

**BRIDGETON-NOCKAMIXON-TINICUM
GROUNDWATER MANAGEMENT COMMITTEE**

163 Municipal Rd
Pipersville, PA 18947
610-294-9154
gwmc@epix.net

Chair:	C.C. Hopf	B	Todd Stone	N
Vice-Chair:	Robert B. Stanfield ScD	T	Stephen F. Donovan PhD	N
		Vincent Dotti	T	

Date: December 22, 2009

Amount Requested: \$25,000

Purpose

To monitor in real time the conditions of the Rapp Creek (EV Watershed), enabling the downstream townships to alert the appropriate authorities of a pollution event, thus allowing the authorities to take immediate remedial and enforcement action. Besides the residents, there are two potential polluters on the creek, Hanson Quarry and Arbor Resources LLC (a gas drilling company). The project will develop a data history of the condition of this Exceptional Value stream in order to define alarm criteria to minimize any false alarms, yet be sensitive enough to sense an emergency event with a high degree of certainty.

Length of project

The project is intended to fund the initial capital costs of equipment, the installation and the establishment of the Internet monitoring network. There will be lesser operating costs of an Internet website and equipment maintenance costs for 2 years.

Scope of Project

The monitoring equipment will measure:

- Conductivity
- Turbidity
- Temperature
- Stream Depth
- Dissolved Oxygen
- pH

These measurements will be taken at 15-minute intervals and transmitted via a WiFi link to a

base station.¹ These measurements will transmit via the Internet to a Web Site. There is software that will perform an autodial when any of the property levels has been exceeded. The first three parameters (conductivity, turbidity, stream depth and the temperature) are the priority parameters that will spot any exceedances indicative of a fracking fluid spill. The pH and dissolved oxygen would be useful if there are funds for those characteristics. The incremental cost of transmitting additional data streams is just the cost of the monitoring probes, and installation. There are continuing for periodic maintenance, calibration, software licensing fees and web site data base costs.

Will the scope be Regional?

The project will develop the expertise of fielding this instrumentation and it will also be possible to add additional monitoring sites as any additional gas-drilling sites are permitted and operated in the Lower Delaware basin.

How will it relate to the Delaware River?

There have been serious spills of fracking fluid brines to a wetland and a creek near Dimock (Northeast PA) in the Delaware River watershed; at Dunkard Creek, a tributary to the Monongahela River on the border of Pennsylvania and West Virginia (Southwestern PA); and there are many incidents in several western states. These fracking fluids contain an undisclosed mixture of a brine of many different metal cations, surfactants, biocides, radioactive compounds and other unknown organic compounds. The contamination of the Delaware River through unrecorded spills would cause irreparable damage without close scrutiny of potential pollution at the source.

Is there a Partnership possibility?

The Bridgeton Nockamixon Tinicum Groundwater Management Committee, together with the downstream municipalities of Nockamixon and Tinicum, will be actively administering and evaluating data. The Pennsylvania Fish and Boat Commission have expressed interest in participating in monitoring the condition of the stream.

If there are matching funds, are there any deadlines?

We have not applied for any matching funds; therefore there are not any deadlines.

Deliverables:

We will develop expertise and experience in real time monitoring of streams to minimize any damage from environmental spills, and unequivocally point to problems at the very time of incidents are actually taking place. Besides minimizing exposure of the Delaware watershed to chemical pollution, it will be an invaluable aid in confidently directing the appropriate state and federal agencies to take the appropriate enforcement action. We will be able to better carry out

¹ There are also cell phone, satellite and 930MHz spread spectrum options. WiFi, if feasible, would be preferable.

due diligence of safeguarding the EV status of our streams. If these streams are degraded, there are those who would immediately petition the EQB to downgrade their status from their current EV rating.

Background:

There have been a number of incidents of fracking fluids being spilled into streams from gas drilling operations in PA and elsewhere. Arbor Resources has identified two sites where they may wish to start the initial well drilling operations. If they find economical amounts of natural gas, they are apt to put in many other wells in our area. It is fully expected that they will need to use fracking techniques.

In one of the unfortunate events of leaking fracking fluids into the streams of Pennsylvania, the real-time monitoring proved invaluable to spot the occurrence and document the event. The PA Bureau of Oil & Gas Management within the Office of Mineral Resources Management of the Department of Environmental Protection is responsible for inspecting and monitoring all gas and oil drilling operations within Pennsylvania. The current boom in gas drilling in conjunction with the large amounts of layoffs of PA DEP employees this year is a great source of concern. From conversations with Ron Gilius, the Director of the PA Bureau of Oil & Gas Management, the amount of new drilling operations and the limited size of the staff will mean that any particular drilling operation may only be visited once or twice during the entire drilling process. The drilling company will hopefully follow all best management practices. Unfortunately, this has not always occurred. He also said that while the local municipalities have no statutory right to monitor and inspect on site, they should let the PA DEP know if there are any problems with a drilling operation. This is only possible by municipalities with stream monitoring immediately off-site. The only practical way to do this is continuously monitoring (24/7) the water downstream of the drilling site. If this monitoring is done properly, it will be possible to spot a problem as soon as it occurs.

To be able, with good confidence, to spot and report an exceedance due to fracking fluids and not due to such things as rain storms, runoff of road salt, fertilizers from lawns or any other random “normal” event that can cause the water to change its properties, it is prudent to have been monitoring the normal variations of our streams characteristics for at least a year in advance of any drilling operation. The BNT GWMC has had a good history of monitoring a complex network of well monitors that continuously measure the water level and use this information to allow the local municipalities to more effectively plan development within the resources of the land in question.

Appendix A
Equipment Costs

Installation Costs

Datasonde (Multiprobe instrument)	~\$11,000.
Data platform (Temp, pH, depth, conductivity, turbidity, DO).....	~\$3,500.
Power, housing, cables, etc.	~\$2,500.
Labor/travel/supplies.....	~\$2,200.
Total	~\$19,200.

Recurring Costs (Operations and Maintenance)

Datasonde servicing, maintenance and insurance.....	~\$1,000.
Communications, data management, and staff time.....	~\$2,800.
Total	~\$3,800.

Reserve for Unanticipated Items.....**\$2,000.**

Total Grant Request.....**\$25,000.**

Detailed pricelists, equipment descriptions, options and some ideas for leveraging this equipment is available from us on request. We are in contact with other users of this equipment in Pennsylvania in order to learn from their experience in deploying it to monitor streams for fracking fluids. The prices and items were modeled after the stream monitoring efforts of the Susquehanna River Basin Commission.

Appendix B

Some recent adverse events from fracking fluids that have been released into streams in Pennsylvania:

In the Delaware River Watershed:

[PA DEP Orders Cabot Oil and Gas to Stop all Hydrofracking. Due to Spills \(9/25/09\)](#)

Brief WNEP-TV news story that Pennsylvania Department of Environmental Protection ordered Cabot Oil and Gas to stop all hydrofracking until they have completed a number of safety and engineering tasks, as a result of three spills of over 8,000 gallons of fracking fluid that contaminated a wetland and creek near Dimock, PA, in one week. Also mentions that Cabot's drilling activities polluted a number of home water wells earlier this year.

[Third Fracking Fluid Spill in a Week near Dimock, PA \(9/22/09\)](#)

Hundreds of gallons of fracking fluid spilled by Cabot Oil & Gas in Dimock, PA, on 9/22/09 bring the total in Dimock to three substantial spills in less than a week.

[Fracking Fluid Spill in Dimock, PA Contaminates Wetland & Stream \(9/17/09\)](#)

6,000 to 8,000 gallons of fracking fluid leaked from a Cabot Oil & Gas pipe in Dimock, PA, 25 miles south of Binghamton. The next day, DEP and Cabot spokesman were not able to identify the chemical composition of the material spilled. Officials are evaluating whether or not the aquifer feeding private wells could be affected.

In other Pennsylvania Watersheds:

[Pittsburgh Post-Gazette \(9/20/09\) Likely Fracking Fluid in PA Stream Kills Aquatic Life for 38 Miles](#)

Contamination in Dunkard Creek, on the border of Pennsylvania and West Virginia, has killed all aquatic life for the 38-mile length. Officials originally thought pollution was from discharge from a mine water treatment facility, but have now found fish kills upstream of the facility, and testing shows the pollution to be drilling wastewater. Illegal dumping of gas drilling wastewater may be occurring.