbytery, especially for those sessions who are considering leasing church property for gas drilling. This Advisory Report is just that – advisory not legislative. The hope is that this Advisory Report of the presbytery will be helpful to sessions in two ways. First, this Advisory Report will inform a session/congregation of information about gas drilling and issues related to drilling, including a list of resources that should be consulted in the process of decision making. Second, this Advisory Report will contain biblical references and comments that can guide a congregation and session in the discussion of our Christian stewardship of the earth in relation to gas drilling.

This Advisory Report to the sessions does not advocate a yes or no answer to the question of whether church property should be leased for gas drilling. The Report does admit to the complexity and dilemmas of the issue. It assumes that each session must prayerfully and responsibly deal with the issue in light of their situation, their faith and the teachings of the Scriptures regarding our responsibility as Christian stewards. The session should not expect that a responsible, prayerful decision can be reached quickly. This report recommends that the congregation be actively involved in prayerful consideration of God’s will for them in this matter.

SECTION II - BIBLICAL, THEOLOGICAL CONCERNS RELATED TO GAS DRILLING

Biblical Introduction:

“They put their hand to the flinty rock, and overturn mountains by the roots. They cut channels in the rocks, and their eyes see every precious thing. The sources of the rivers they probe; hidden things they bring to light. But where shall wisdom be found? And where is the place of understanding?” Job 28:9-12 NRSV

The current rush to develop the Marcellus Shale and other shalefields (shaleplays) is a complex and challenging issue that touches on fundamental Christian themes such as equality, stewardship, and justice. The information surrounding the extraction of natural gas is often multifaceted, technical, and potentially overwhelming. To complicate matters the choices that we make affect nearly every aspect of the lives of our brothers and sisters around the globe.

The following passages of scripture and discussion questions are designed help us as Christians examine how we view our actions as part of a grateful response to God’s good gifts. God creates the earth, calls it good and it is good. We get to live in it, care for it, and receive immense blessing from God through it.

God called the dry ground “land,” and the gathered waters he called “seas.” And God saw that it was good. Genesis 1:10 NIV

Your children who follow you in later generations and foreigners who come from distant lands will see the calamities that have fallen on the land and the diseases with which the LORD has afflicted it. The whole land will be a burning waste of salt and sulfur—nothing planted, nothing sprouting, no vegetation growing on it. Deuteronomy 29:22-23 NIV

Throughout the New Testament, we are repeatedly reminded of the goodness of God’s Creation and His love for it. In the biblical story as in our lives, land and its fruits represent God’s approval. Both the Old and New Testaments not only affirm that the fruitfulness of the land comes as a blessing from God when we honor our covenant with God but the preceding verse explains what will happen to those that fail to honor the will of the LORD. How do we as Christians reflect God’s love for his creation? How have our choices and needs failed to respect his Creation? What happens when we do not respect God’s commandments that instruct us regarding specifics of love and justice? Consider the following:

- What other biblical stories refer to the gift of the abundance of Creation as a reflection of God’s love? When has Creation flourished? Why? (Genesis 1:22, Deuteronomy 28:1-6, Psalm 72:16,
- What other biblical stories refer to the removal of the abundance of Creation as a reflection of God’s disappointment? When has Creation suffered? Why? (Genesis 6, Luke 21:11, Amos 4:6-9)
- What can we learn from these passages and how do these lessons relate to the Church’s potential involvement in gas drilling?

For the creation waits in eager expectation for the children of God to be revealed. For the creation was subjected to frustration, not by its own choice, but by the will of the one who subjected it, in hope that the creation itself will be liberated from its bondage to decay and brought into the freedom and glory of the children of God. Romans 8:19-21 NIV

In this passage we see a distinction drawn between those that respect the covenant and those that ignore it. We are told that God awaits those that will respect Creation to liberate it from those that subject it to bondage to decay.

- How have we as a Church liberated and respected Creation?
- How have we as a Church imprisoned the Creation and caused it to decay?
- What can we learn from these passages and how do these lessons relate to the Church's potential involvement in gas drilling?

Let each of you look not to your own interests, but to the interests of others. Philippians 2:4 NRSV

The King will reply, 'Truly I tell you, whatever you did for one of the least of these brothers and sisters of mine, you did for me.' Matthew 25:40 NIV

As Christians we are not only compelled to give of ourselves to others, we are obligated to consider how our actions and the results of those actions affect others. Jesus' death on the cross embodies our Christian obligation to sacrifice in order to provide for others and to place the necessities of others over our own.

- Can you think of a time in your personal life or in the life of your church when the interests of others were placed over your own interests? What were the results?
- Can you think of a time in your personal life or in the life of your church when you placed your interests over the interests of others? What were the results?
- What do we as a Church do to insure that other's needs and wellbeing are not harmed by our actions or inactions?

SECTION III – HEALTH AND ENVIRONMENTAL CONCERNS RELATED TO LEASING CHURCH PROPERTY FOR GAS DRILLING

Biblical Introduction:

“And the Lord God took the man, and put him into the garden of Eden to dress it and to keep it.” Genesis 2:15 ESV

One of the important factors to consider when deliberating about whether to lease your church property's gas rights is the potential environmental impact that Marcellus Shale drilling (hydraulic fracturing, or fracking) may have. This discussion should include consideration of the potential short- and long-term effects that the process may have on the people and environment on the church property, in the area immediately surrounding the site, and in the region as a whole.

Environmental organizations have raised concerns about health risks arising from contamination of sources of drinking water, both in wells close to the site and in more distant areas due to contamination of the aquifer. Moreover, concerns have been voiced that the environmental impact may affect future generations as the toxins injected deep underground gradually migrate to the surface. Finally, environmentalists point out that the process of fracking permanently removes very large quantities of water from the water cycle. At the same time, industry representatives reassure us that the process is safe. It can be difficult to discern which sources of information to trust. In an effort to shed light on this issue, the Task Force on Gas Leasing searched for reliable information on the health and environmental impact of fracking. The following bulleted list presents material found in the scientific and medical literature, as well as government web sites.

1. A study of water quality in private wells in northeastern Pennsylvania and upstate New York compared the quality of water in wells at different distances (< 1 vs. > 1 kilometer) from gas wells. Methane concentrations were an average of 17 times higher in water wells close to gas wells, falling within the defined action level for hazard mitigation recommended by the U.S. Office of the Interior. Chemical analysis of this methane showed that it came from sources deep underground, not from naturally-occurring sources close to the surface. Ethane, butane, and propane were also far more frequently found in water wells close to gas wells. The study did not find evidence of well contamination from the fracturing fluids themselves.ⁱ
2. A risk analysis of the potential impact of fracking on water quality concluded that there is substantial regional risk of groundwater contamination. The authors concluded, "Using the best-case median risk determined above, this volume of contaminated water would equate to several hours flow of the Hudson River or a few thousand Olympic-sized swimming pools."ⁱⁱ
3. An analysis of the geologic features in our region concluded that there is a potential for contamination of the aquifers that could develop over time, in as little as 10 years.ⁱⁱⁱ

4. A study of air quality surrounding gas wells in Colorado found elevated levels of numerous toxic substances that can damage the neurological and respiratory systems, as well as increase the risk of cancer. Residents living less than ½ mile from wells was found to be at highest risk of experiencing negative health effects. The authors noted that the short-term health problems reported by nearby residents during well completion activities (headaches, throat and eye irritation) are consistent with the known effects of many of the hydrocarbons detected during the study.^{iv}
5. On April 22, 2012, the U.S. Environmental Protection Agency (EPA) issued new regulations to reduce air pollution from natural gas wells that use the fracking process. These regulations allow smog-producing volatile organic compounds to be reduced by burn-off until January 2015. After that time, a more effective capturing process must be used. The new regulations do not apply to all wells.^v
6. Governor Corbett's 2011 advisory panel report describes regulations currently in place in Pennsylvania designed to reduce the potential environmental and health risks of fracking operations. The report notes several incidents in which breaches occurred and significant amounts of hazardous substances were known to be released into the environment. The report also mentioned potential environmental problems stemming from wastewater storage, land clearance and earth disturbance, threats to forests and threatened species at and adjacent to well sites, and air pollution.^{vi}

ⁱ Osborn SG, Vengosh A, Warner NR, Jackson RB. Methane contamination of drinking water accompanying gas-well drilling and hydraulic fracturing. *Proceedings of the National Academy of Sciences*. 2011, 108(20): 8172-8176. [Article available at <http://www.pnas.org/content/108/20/8172.full.pdf+html>]

ⁱⁱ Rozell DJ, Reaven SJ. Water pollution risk associated with natural gas extraction from the Marcellus Shale. *Risk Analysis*. 2011. DOI: 10.1111/j.1539-6924.2011.01757.x [Abstract available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2011.01757.x/abstract>]

ⁱⁱⁱ Myers, T. Potential contaminant pathways from hydraulically fractured shale to aquifers. *Ground Water*. 2012. DOI: 10.1111/j.1745-6584.2012.00933.x [Abstract available at [http://www.ncbi.nlm.nih.gov/pubmed?term=\(Myers%20T%5BAuthor%5D\)%20AND%20%22Ground%20Water%22%5BJournal%5D](http://www.ncbi.nlm.nih.gov/pubmed?term=(Myers%20T%5BAuthor%5D)%20AND%20%22Ground%20Water%22%5BJournal%5D)]

^{iv} McKenzie LM, Witter RZ, Newman LS, Adgate JL. Human health risk assessment of air emissions from development of unconventional natural gas resources. *Science of the Total Environment*. 2012, 424: 79-87. [Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/22444058>]

^v Environmental Protection Agency. Fact Sheet: Overview of Final Amendments to Air Regulations for the Oil and Natural Gas Industry. <http://www.epa.gov/airquality/oilandgas/pdfs/20120417fs.pdf>

^{vi} Pennsylvania Governor's Marcellus Shale Advisory Commission Report, pages 75-77. 2011. http://files.dep.state.pa.us/PublicParticipation/MarcellusShaleAdvisoryCommission/MarcellusShaleAdvisoryPortalFiles/MSAC_Final_Report.pdf

SECTION IV – SESSION CONSIDERATIONS RELATED TO LEASING CHURCH PROPERTY FOR GAS DRILLING

Biblical Introduction:

“The land must not be sold permanently, because the land is mine and you are but aliens and my tenants.” Leviticus 25:23 NIV

Background - Marcellus Shale

Water Testing

Residential well water testing is very important and must be done before drilling or gas industry operations begin.

Water testing is expensive, so it is important to negotiate the costs of water testing with the gas company if you are planning to sign a lease.

A certified laboratory must be used for testing to insure proper documentation and the ability to use the results to demonstrate contamination.

Test for chloride, bromide, sulfate, strontium, barium, manganese and magnesium, ethane, butane, methane, and propane.

The Drilling Process

Extracting natural gas from the Marcellus Shale formation requires seismic echo testing to determine the best location for drilling. A number of lines are laid in a grid fashion over the area of exploration and explosions or earth pounding are used to send vibrations into the earth. The echoes reveal the location of the Marcellus shale.

A conventional drilling rig is brought in to drill a vertical shaft and casings are installed. A larger rig is then brought in for horizontal drilling. As many as ten or twelve horizontal wells can be drilled from one vertical well.

Drilling Mud/Water is the most common drilling fluid. It is used strictly in the drilling process. It is typically known as “mud” and may contain clay, chemicals, weighting materials, water, oil, or gases. It most commonly consists of bentonite clay with additives such as barium sulfate, calcium carbonate, or hematite. Various thickeners are used to influence the “sliminess” of the fluid, e.g. xanthum gum, guar gum, glycol, carboxymethylcellulose, polyanionic cellulose, or starch. In turn, deflocculants are used to reduce “sliminess” in clay-based muds: anionic polyelectrolytes. Mud is, in varying degrees, toxic. It is difficult and expensive to dispose of in an environmentally-friendly manner.

When drilling is concluded, 1 to 6 million gallons of water, sand, and chemicals known only to the gas company are pumped at high pressure to fracture the shale around the well.

When the fracturing process is completed, there is a flow back of water which must be treated to remove chemicals and minerals. This flow back water can be 30 to 60 percent of the original fracturing water. Typically flow back water is pumped into lined ponds, where it is held and then pumped through pipelines over land to other wells to be fractured. By some accounts this flow back water is now 5 to 10 times saltier than ocean water. It not only contains the chemicals originally involved with the fracking fluid, but has now picked up salts, hazardous substances such as heavy metals, volatile organic compounds, and naturally occurring radioactive elements from the shale formation. The U. S. Geological Survey has determined that a typical 3 million gallon fracturing operation results in 15,000 gallons of chemical waste. There is presently no proven effective way to treat this water. Some companies are attempting to distill the water and reuse it. Others want to inject the flow back water into deep wells or evaporate it, which leaves a toxic residue which must presently be disposed of in an approved landfill.

Air Quality Concerns

The air in the town of Dish, Texas, which is an area unaffected by other industry, experienced the presence of multiple recognized and suspected human carcinogens as a result of emissions present at several locations tested. These emissions are sources of hazardous air pollutants. They include emissions from pumps, compressors, engine exhaust and oil/condensate tanks, pressure relief devices, sampling connections systems, well drilling engines, the well head machinery, gas processing and transmission as well as mobile vehicle transportation emissions.

Gas Leases

A mineral lease is a contractual agreement between the owner of a mineral tract (the lessor) who grants the right to develop deposits of the mineral to a producer (the lessee). Oil and gas can be sold or leased separately to different parties. Different deposits of the same minerals in different formations can also be leased or sold separately. Usually, a lessee will insist on the right to sell or reassign a mineral lease to another party. Because a mineral lease gives the lessee a property interest in the mineral, leases should be recorded at the Recorder of Deeds office of the county where the leased tract is located.

The gas industry must own or hold leases for subsurface mineral rights, which means all forms of natural gas, before drilling in an area. Gas industry spokespersons have stated that they cannot drill horizontally through land that they do not own or lease for subsurface mineral rights. The gas industry often employs “landsmen” to obtain the necessary leases.

There are many approaches used to recruit owners to lease their land. These can include parties or private meetings where prospective owners are informed of all the benefits of leasing, including the cost per acre the company is willing to pay for a lease and the percent of income from the sale of gas promised to the land owner for the right to lease the land. This is called a royalty.

Once a lease is signed the gas industry now has full access to leased property and can clear the surface of whatever land is necessary for a well pad, and all that this entails, including product water tanks, drying tanks, compressors for pumping gas, and access roads, unless restrictions have been negotiated by the owner. A signed lease allows the gas company to lay pipeline and dig a lined impoundment to hold fracking and flow back water. The impoundment must be at least 200 yards from a home or business. Information related to these impoundments and their location may or may not be included in the language of the gas lease.

Risks

According to the Environmental Protection Agency, the Safe Drinking Water Act specifically excludes fracking from regulation under the Underground Injection Control (UIC) program, which regulates the subsurface emplacement of fluid. However, UIC does regulate the use of diesel fuel during fracking and provides that any service company that performs hydraulic fracturing using diesel fuel must receive prior authorization. However, as a result of the lack of broad regulation of hydraulic fracturing operations, companies are not required to disclose the chemicals used during fracking operations, with the sole exception of diesel fuel. Thus, it is extremely challenging to determine if such operations are contaminating water supplies. Because of the lack of regulation, there is concern that fracking and associated operations could be detrimental to the environment and the health of surrounding communities.

IF YOU DECIDE TO MOVE FORWARD WITH THE PROCESS REALIZE THAT LEASES ARE NEGOTIABLE!!! Consult a knowledgeable attorney. Taking time to understand and negotiate a gas lease will avoid a lot of problems and heartache.

Here are five important rules to follow when considering leasing your property.

- 1. Take your time in negotiation!** A quick or impulsive decision on your part – instead of careful deliberation – benefits only the landsman and the gas company. Never agree to anything you haven't fully considered.
- 2. Virtually everything in a proposed lease is negotiable.** Often, when a Landsman expresses interest in leasing your land, he landsman will give you a Document referred to as a 'standard lease.' Just because your neighbors Decided to sign what the landsman give them doesn't mean that you should!
- 3. Each tract, each lessor's needs, and each lease are unique.** One size does not fit all and there is no such thing as a standard lease. Ask yourself why the gas producer wants each paragraph in its draft lease. What does it do and why should that particular gas producer's form lease be used?
- 4. Don't accept anything a landsman tells you as true!** Determine the identity of the lessee. Who does the landsman work for? Does he/she work for a gas driller/producer or someone trying to put together numerous leases to sell to another party? Try to be certain the lessee is a gas driller/producer that is financially capable of undertaking and conducting the operations contemplated.

5. Speak with the owners of neighboring properties! Discuss the possible impact of drilling with neighboring property owners to ascertain their perspective. Talk to them about the idea of combining properties into one “pooled” lease, in order to enhance your potential for a fair and competitive lease. Whether combining on a lease with your neighbors or leasing your own property, the more information you have about the potential driller’s operations, the better off you will be in making a good lease decision.

6. Make sure that all agreements regarding procedures and operations are included in writing in the lease!

Questions you may want to ask when considering a drilling lease. (From experience of the Franklin Springs Church and others.)

1. Will the lease be for an individual parcel of land (just church property), or will the property be part of a “unit” of land, combined with other properties?
2. How many acres does the church (thus Presbytery) own? Does the church own the mineral rights to the property?
3. How many acres does the company need to drill a well? How many lessors do they have signed on at this point?
4. Approximately when will the well be drilled?
5. Where will the well head be placed? How far and in what direction will the pipeline carrying the gas away from the drill head be laid?
6. Where is the nearest producing gas well?
7. How much disturbance will the work cause, both during the drilling and production phases?
8. What is being offered as a “sign on bonus” per acre? What percentage of royalties is being offered over the life of the well?
9. How soon can the church expect to receive the “sign on bonus” money?
10. How long is the lease? Is it renewable?
11. Is the church being offered a “non-surface occupancy” lease? (Under such a lease the driller is not allowed to do anything to the surface of the property; any work will be done below the surface.)
12. What happens if the church’s water source is affected? What will the drilling company do to repair/replace it?

13. Who is responsible for testing the church's water source before, during, and after drilling?
14. What maintenance will be required on the pipeline? Whose responsibility is that maintenance?
15. What are the implications for the church's insurance policy if the church signs a lease?
16. Will the church, as a non-profit, have to pay taxes on the income it receives from a lease?
17. Is there a "shut-in" clause in the contract, allowing the company to cap a well and cease making royalty payments if they deem the well unprofitable?
18. Concerning toxicity: What quantitative or qualitative goals and/or timetables will be established for lowering the toxicity of chemicals used in drilling, using available toxicity scoring tools?
19. Can non-potable water sources (saline aquifers, treated industrial waste waters, flowback waters, etc.) be used for fracturing operations?
20. Does the company store wastewater in covered tanks, or is a program in place for transitioning from storing water in lined pits (where allowed by state regulations) toward covered and appropriately vented tanks?
21. Does the company monitor, measure, and report publicly on air emissions (e.g. greenhouse gases [including methane], volatile organic compounds, BETX and other toxic chemicals) from the operation?
22. Does the company reduce emissions from well sites by using alternative methods such as natural gas in place of diesel fuel for powering site operations?
23. Will the company establish an ambient air quality monitoring network, funded by the company or collaboratively with the local community and regulators, to provide routine data on ambient conditions, including tracking of specific chemicals of concern (such as hydrogen sulfide and BETX)?
24. Does the company use closed-loop systems for management of drilling residuals?
25. Does the company monitor and track naturally occurring radioactive materials (NORMs) in waste streams where such materials exist?
26. Does the company dispose of drill cuttings and other solid waste and sludge only in licensed disposal facilities consistent with state and federal regulations?
27. Is money the primary concern for your congregation?

Stewardship of Creation in the Book of Order

W-7.5003 – As Stewards of God’s creation who hold the earth in trust, the people of God are called to:

- a. Use the earth’s resources responsibly without plundering, polluting, or destroying,
- b. Develop technological methods and processes that work together with the earth’s environment to preserve and enhance life.
- c. Produce and consume in ways that make available to all people what is sufficient for life.
- d. Use and shape earth’s goods to create beauty, health, and peace in ways that reflect God’s love for all creatures.

Some Words of Caution About Royalties

(From an interview with Craig Tillotson of Hefren-Tillotson wealth management firm – Post-Gazette, May 23, 2012)

Royalty checks that start to arrive when a gas company drills on your property can make for some very profitable envelopes in the mailbox. But the low natural gas prices that have disrupted industry balance sheets in recent months could start to cut into those checks.

Put it this way: “You could be having filet mignon when they’re high, and . . . macaroni and cheese when they’re low,” said Craig Tillotson, executive vice president of sales at Hefron-Tillotson.

. . . The lowest natural gas prices in a decade . . . have forced a new industry emphasis on lease terms that allow companies to deduct certain well costs from landowner royalty checks.

. . . Landowners typically make money in two forms when they sign a lease: a per-acre lump sum and then monthly royalty checks once a well is drilled and starts producing. While the lump sums can total millions of dollars for major landowners, the potential for years of royalty checks can add up to even more. “The aggregate of royalty checks should make the bonus payment appear insignificant,” said Kit F. Pettit, an attorney in Pittsburgh who specializes in representing landowners. . . .

Complicating the value of royalty checks is whether a company can deduct post-production costs from a royalty payment before cutting the check to the landowner – a detail often negotiated during a lease signing. Post-production costs can include everything from the cost to compress and process the gas to the cost of the pipelines needed to transport it. Some companies will even take marketing costs out of the post-productions expenses, using the funds to pay for billboards or commercials.

The industry has a precedent for turning to royalty checks to help trim costs. When the price of gas started to drop in August 2011, Chesapeake Energy saved

money by deducting post-production costs from the royalty checks of about 20,000 royalty owners in the Barnett Shale in Texas. The deductions, which affected landowners who didn't have provisions guarding against the practice, slashed royalty checks by about 25 percent.

. . . Some leases even include a "shut-in" clause that allows the company to cap a well for an indefinite amount of time if it decides that it can't turn a profit right away. "More recently, some of the gas companies are starting to push back on the shut-in clause," said Mr. Pettit. "They want the ability to play the market" and resume drilling when prices rebound, he said.

Some Laws Applicable to Marcellus Shale Activities in Pennsylvania

Pennsylvania Oil and Gas Act

Regulates well drilling, including well construction.

Requires 100 foot buffer from any stream, spring, or body of water identified on a topographic map; 200 foot buffer from buildings or water wells.

Requires restored or replacement water supply if water quality of well worse than pre-drill or quantity is affected:

If water well contamination within 1,000 feet of drilling, presumed that driller caused the contamination and must either restore or replace it and pay for the costs of maintaining or operating the replacement supply.

If water well more than 1,000 feet from drilling, up to water well owner to prove causation of contamination.

Pennsylvania Clean Streams Law

Regulates oil and gas wastewater treatment and disposal.

Technology-based, water quality-based, and Chapter 95 effluent limitations.

Well location (stream buffers) regulation through erosion and sediment control (non-point sources of water pollution).

Earth disturbances must use "best management practices" (silt fences, culverts).

Pits and impoundments that store flow back produced water must be 20 inches above the groundwater table.

Erosion and sediment control plans required only for well sites that may affect High Quality or Exceptional Value streams.

Erosion and sediment control permit required for sites that disturb 5 or more acres.

If water withdrawals diminish the capacity of a stream to assimilate existing pollutant loads, the withdrawal may be restricted.

Pennsylvania Dam Safety and Encroachments Act

A well operator must obtain an encroachment permit if well site, access road, or water withdrawal pad is located within a FEMA designated flood plain.

If no floodway in the case of small streams, buffer of 50 feet from the bed and banks of a stream.

Pennsylvania Water Resources Planning Act (Act 220)

If withdrawing more than 10,000 gallons of water per day, must register the withdrawal and location.

Pennsylvania Solid Waste Disposal Act

Regulates the generation and transport of residual waste, including hydraulic fracturing fluid, flow back, and produced water.

Generators must conduct a detailed analysis that fully characterizes the physical properties and chemical composition of each type of waste that is generated.

Transporters must maintain records of the type and classification of waste and have emergency preparedness plans in case of a spill.