

Getting The Waters Tested The Marcellus Shale Factor

Water Resources

Old Issues

Environment



New Issues

Marcellus Shale Formation

Presented At
PA State Nursing Association
Marcellus Shale: Unearthing
Environmental Health Issues for
Nurses
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B.F. Environmental Consultants Inc.
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 And
 Water Research Center
<http://www.water-research.net>

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Outreach Programs

- Environmental and Professional Education and Training for Citizens and Local Municipalities
- Water Quality Help Guides – Information Library
- Community and Business Outreach Programs
- Low Cost – Informational Water Testing Program with National Laboratory
- Citizen Monitoring Programs


Website: <http://www.water-research.net>
 Free Information on Drinking Water Quality








What is the Marcellus Shale Factor?

- We have been educating private wellowners for 20+ years- but it was difficult to get citizens to test their well water. It looks clear – I am not sick – It is fine.
- The Marcellus Shale Factor – Baseline Testing for Natural Gas Development is conducting Testing and Citizens are told they have a Problem NOW.
- Based on Private Well Construction and Placement - Some Private Wells may be the pathways for Contamination.
- **DO YOU Know that 30 to 50 % of Private Wells in PA produce water that does not meet the Drinking Water Standards??**

WE Support the Citizen Groundwater Database at Wilkes University !



This is Drinking Water from Private Wells in PA?

50% Other 50%

Iron / Manganese Sediment / Gases/ Saline Water

Corrosive Water Bacteria

Based on the geology of the NEPA and my 20+ years experience, the **common** water quality problems are as follows:



Biggest Problem Bacterial And Microbiological Agents

Contamination by VOCs, SOCs, Glycols, Saline Water (< 3 %), Barium, Salt, and Radionuclides are NOT COMMON!

- Corrosive Water
- Low pH
- Soft Water (low hardness) to Moderate Hardness
- Iron and Manganese
- Total Coliform Bacteria
- Sulfur Odors and Methane-
- Biogenic/Thermogenic Gas (Tends to be < 10 mg/L)
- Radon Gas
- Arsenic

Private Wells Not Regulated

- Private Wells Are Not Regulated under Safe Drinking Water Act
 - EPA – NO
 - PADEP – NO
 - County – Very Few Counties in PA
 - Townships – some have basic ordinance on placement- some have comprehensive requirements- but most have nothing.

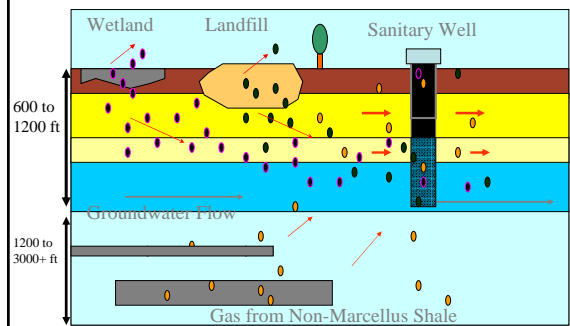
Most Contamination appears to be associated with Total Coliform Bacteria



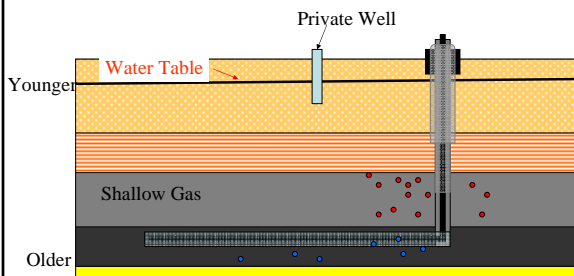
- Insects, Larvae and Nests / Egg Masses
- Mouse Colonies
- Snakes
- Beehives
- Mud - when casing to close to ground

Therefore – In some cases - the Private Wells are Facilitating Groundwater Contamination.

Methane Gas Migration- Not Related to Marcellus Shale



Migration Concepts- Multiple Casements and Recreate Confining Layers – No Uncemented Zones.



Flowback Water Chemistry

Flowback water is generated from drilling and it is what gets produced from the first 5% of water returned after a well is started

Parameter	Frac 1	Frac 2	Frac 3	Frac 4
barium mg/l	3,310	2,300	7,75	4,300
calcium mg/l	14,100	5,140	683	31,300
iron mg/l	52.5	11.2	211	134.1
magnesium mg/l	938	438	31.2	1,630
manganese mg/l	5.17	1.9	16.2	7.9
strontium mg/l	6,830	1,390	4.96	2,000
dissolved solids mg/l	175,268	69,640	6,220	248,428
suspended solids mg/l	416	48	490	330
chemical oxygen demand mg/l	600	567	1,814	2,272

May contain elevated levels of trace metals, nitrogen, bromide, uranium, and hydrocarbons. Most of the dissolved solids includes chloride and sodium.

Source: <http://www.prochemtech.com/>

Production Water

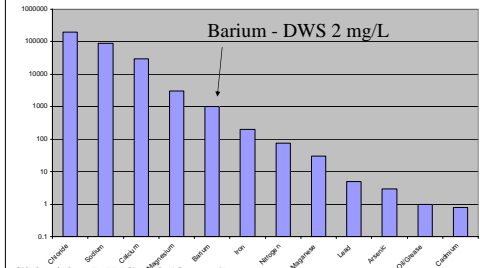
Produced water is waste water that accompanies oil extraction and is high in saline. Typically, separated stored on site and then hauled to treatment/disposal facility.

Parameter	Result	Parameter	Result
pH	4.79	conductivity nanhos	366,600
total oil/grease mg/l	9	chemical oxygen demand mg/l	2,332
surfactants mg/l	105.7	barium mg/l	690
calcium mg/l	23,200	iron mg/l	160
magnesium mg/l	2,249	manganese mg/l	10.1
strontium mg/l	732	dissolved solids mg/l	224,300
suspended solids mg/l	33		

May contain elevated levels of trace metals, nitrogen, bromide, uranium, and hydrocarbons. Most of the dissolved solids includes chloride and sodium.

Source: <http://www.prochemtech.com/>

Approximate Flowback Water - Wastewater Chemistry Concentration - mg/L (Source: PSU and Marcellus Shale Coalition)



More Data can be found at <http://www.bfenvironmental.com>

• Citizen Database



Please Participate – Survey of Private Well Owners In PA – Data will be used to update informational guidebook. Please Visit:

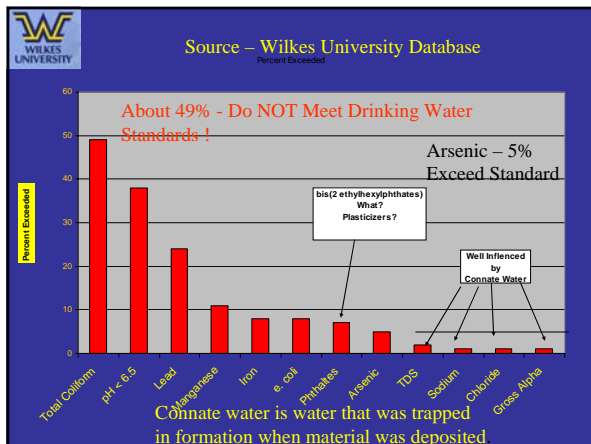
<http://www.surveymonkey.com/s/NMG6RQ3>

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Goal of the Database

- Provide a Central Location to Store Baseline Pre-Drilling and/or Post-Drilling Water Quality Data for the Region
- Document Quality by Geological Formation
- Identify Existing Regional Issues or Concerns
- Provide an Un-Biased Community Resource
- Provide a Mechanism to Track Temporal, Spatial, and other Geospatial Variation in Water Quality.



New Community Resource



Download a Free Copy (pdf) or Link to a copy at <http://www.wilkes.edu/water>

Also:

1. We are Working with Wilkes University on a Regional Citizen Water Quality Database.



Add Your Data to the Citizen Database- Contact Mr. Brian Oram at bfenviro@ptd.net