

- 1) Is there any safety regulations for people building facilities to support Marcellus Shale? Training requirements, i.e. built right aged for construction workers). Will there be any intermediate pumping stations built in N.E. PA? How many compression stations, pumping stations, and water treatment facilities will be built?

As part of our commitment to best management practices, employees must participate in ongoing safety training exercises, including many longstanding industry practices approved and developed through the American Petroleum Institute. The number of potential compressor stations needed will vary on a number of geologic and topographic conditions. Our industry is committed to working with local communities as these types of facilities are needed. There are more than a dozen permitted and approved water treatment facilities in the Commonwealth of Pennsylvania. Many producers are working with water treatment companies to increase facilities in the future and bring new technologies to the Commonwealth that can help to enhance overall water quality. Individual companies and industry-wide organizations are reaching out to local vendors and business people to help them benefit from Marcellus shale development. Requirements and regulations vary so through open houses and summits, gas producers and local extension services are teaching local businesses what they need to know. Penn State is offering online seminars starting this month and running through May.
<http://www.pocorecord.com/apps/pbcs.dll/article?AID=/20090114/LIVING/901140312>

- 2) There is a well currently being drilled in Greenfield Township. Where is the closest DEP approved frac water treatment plant? Also; has DEP approved the recycling of frac water?

The Marcellus Shale Coalition worked closely with the DEP to develop large scale water recycling and reuse technologies. Now Pennsylvania leads the nation in shale gas water recycling. More than 60% of all Marcellus water is currently being recycled and that number is expected to increase in the coming weeks and months. The Department of Environmental Protection recently issued a system industrial wastewater discharge permit to TerraQua Resource Management LLC of Williamsport that allows the company to treat and discharge 400,000 gallons per day of gas well drilling wastewater. A fully permitted well was drilled in Greenfield Township; water management plans listing approved facilities are required by DEP to receive a drilling permit.

- 3) Isn't it true that the safe drinking water act underground injection control program did not regulate hydraulic fracturing since it was passed during the Carter Administration? If an "Exemption" occurred in 2005, where is your support or regulation of fracking that it occurred before 2005?

Correct – EPA has never required regulated hydraulic fracturing. This practice was codified in law by the 2005 Energy Policy Act after extensive study by the EPA that found hydraulic fracturing to be safe. We believe that states have the best understanding of the individual and unique regulatory requirements and best practices. Keep in mind that the natural gas industry is highly regulated. Before a well is even drilled, thousands of pages of documentation must be filed and submitted to the DEP for review and approval. Many aspects must be stamped by a Professional Engineer. In addition the Susquehanna River Basin Commission, the Delaware River

Basin Commission, and the Pennsylvania Fish and Boat Commission also have various levels of regulatory oversight. We're subject to the Pennsylvania Oil and Gas Act, the Pennsylvania Clean Streams Law, the Federal Clean Water Act, the Federal Emergency Planning and Community Right-to-Know Act, the Federal Worker's Right to Know Act, the Federal Dam Safety Law, and others. All of our locations are also regularly inspected by industry and regulatory

- 4) During the permitting process, does your staff go to the site if wetlands and streams are impacted? If not, why?

Companies typically conduct on-site visits prior to pad design and submitting an application for a permit.

- 5) One speaker compared water use among industries, and stated only 30 million gallons per day is used for shale drilling. If this is current use, how much will it increase to when all the leaves are in operation? 30 million gallons per day is not current use. That amount is the SRBC estimate they used for when the Marcellus is in full development. They took the Barnett current use today and doubled it. Even at those numbers, Marcellus Shale development would still only amount to less than 1% of the state's daily water consumption of 10 billion gallons or less than half of the water used for recreational purposes like golf courses and ski resorts. In the Marcellus Shale area of the Appalachian Basin, for example, power generation accounts for more than 70% of water consumption.

- 6) DEP says a contaminated water supply has to be replaced. How is it possible to clean an aquifer?

A groundwater aquifer cannot be contaminated by Hydraulic Fracturing. Fracturing has been safely performed to complete more than one million wells over the past sixty years. Every gas producing state was asked if they'd ever seen groundwater contamination from the practice. Every state answered "no". (Source: <http://www.dec.ny.gov/energy/58440.html> click on second appendix) That's because the areas we fracture are isolated from the areas that house drinking water by thousands of feet in distance and millions of tons of impermeable rock. Additionally, scientists and engineers cement millions of pounds (and thousands of feet) of steel casing into the well, thus eliminating any and all pathways of exposure between what's taking place inside the wellbore and what's naturally occurring outside it. Impacts from surface spills or some degree of human or mechanical error that may impact groundwater is very rare. In fact, the PA DEP has indicated that less than 0.2% of all wells drilled in the last 15 years have had some impact on ground water. In those rare instances, it's even less common that there was any impact on health or property; it's typically a temporary inconvenience while remediation efforts are performed.

- 7) What countries have gas storage fields and is it possible in Susquehanna County?

Gas storage fields typically are operated and maintained by pipeline infrastructure companies, not drilling companies. This question is better suited for an infrastructure developer.

- 8) Will one industry be place close to cities or will our rural environment become an industrial one?

Natural gas drilling can be done safely in any environment – rural or urban. While the drilling and completion of a well require a short period of activity and equipment on a particular site, the long term footprint is small and the site will be reclaimed to a natural state upon the wells end of commercial productivity.

9. It has been documented that toxic chemicals have been injected via the fracturing process in the states of Alabama, Colorado, New Mexico, Ohio, Texas, Virginia, West Virginia and Wyoming. Not only do they make the water unsafe, but create health risks and destroy land values. How will this not happen in Pennsylvania? **Both the federal EPA and the Groundwater Protection Council, an association of state groundwater protection officials, have found no instances, ever, anywhere, that hydraulic fracturing contaminates groundwater despite the fact that over 1 million wells nationwide have been hydraulically fractured over the last several decades.**
10. A friend in Dimmock, Pa is currently having water brought to their home by Cabotail because they cannot drink their water or was their clothes. Two horse died from drinking water rather ran off and leached up on the land. How were these destructive results prevented? **Subsurface methane gas exists naturally in many parts of Pennsylvania, and the industry has been working with DEP to better understand how Marcellus Shale wells can be drilled and completed without creating a potential concern with this natural geological condition.** (DEP even offers a fact sheet on gas migration in Pennsylvania. Go to this link and type in “gas migration” in the search box: <http://www.elibrary.dep.state.pa.us/dsweb/HomePage>) **On March 28, after tests, Pennsylvania DEP said it found no indication of wells in Dimock being tainted from gas well hydro-fracturing activity. The DEP laboratory has analyzed numerous water samples for total dissolved solids, chlorides, specific conductivity, pH, alkalinity, hardness, sodium, calcium, barium, manganese, potassium and aluminum. None of these contaminants were found in levels that would indicate that liquids used to fracture natural gas wells have migrated to groundwater. (Testimony J. Scott Roberts, Deputy Secretary for Mineral Resources Management Department of Environmental Protection before the Senate Majority Policy Committee April 9, 2009)**
11. Gas drilling uses a tremendous amount of clean, fresh water in the hydraulic fracturing process. There is also a tremendous amount of waste water that is produced. Over 250 toxic, cancer causing agents are used in this process. When this waste-water comes back to the surface, we have millions of gallons of toxic, radioactive “brew.” The radioactive elements uranium, radium, and others are brought back to the surface. Radium has a half-life of 1600 years. At present, there is NO safe way to properly dispose of this radioactivity and the toxic, salty brine. How do you plan to dispose of this waste safely? **Produced water can be safely disposed of through deep well injection which returns the salty brine deep into the earth from which it came, usually in a formation even deeper than the one from which it is produced. This practice is regulated by the federal EPA and the states and has been proven safe and effective for several decades. It can also be safely disposed of through treatment at a regulated Industrial Wastewater Treatment facility. Recent advances have resulted in the elimination of a wastewater stream from drilling/completion/and production through the recycling and reuse of produced water. There are only a handful of additives used in the process, all of which can be found on the DEP’s website. A complete water characterization has been performed that the DEP has and it concluded that the primary constituent is salt, mainly sodium chloride, which makes up about 9% of the water. All of additives used in the process are rendered inert after injection. For**

instance biocide is used to eliminate bacteria and diluted to about 99.9% fresh water. Once injected there is no longer biocide present and no longer bacteria.

12. Do townships have the right to ban all gas drilling within their borders, if they so desire? And can they overrule the gas leases signed there?

No. Mineral owners have the right to develop their mineral resources as instituted by the PA Oil and Gas Act, which pre-empts municipal regulation of oil and gas activities. Gas drilling in Pennsylvania is regulated by the PA Department of Environmental Protection and the Susquehanna and Delaware River Basin Commissions.

13. Can townships ban drilling around water supply areas such as wetlands within their borders?

No, the PA Oil and Gas Act pre-empts municipal regulation of oil and gas activities. Water supplies and wetlands are protected by state and federal law administered by the PA Department of Environmental Protection, the federal EPA and the Susquehanna and Delaware River Basin Commissions.

14. How are we going to clean up the 9 square miles contaminated in Dimmock, Pa? On March 28, after tests, Pennsylvania DEP said it found no indication of wells in Dimock being tainted from gas well hydro-fracturing activity. The DEP laboratory has analyzed numerous water samples for total dissolved solids, chlorides, specific conductivity, pH, alkalinity, hardness, sodium, calcium, barium, manganese, potassium and aluminum. None of these contaminants were found in levels that would indicate that liquids used to fracture natural gas wells have migrated to groundwater. (Testimony J. Scott Roberts, Deputy Secretary for Mineral Resources Management Department of Environmental Protection before the Senate Majority Policy Committee April 9, 2009)

15. Can property owners who are against tall forms of gas drilling sue their neighbors who have signed gal leases if contamination occurred on their adjacent land? Can they also sue the gas company?

16. How thick is the Marcellus formation? How deep do you drill?

Thickness of the shale varies greatly across the formation. It could be ~50 feet thick in portions of southwestern Pennsylvania and can be ~250 feet thick in areas of northern PA. The depth of drilling also varies by area as the Marcellus formation varies in depth. In northern PA, drilling of horizontal wells is usually about 8000 feet deep.

17. Why are you letting frack fluid be disposed of in Williamsport? How many DEP employees are for issuing permits vs. the amount of inspectors?

18. If Chesapeake advertises that natural gas is good for America, why not tell the truth: Statoil purchased over 30% of these first, and now negotiates with China for further sales!

Chesapeake partners with Statoil and their decision to invest in American natural gas. Statoil's investment in CHK is a financial interest in our operations in the Marcellus; it does not result in delivery of gas to Statoil for resale. All of the production of Marcellus shale gas is sold and consumed in North America.

19. Why are most riggers from out of state?

The initial drilling workforce was largely from out-of-state because it takes trained and experience personnel to operate the high tech equipment used to drill modern wells. These experienced workers came from other operating areas throughout the country as there were not enough local workers with training in this industry. This situation is changing rapidly as Chesapeake, for example, has been hiring dozens of new employees to begin as trainees with our drilling subsidiary NOMAC and Chesapeake is planning construction of a \$6.3 million residential facility in Bradford County to house the temporary workers that will be necessary for some time, but will also be home to our Eastern U.S. NOMAC Training Center, so that we can more quickly hire and train local workers.

20. If so concerned, why did you need exception for the clean air, clean water act in 2006?

21. 60,000 wells doesn't sound like the few we heard about.

22. Do you think fossil fuels are our future, or a transition?

We believe that natural gas is a big part of our nation's future because it is the lightest hydrocarbon on the planet. It emits half the carbon dioxide of coal, and almost no air-polluting particulates, which is 99% less than coal. We have a 100-year supply of it. Additionally, natural gas makes wind and solar viable and provides a foundation for them to grow. Power plants can use natural gas when the wind doesn't blow and the sun doesn't shine.

23. Not all of us are interested in cashing in on the great gas bonanza, yet we are equally affected by the possible downsides, as air and water contamination are not contained to property boundaries. When drilling one mile or more into the earth and leaving two-thirds or more of the toxic water deep underground, how can they guarantee that it will not migrate in the near future or the future of my children? The NYCDEP did an environmental study showing how slick water hydraulic fracturing goes through existing fissures and creates other fissures. Yet the gas companies are exempt from the super fund act. They have no liability to our future after the extract our wealth.

The benefits of natural gas production are beginning to be shared across the commonwealth. Last year alone Pennsylvania could attribute 50,000 jobs to environmentally safe natural gas production. Companies have contributed hundreds of millions of dollars directly to landowners, and they are using it to make their communities better. According to an article in Wilkes-Barre, one family in Tunkhannock leased 15 acres at \$5,750 an acre, and then donated to several charities – including the Dietrich Theatre, the Church, the Red Cross, and the Conservation district. Of course for many companies, philanthropic contributions are in the hundreds of thousands of dollars in the communities where the drilling is happening. None of this outweighs protection of natural resources, especially water. But every state that has experienced hydraulic fracturing over the last 60 years has testified they have never seen one case of groundwater contamination from the practice. That's because the areas we fracture are separated from the areas that house drinking water by thousand of feet in distance and millions of tons of

impermeable rock. The fracturing is tightly controlled. We're talking about a separation of groundwater aquifer, and fracturing zones, of more than a mile.

24. As the member of Brown Fields attests, we're still recovering from the environmental damage done by anthracite mining and the steel industry. Won't the cost of healthcare for people affected by poor quality water and air, as well as damage to roads caused by the heavy truck traffic, far outweigh the short-term benefits of jobs that last on two to eight years?

Natural gas production has been going on for sixty years. Millions of wells have been drilled and hydraulically fractured. Water and air quality have been unaffected by it. Roads are damaged and fixed by companies that sign road use maintenance agreements with local municipalities. The industry is rigorously regulated and the technology is time-tested. There is simply no long term environmental trade off for the hundreds of thousands of jobs and revenue that this industry is providing. There is no question that the coal industry has had a large impact on our environment. We are not the coal industry or the steel industry.

25. When will gather pipelines to the transmission line be built? Where are the first gathering pipelines planned?

26. What percentage of 500 trillion cubic feet is considered recoverable?

A typical initial model from other shale fields is 10%. The Barnett recoverable percentage has increased over time as improved technology and techniques evolve. No one knows for certain how much gas can be recovered from the Marcellus. The 500 tcf number frequently cited is the amount of believed recoverable gas of some experts.

27. Are there well-abandonment funds in escrow for each pad? If so, how much?

28. Have you done any long-term studies to determine if the fissure created by fracking and the chemicals injected will migrate over time or during an earthquake?

Hydraulic fracturing has been done more than one-million times, over sixty years, in sixteen states. Each of the states testified that they had never documented one single case of groundwater contamination during that time. (<http://www.dec.ny.gov/energy/58440.html> click on Appendix 2)

Science confirms that it has not happened in the past, and cannot happen in the future. Geology gives us physical barriers that exist between the underground strata containing drinking water (generally found between 100 and 350 feet below the surface) and the formations below (sometimes miles below) that hold trillions of cubic feet of shale gas resources. They have been ensuring the water at 200 feet, is separated from the shale at 8,500 feet for a million years, preventing the salty water that's already down there naturally from penetrating our aquifers and ruining our drinking water.

29. Would you support changes in the law to allow local county conservation districts to have some ability to enforce regulations? Currently, due to exemptions given to the oil and gas industry, the conservation districts have no over-sight – only the DEP which is short-staffed. We believe that the DEP is well staffed to properly regulate Marcellus Shale development. There is a

sustainable model in place for permit fees that have allowed the DEP to already hire 40 additional inspectors and staff, with plans to hire an additional 68 this year. These increased permit fees have also allowed the DEP to open a new office in Scranton.

30. On a well-site, three wells in line, with wells seals, what are the casings behind of each of these sealed wells? Looks like the casing is 8 inches to 12 inches in diameter. They are not capped.

31. Is all the gas being produced from the Marcellus shale going to be used only in the United States? Is the 'fracking' technology exactly the same as has been used for 20 years?

97% of the natural gas produced in the United States, is used in the United States.

How many local people have been hired, and for how long? I understand most of the labor involved with the MS play is from out of state and will be moving on. Creating a boom-bust cycle in communities where gas drilling is active. Last year alone Pennsylvania could attribute 50,000 jobs to environmentally safe natural gas production. The initial drilling workforce was largely from out-of-state because it takes trained and experience personnel to operate the high tech equipment used to drill modern wells. These experienced workers came from other operating areas throughout the country as there were not enough local workers with training in this industry. This situation is changing rapidly as Chesapeake, for example, has been hiring dozens of new employees to begin as trainees with our drilling subsidiary NOMAC and Chesapeake is planning construction of a \$6.3 million residential facility in Bradford County to house the temporary workers that will be necessary for some time, but will also be home to our Eastern U.S. NOMAC Training Center, so that we can more quickly hire and train local workers.

32. What do you know about air quality in Dish, Texas?

On January 12, 2010, the Texas Commission on Environmental Quality announced positive results from an air emissions study conducted at more than 100 natural gas production facilities within the city limits of Fort Worth. The TCEQ stated that the study, which took place the week of December 14, 2009, found no **pollutants at levels that would be cause for concern.**

33. In January 2009, there were 15 DEP inspections for 60,000 drill sites. How many inspections are there for how many drill sites as of January 2010? In 2009 more than 14,500 oil and gas field inspections were performed by the DEP in Pennsylvania, less than 1.1% of the findings that were out of code were discovered on Marcellus locations, typically administrative in nature and were quickly corrected and often with no fines. We anticipate even more inspections in 2010 as evidenced by the staffing increases at the DEP for this industry.

34. Where are we concerning the FRAC ACT?

35. I am the Northeast Manager of the Carpenters Union and President of the Cranton Building Trades. Chesapeake and all of the other companies are bringing in hundreds of out of state workers who do not pay local taxes etc. When are you going to reach out to the local Building

Trades for contractors to work on the pumping stations and water treatment plants and put local taxpaying citizens to work?

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36. In addition to the current staff of 16 inspectors, how many positions for additional inspectors are currently budgeted? Already this year, at the Governor's direction, the Department of Environmental Protection began hiring 68 new personnel who will make sure that drilling companies obey state laws and act responsibly to protect water supplies. DEP also is strengthening oil and gas regulations to improve well construction standards to enhance water quality protections. In addition, DEP recently announced plans to open a new Oil and Gas Management office in Scranton, Lackawanna County, to improve the agency's ability to oversee and respond to issues stemming from increased natural gas drilling throughout the region.
37. What is the optimum ratio of inspectors to open sites in order to ensure compliance with environmental protection laws?
38. You noted "water use" by other industries – but, do all of those industries pollute their water to the degree "fracking" does?

Natural gas production has been going on for sixty years. More than one million wells have been drilled and hydraulically fractured. Water and air quality have been unaffected by it. The industry is rigorously regulated and the technology is time-tested. There is simply no long term environmental trade off for the hundreds of thousands of jobs and revenue that this industry is providing. All human activity has some degree of impact on the environment, but with proper regulations and best management practices any impacts from natural gas development are manageable and minimal.

39. What year was the Pittsburg water issue and how long did it last? A study completed by international environmental engineering and consulting firm Tetra Tech, Inc., revealed that natural gas development was only a minor contributor to elevated levels of Total Dissolved Solids (TDS) in the Monongahela River last fall. Tetra Tech found that the primary TDS load in the Monongahela River came from abandoned mine discharge, which was realized in high sulfate concentrations. Drilling activity accounted for approximately seven percent of the total TDS concentrations detected in the Monongahela River in October 2008 and decreased to less than one percent by December 2008. Increases in river flow rates and reductions in discharges from abandoned mines appear to be the most significant factors that contributed to the reductions in TDS concentrations between October and December 2008.

40. Hexavalent Chromium is not a normal form of natural chrome in groundwater. However, Hex Chrome has caused wide spread contamination during natural gas drilling in Texas. What is the source of Hex Chrome? Is there any Hex Chrome in Northeast PA during residential well water tests?
41. What do we need to test the water and "local air" for? Is there a list and protocol? How much should it cost?
42. Does DEP have a projected cap on drilling permits? If the answer is NO: why not? If YES: what is the number?