

Public Misinformation about Marcellus Shale

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The public is being misinformed about the Marcellus Shale since the recent increase in drilling activity in PA and WV. Much of the misinformation is either from extremists with personal agenda, or people uninformed of the facts about: 1) the gas shale resource, 2) the manner in which it has historically been drilled for natural gas, and 3) the manner currently being used to produce gas from it. Fortunately, for the benefit of local and state governments, citizens, especially the environment, and our entire country, advanced technology has made it possible to more economically and efficiently drill and produce safe, clean, natural gas from this resource. As a retired professional engineer, experienced in the industry, and one who is concerned about both our environment, clean streams and rivers, and sources of clean energy, I believe is important for the public to receive factual information and not fiction, horror-story types of misinformation.

The Marcellus Shale is about 150' thick and 7,500' deep in the Monongalia County, WV area, and varies from 0 to 900' thick in the Appalachian Basin. It is the bottom layer of the Devonian age shales that lie on top of the Onondaga Limestone. Unlike many sandstone gas reservoir wells that may produce 30 years or so, these Devonian shale wells may produce for 100 years or more, but at a lower rate which has made them economically marginal to drill in the past. The US Dept of Energy, National Energy Technology Laboratory (NETL) in Morgantown has researched how to enhance recovery from these shales since 1970, and now much of their technology developments, along with those from industry, are finally coming to fruition. In addition to the USDOE and WV Geological and Economic Survey characterization of the shales, perhaps the two greatest technology improvements that have contributed to the present activity were massive hydraulic fracturing (MHF) and horizontal drilling technology, both researched and field demonstrated by US DOE in Morgantown.

Now horizontal wells are being drilled out through the pay zone in the Marcellus shale for distances up to 3,500' laterally from the conventional vertical access wells. This means that more than 20 or 30 times the pay zone can be stimulated than from a vertical well! It means that the production can be more than 20 times as great, because the horizontal wells also intersect perhaps 300 or more natural fractures or gas conduits in the otherwise impermeable shale. One could make the argument that one such horizontal well is better than 20 vertical wells! In addition, from the same drill pad (drill site, drilling location etc.) another horizontal well can be drilled in the opposite or several other directions. This means that for just one direction, 19 times less pipelines, roads, drill sites, sacrificed trees, excavation and erosion, fresh water for hydraulic fracturing, and other community disturbance will occur in order to recover approximately the same amount of gas. Unfortunately, the costs of drilling these horizontal wells are extremely high, but the environmental benefits are huge, even though the public only gets the sensationalized news from one of these horizontal wells instead of the advantages over the equivalent 20 conventional vertical wells as drilled in the past to recover the same reserves.

One recently published article by Pamela Dodds in the 9 November 2008 *Dominion Post* about the Marcellus Shale really needs to be corrected for a more accurate public understanding. The entire context is misleading and not reflective of actual industry practices or conditions, including the following quotes:

- 1) "Silica sand is stored in a silo and can cause a surrounding area silicosis problem". (It is actually contained in closed tanker transport trucks that are connected to the well by pipelines, i.e. a closed system!)
- 2) "Chemical surfactants are used to help release kerogen". (Surfactants are actually like slick soap to reduce the friction and pipe pumping pressures during injection of jelled water and suspended sand to prop open the fractures, and not used to "release kerogen".)
- 3) "The pyrite based sulfuric acid and iron hydroxide and numerous other "toxic" metals such as copper, aluminum, lead, zinc, etc and resulting acid drainage thereby releasing them to the environment" (This is utter nonsense. First of all, the cuttings and fluids produced during well drilling and completion operations are contained by huge excavated plastic lined pits, or tanks, so that none of these fluids laden with cuttings are released back into the groundwater, or streams, or the environment, unless there is an unusual accident.)
- 4) The Dodd statement, "The release of radioactive materials into the air as methane gas", and "The release of radioactive materials onto the ground surface and into streams from drill cuttings and from recovery of drilling water directed into streams" (This is fiction, and never occurs without an unusual accident and serious violations of the permitting processes.)
- 5) "Any radioactive methane gas recovered from the well is piped to holding tanks and subsequently transported to major gas pipelines". (There is no radioactive methane gas, and pumping such into "holding tanks" is fictional. Hundreds of miles of pipelines transporting radioactive methane gas is also fictional.)
- 6) Radioactivity associated with the Marcellus Shale and the methane gas as being used in the Dodds news article is an absurdity. The slight relative difference in the low background level radioactivity of the Marcellus shale and other historical gas producing shales can only be detected by highly sensitive gamma ray well logging tools. The methane gas is not radioactive and does not contain or entrain any significant even low level radioactive shale components.

The entire issue of various forms of contaminated water, brines and drill cuttings entering streams and rivers shows a complete lack of knowledge, if not total ignorance, of the oil and gas industry, and how operations are actually performed, in addition to how it is regulated now compared to 40 years ago. All drilling cuttings and water coming back out of wells either when they are drilled, or later as they are produced, are collected either in a large plastic lined pit or huge tanks and either treated for recycling or hauled to government regulated waste disposal well sites. It is ironic that 1,000's of tons of salt and other particulates spread on highways every year that actually wash into streams and rivers is never mentioned, while no driller has been accused of polluting streams directly through the discharge of brine from gas wells! Such false and misinformation is counterproductive for both serious environmental improvement and energy development.

It is true that each well requires lots of water, especially in a drought year, and more water recycling plants need to be built to accommodate the new drilling rates. However, this is only part of the story. Developing the Marcellus shale using horizontal wells and the large amounts of water required for each well is actually much more environmentally friendly, as well as, more efficient, than the conventional vertical wells. Today, one Marcellus shale horizontal well is typically drilled on a 640-acre spacing,

whereas, the same number of vertical wells drilled in the past to recover the gas would typically be on a 40 acre spacing, or require 15 or more wells. The benefits of the technology currently being used needs to be recognized and appreciated in a more holistic perspective of the overall natural gas and entire energy industry. This is the best, new technology available now being introduced here in WV in the Marcellus shales that is used anywhere in the U.S. or around the world, and the streams or environment are really not being polluted as a result of it.

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