Centre County Natural Gas Task Force
Meeting Notes
March 12, 2012 at 4:00 p.m.
Location: Central PA Institute of Science and Technology
540 North Harrison Road, Pleasant Gap, PA 16823

Present: Susan Shoemaker Benedict, Jessica Bilger, Bob McDaniel, Dan Fisher, Greg Myers, Ken Hall, Mike Savage, Steve Greer and Tim Ziegler,
Absent: Bob Norbeck, Jeff Kern, John Ferguson and Stan LaFuria
Sub-Committee Members Present: Joe Urbanick, Art Dangel, Dean Lawrence, Steve Lyncha, John Rodgers, Todd Taylor, and Rob Balsamo.
Sub-Committee Members Absent: Mike Schaul, John Spychalski, Lou Stubbs, Mary Carol Frier, Bruce Snyder, Colleen Williams, Mike Welch, Bob Griffith, Joe Hart, Andrew Sicree, Butch Davey, Matt Hall, Dick Mullfinger, Jamie Walker, Alison Amaismeirer, Louis Glantz and Lynn Herman.
Liaison Members Present: Doug D’Amore
Liaison Members Absent: Dan Vilello, Paula Ballaron and Rick Lamkie
Ex Officio Members Present: None.
County Resource Persons: Sue Hannegan and Jim Coslo
Centre County Commissioners: Michael Pipe

Guests: Guy Woodard – CPI / EE&I Program Instructor; Kathy Brasier – PSU Ag Economics; Mary Wolf – Anadarko; Matt Blymire – Columbia Gas New Business Services; Matt Genchur – PA Rural Water Association; Nora Aiden – EIS Solutions and Eneplus; Rick Hollinger – Columbia Gas; Pete Smeltz – Clinton County Commissioners, Natalie Pekney – National Energy Technology Laboratory; Mike Belski – Columbia Gas; Margaret Hopkins – PSU / MCOR Coordinator of Public Information.

Total Number Present: 31

The meeting was opened by Chairman Susan Shoemaker Benedict at 4:00 p.m. with a quorum present.

Welcome and Introductions: All meeting attendees provided a short introduction of themselves.

Declarations of Conflict of Interest and Ex Parte Communication: In order to remove any doubt of impropriety, the following task force and/or sub-committee members have declared interests. Bob McDaniel – Business Development Coordinator, G.O. Hawbaker, Inc. supplying contract work for drilling companies; Susan Shoemaker Benedict -- property owner with expected gas industry development; Steve Greer – Senior Project Manger with Arm Group, Inc., sub-contractor/consultant to various companies involved with the gas drilling industry; Ken Hall – actively involved with property lease management; Greg Myers -- Senior Engineer/Senior Geologist, DMS Environmental Services, providing services to the oil and gas industry; Joe Hart – employed by HRT, Inc. & PA Brine, who serve as sub-contractors to the natural gas industry; John Ferguson – employed by Columbia Gas of PA; Dean Lawrence – realtor with commercial real estate activity of interest to the natural gas companies; John
Election of Officers:

The CCNGTF Bylaws, Article XI, Selection of Officers, stipulates that officers serve for a one-year term; and no officer may serve in the position in which he or she was elected for more than two consecutive years. As a result, neither Susan Benedict nor Bob Norbeck would be eligible to continue in their respective offices, chairman and secretary.

On a motion by Mike Savage and seconded by Ken Hall, the task force approved suspending the bylaws to amend the election provision. Subsequently, on a motion by Mike Savage and seconded by Jess Bilger, a clarifying motion was made to suspend Article 11, Section 2 for a period of one year. This second motion was also approved.

On a motion by Dan Fisher and seconded by Mike Savage, the present slate of officers were nominated for the offices of Chairman, Vice Chairman and Secretary. Motion approved.

The 2012 Officers are:

- Chairman: Susan Benedict
- Vice Chairman: Jessica Bilger
- Secretary: Bob Norbeck

Approval of Prior Meeting Notes:

Following a motion by Ken Hall and seconded by Steve Greer, the minutes of the February 13, 2012 meeting were approved as presented.

Announcements:

- Susan Benedict announced, and invited all to attend, the April 14th Public Issues Forum – “The Marcellus Shale – What Does It Mean for Us? “ The Forum will be held from 9 a.m. to 3 p.m. on Saturday, April 14th at the Central PA Institute of Science and Technology (CPI).
- The Marcellus Shale Coalition has introduced "Marcellus on Main Street" which is a web-based database listing business information and contacts. For $25 a business can be listed on this site. The purpose is to connect natural gas industry businesses with other local businesses that may be able to provide a service.
- The Centre County private drinking water testing results have been compiled and were distributed to property owners who participated in the program. Approximately 50 wells were tested. Sue Hannegan announced that it is still possible to participate in the program and if interested the application is posted on the county’s website http://www.co.centre.pa.us/planning/natural_gas_task_force.asp

Citizen Comment: None offered.

Presentation: “Investigating Air Quality Impacts from Oil and Gas Exploration and Production Activities” by Natalie Pekney, Ph. D., National Energy Technology Laboratory, Environmental Sciences Division.

A .pdf copy of Natalie’s presentation is attached to these minutes. A few key points are listed below:

- The Environmental Sciences Division of the National Energy Technology Lab (NETL) researches environmental impacts and develops environmentally friendly technologies and management strategies.
Currently the Division is focused on Marcellus Shale; having just completed monitoring in the Allegheny National Forest. The preliminary conclusions of the Allegheny National Forest research found that the concentrations of criteria pollutants were below the national ambient air quality standards.

A Marcellus Shale Test Site / Life Cycle Assessment will be established in Washington County, PA. Background data is now being collected prior to drilling. The collection of data at this site will continue from well pad construction through drilling, to production.

Typically, it is difficult to quantify industrial impact partially due to multi-point emission sources and variations in operator procedures.

Ozone is created by the chemical reactions between NOx and VOCs that are emitted from equipment needed to operate the well drilling process.

Natural Gas fired electricity production has a life cycle green house gas emission at 42% - 53% lower than coal-fired electricity; and unconventional natural gas fired electricity has a 39% lower green house gas emission than coal.

A mobile Methane Survey Monitor using a wireless air monitoring system (WAMS) is solar powered and can be strategically placed in remote locations for the collection of spatial data. It can be used to provide preliminary data for a particular source which is then considered for more in-depth research.

NETL has the capability to survey methane emissions using a Leak Detection System, an instrument with an integrated GPS that provides concentrations linked to a geographic location for a spatial representation of emissions. These surveys will provide preliminary data for a particular source which then can be considered for more in-depth research.

Following a questions asked by Bob McDaniel, Natalie identified the major contributors to the natural gas industry air quality as the following and suggested that a switch to natural gas fueled vehicles would improve the air quality.

- Hydrofracking because of the number of diesel engines
- Vehicle emissions
- Fine particulate matter / dust from dirt and gravel roads.
- Compressor stations

For ways to reduce impact, visit the National Energy Technology Laboratory, Environmental Sciences Division. One of the important considerations is the use of “green completions” during which the initial gas generated by a well is collected rather than flared, the impurities separated, and the marketable gas sent to the pipeline.

**Old Business:**

Mobile Energy Education Training Lab (MEET-U): The MEET-U exhibit covers all energy providers and is not restricted to natural gas. Two high schools will be participating and sending 10th and 12th grade students between 9 a.m. and 3 p.m. The public is invited to visit between 4 and 7 p.m. Seven sponsors have provided the funding for the exhibit: Anadarko Petroleum Company, Aquatech, Babst / Calland Attorneys at Law, Columbia Gas of Pennsylvania, Fulton Bank, HRG, and Resource Technologies Corporation. EXHIBIT DATE: Thursday, April 19th.

New Business: None offered.

Committee Reports:

**Economic Development:**

Steve Lyncha provided a short report of the March 6th committee meeting. The next steps for the committee will be to build partnerships to improve economic development opportunities and create a stronger awareness for natural gas industry activities.

**Education:**

Todd Taylor made the following two announcements on behalf of the committee:
The US Department of Labor has awarded a $500 million grant to Marcellus ShaleNET for education and training. As part of the Clinton, Centre, Clearfield Consortium, CPI will be offering several program options.

Ground for CPI's new transportation center should be broken in May.
Environment / Infrastructure:

Steve Greer thanked Natalie Pekney for the informative presentation and mentioned the following two committee activities:

- Recent information received from DEP and SRBC will be evaluated for optimal water withdrawal locations and community water system improvements.
- Develop a process to distribute information to the media for publication. Greg Myers volunteered to contact Andy Elder at Marcellus Business Central.

Public Policy, Planning and Legal Issues:

Ken Hall shared some preliminary information on the local distribution of ACT 13 impact fees. Snow Shoe Borough will receive a small, disproportionate amount considering they are impacted by nearly all of the traffic accessing well pads in the northwestern portion of the county.

Meeting Schedule:

CCNGTF: April 9, 2012 at CPI at 4 p.m. (Second Monday, Monthly)
Economic Dev. Sub-Committee: April 11th at 7:30 a.m. – Willowbank Building, 3rd Floor
Environmental / Infrastructure Sub-Committee: April 5th at 9 a.m. – Willowbank, 3rd Floor
Public Issues Forum: Marcellus Shale, April 14th, 9 a.m. to 4 p.m. -- CPI
Mobile Energy Education Training Lab / MEET-U – April 19th -- CPI

Meeting Adjourned: The March meeting of the Centre County Natural Gas Task Force was adjourned at 5:25 p.m. following a motion by Greg Myers, seconded by Tim Ziegler.

The presentation by Natalie Pekney, “Investigating Air Quality Impacts from Oil and Gas Exploration and Production Activities”, starts on the following page.
INVESTIGATING AIR QUALITY IMPACTS FROM OIL AND NATURAL GAS EXPLORATION AND PRODUCTION ACTIVITIES

Centre County Natural Gas Task Force Meeting
March 12, 2012
Natalie Pekney, Environmental Science Division, NETL
Environmental Impacts of Oil and Gas Development

Energy Policy Act of 2005, Title IX, Subtitle J, Section 999

To ensure that oil and gas development proceeds at a rate that protects the environment while maintaining an adequate domestic supply by researching environmental impacts and developing environment friendly technologies and/or management strategies.

- **Air Quality Impacts Research**
  1. Conducted targeted, on-site measurement of pollutant concentrations to quantify impact
  2. Use the information as input or to verify atmospheric chemistry and transport models
Challenges

• **Establish contributions from background vs. multiple point emission sources**
  – Pollutants vary by activity: diesel drilling rigs, condensate tanks, compressor stations, truck traffic are sources of PM$_{2.5}$, ozone, NO$_x$, VOCs
  – Background concentrations in eastern US already high
  – Seasonal and diurnal variation in background emissions
  – Variations in measured species from photochemical and ‘aging’ effects

• **Variations in operator practices**
  – Venting, flaring, “green” completions
  – Open surface impoundments, storage tanks

• **Adapt a combination of predictive models, validated with field data**
Ambient Air Monitoring

- Methane and $^{13}$C in CH$_4$
- CO$_2$ and $^{13}$C in CO$_2$
- VOC’s (52 components on the EPA PAMS list)
- Ozone
- SO$_2$
- NO$_x$ (NO, NO$_2$ and NO+NO$_2$)
- PM$_{2.5}$ and PM$_{10}$
- Ammonia
- Organic and Elemental Carbon in Aerosols
- Meteorological station (temperature, relative humidity, wind speed, wind direction, rainfall, solar radiation)
- Radon

Mobile Air Monitoring Laboratory
Volatile Organic Compounds (VOCs)

- Acetylene
- n-Butane
- 1-Butene
- cis-2-Butene
- trans-2-Butene
- Cyclopentane
- 2,2-Dimethylbutane
- 2,3-Dimethylbutane
- Ethane
- Ethylene
- 1-Hexene
- Isobutane
- Isopentane
- Isoprene
- n-Pentane
- 1-Pentene
- 2-Methylpentane
- 3-Methylpentane
- cis-2-Pentene
- trans-2-Pentene
- Propane
- Propylene
- Benzene
- Cyclohexane
- n-Decane
- m-Diethylbenzene
- p-Diethylbenzene
- 2,3-Dimethylpentane
- 2,4-Dimethylpentane
- n-Dodecane
- Ethyl Benzene
- o-Ethyltoluene
- m-Ethyltoluene
- p-Ethyltoluene
- n-Heptane
- n-Hexane
- Isopropylbenzene
- n-Octane
- Methylcyclohexane
- Methylcyclopentane
- 2-Methylheptane
- 3-Methylheptane
- 2-Methylhexane
- 3-Methylhexane
- n-Nonane
- n-Propylbenzene
- Styrene
- Toluene
- 1,2,3-Trimethylbenzene
- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene
- 2,2,4-Trimethylpentane
- 2,3,4-Trimethylpentane
- n-Undecane
- o-Xylene
- m/p-Xylene (combined)
Allegheny National Forest Monitoring Campaign

- Air quality monitoring was conducted in the Allegheny National Forest (ANF) in July 2010- June 2011
- ANF is a 513,000 acre forest in northwestern PA
- 8,000 wells in the ANF in 2005; currently >12,000
Allegheny National Forest
Air Monitoring Sites in Allegheny National Forest

Bradford Ranger Station
Hearts Content
Kane
ANF Campaign Conclusions

• Concentrations of criteria pollutants $\text{NO}_x$, $\text{PM}_{10}$, $\text{PM}_{2.5}$, and ozone were well below the National Ambient Air Quality Standards.

• Several VOCs were consistently detected but concentrations were typically less than 10 ppb.

• An initial comparison of criteria pollutant data from the three sites shows similar concentrations, but differences in the behavior of several VOCs were observed; concentrations of VOCs were not always lowest at the background site.

• Future work will include a complete reporting of all pollutant behaviors, including statistical analyses to determine statistically significant differences between sites, as well as examination of meteorological data to determine probable source areas.
Marcellus Shale Monitoring Effort: Marcellus Test Site, Washington County, PA

• Multi-agency environmental impacts analysis
• Mobile Air Monitoring Laboratory collected background data at the site July 2011- Feb. 2012
• Collection of data will continue through well pad construction, drilling, fracking, and production
Marcellus Test Site Monitoring Team

- US Army Corps. of Engineers
- DEPT of Energy-NETL
- US Geological Survey
- Natural Resources Conservation Service
- US Fish and Wildlife Service
- Pennsylvania Dept. of Environmental Protection
- Pennsylvania Geological Survey
Environmental Monitoring Timeline

Pre-Development

Site Construction

Well Drilling

Well Stimulation

Production

One Year

2.5 Years
Marcellus Test Site: NETL Projects

• NETL has collected water samples from nearby streams; the samples are currently being analyzed
• Two baseline electromagnetic surveys to detect unwanted migration of production waters
• NETL will perform baseline methane surveys, both in air and in soil gas
Marcellus Test Well Site: Other Agencies

- US Fish and Wildlife Service: Bat listening devices (site is on major bat migration pathway in western Pennsylvania)
- USGS: Groundwater monitoring wells
- Penn State University (funded by Dept of Agriculture NRCS): soil investigation, including ground penetrating radar surveys
- PA DEP: Fish and macroinvertebrate surveys of nearby streams and a large pond below the proposed drill pad
Life Cycle Inventory of Fugitive Emissions From Shale Gas Operations

- Use a life cycle assessment framework to develop improved characterizations of greenhouse gas (GHG) emissions
- Inventory of GHGs from extracting, processing and transporting various sources of natural gas and coal to large end users, and the combustion of that natural gas to produce electricity
- Natural gas-fired baseload power production has life cycle GHG emissions 42-53% lower than those for coal-fired baseload electricity
- Unconventional natural gas-fired electricity (Marcellus Shale) has 39% lower GHG emissions than coal
LCA of GHG Emissions From Shale Gas Operations: NETL’s plans for 2012 and Beyond

• Reduce uncertainties associated with emissions from key activities and process elements of site development and resource extraction
  – Review of current operator practices to update currently used emission factors
  – Ambient air monitoring during fracking operations to evaluate/update currently used emission factors
Methane Surveys

- Air Filter
- Apogee LDS
- Fan
- Airflow Sensor
- WAAS GPS
- Sample Air Intake
Point Emission Sources

Drop-out Tank

Oil:gas:water separation plant

Leaking Wellhead

Wind direction

Pipeline Leak
Wireless Air Monitoring System (WAMS)

- Regional University Alliance (RUA) collaboration with West Virginia University professor Michael McCawley
- Spatial representation of pollutant concentrations obtained by collecting data from air monitoring instruments at each of several strategically-placed modules
- The wireless system sends data from the module locations to a website server accessed remotely
- Inexpensive and easy to use in a wide variety of situations
Wireless Air Monitoring System
Questions?