

## **Introduction**

The Conservation and Natural Resources Advisory Council (CNRAC) was created by the same legislation that created the Department of Conservation and Natural Resources (DCNR) in 1995. The CNRAC is charged with reviewing all conservation and natural resource laws of the Commonwealth, and with studying the work of the DCNR. It is required to advise the DCNR on its work, and to make recommendations for the improvement of the work of the DCNR.

The Citizens Advisory Council (CAC) was legislatively created in 1971. The CAC is charged with reviewing all environmental legislation, regulations and policies affecting the Department of Environmental Protection (DEP). It is mandated to review the work of the DEP and to make recommendations for its improvement, to study major environmental issues facing Pennsylvania, and to promote sound environmental legislation.

Both Councils are required to report their recommendations to their respective state agencies, the Governor, the General Assembly, and the public.

Both Councils function independently of each other, and yet have sometimes come together in the study and review of issues of common interest. Such is the case of our interest in the development of the Marcellus Shale Natural Gas in Pennsylvania, as well as abandoned mine drainage (AMD) areas found in the Pennsylvania State Forest system.

This regional business report focuses on these two areas of mutual interest – Marcellus Shale development, and AMD issues on state forest lands, and reports what we have seen and heard about these issues.

## **Site visits**

**Wednesday, October 21** – CAC and CNRAC visited several sites of environmental interest in the Sproul State Forest.

- **Marcellus Shale Lease Site 231–**

This site is located near the Marsh Creek Trail, south of the Kato-Orviston Road in Snowshoe Township, Centre County. It is situated in the Sproul State Forest, near its southern border.

The site is leased by the Anadarko Petroleum Corporation, which is based in Texas. Anadarko is leasehold operator of more than 300,000 net acres focused in the seven-county area of Bradford, Centre, Clinton, Lycoming, Potter, Sullivan and Tioga. The company's efforts to conserve surface space were recognized by the Utah Division of Oil, Gas and Mining with its 2008 Earth Day Award. In addition, Anadarko has received several Wyoming Game & Fish Awards for wildlife conservation and reclamation work.

Anadarko expects to operate six natural gas wells on this site. Gas will be extracted using both vertical and horizontal drilling, combined with a process known as 'hydraulic fracturing.' Horizontal drilling enables companies to drill multiple wells off one well site, thus decreasing impact on the land, wildlife and habitat on the surface.

After the well is drilled, cased and cemented to protect groundwater and the escape of natural gas and other fluids, drillers pump large amounts of water mixed with sand and other fluids into the shale formation under high pressure to fracture the shale around the well, allowing the natural gas to flow freely to the well bore. The amount of water typically required for hydraulic fracturing ranges from about one million gallons for a vertical well to approximately five million gallons for a vertical well with a horizontal lateral.

The tour included presentations at three operation centers at the site:

- Control Center – Otherwise known as the “dog house,” this is the control center on the rig.
- Frac Tank Staging Area – This is the area where the frac tanks are lined up with water from local suppliers that will be pumped to a blender with frac sand and proppants (man-made or specially engineered materials that are mixed with fracturing fluid to hold fractures open after a hydraulic fracturing treatment). Anadarko plans to re-use a portion of this water, while transporting the rest of the unusable frac water to treatment facilities in the region.
- “Mud Logger’s House” – This is a trailer where geologists clean cuttings from the drilling and then analyze them under a microscope.

The pad site is monitored for trespassers and personal safety is emphasized – hard hats, safety glasses, ear plugs, solid boots, etc.

- **Two-mile Run Area 7, “Three-Fingered Devil” Re-mining Project –** Located approximately 6 miles northwest from Renovo, and just southeast of Kettle Creek State Park, Area 7 contributes large loadings of abandoned mine drainage (AMD) to Huling and Middle Branch., approximately 50% as “baseflow” contribution which cannot be readily collected and treated by conventional means. These streams eventually add discharges to the West Branch of the Susquehanna River.

It has been determined that this area contains significant recoverable coal reserves (131,000 tons), including a 300-foot wide belt of un-mined, low-sulfur, high-BTU coal along the outcrop area. It has been speculated that the value of this coal could finance most of a re-mining effort. Additional shortfall could be financed through Environmental Stewardship (Growing Greener) funding.

A proposed re-mining plan would extract remaining outcrop coal and reclaim all pits, highwalls, and other disturbed surface areas, involving about 1,000,000 yards of un-reclaimed mine spoil. Lime would be added to help offset the existing heavily acidic conditions.

Working cooperatively, DCNR could contract for reclamation and waive lease royalty in exchange for the value of the reclamation work. In turn, the contractor would have to obtain a surface mining permit from DEP. Additional funding would supplement coal revenues to allow for additional reclamation and enhanced alkaline addition to abate the existing AMD.

# 2009 CAC/CNRAC Joint Informational Session Panel Discussion Summary

## Panel #1 – Anadarko

Several representatives from Anadarko, one of the largest independent oil and gas companies in the world, attended and participated in the evening discussions.

Chris Doyle, Anadarko, General Manager – Appalachian Basin, started the session by providing a brief overview of Anadarko for the two councils.

- Operate in 5 of the 7 continents, and 10 countries
- Are seeking to actively engage DEP, DCNR, various local stakeholders & local community advisory groups.
- Have received recognition for limiting surface disturbance, innovation in water management and reuse of frac water.
- Currently lease approximately 600,000 acres in Pennsylvania – much of which is located on state forest land.
- Are looking at long-term water-management and protection of aquifers, and reclamation efforts.

Chris opened the floor for any questions. Some of the questions/concerns were:

- **Cement casings – Is there data available on deterioration/long-term viability of the materials used?** Marcellus wells are expected to produce for 20 plus years. When a well is plugged and abandoned Anadarko will secure the well with multiple cement plugs and remove some lower casing to ensure a good seal and lateral barrier to protect the aquifer. Pressure testing is done on casing to ensure liability. This play has only become available recently due to recent technology development. Therefore, no long-term data for this type shale play in the Appalachian region is available.
- **What are current well and road bonding requirements?**
  - On state forest land a \$25,000 performance bond is required for each lease track. In addition, each track requires a plugging bond; the amount of this bond is the full amount of the estimated cost to plug the well. If equipment is being brought across roads not included in the performance bonding, they do ask for a road use agreement which typically has a bonding provision attached to it.
  - DEP requirements (i.e. statewide) - At this time, the bond amount the operator must post for a single well is \$2,500; a blanket bond of \$25,000 can be obtained to cover multiple wells. Current bonding requirements are not adequate to ensure the appropriate address of drilling related water supply problems, well pad restoration, or proper plugging of the well when abandoned. DEP is looking at updating bonding related regulations. It is estimated that a Marcellus well would cost approximately \$100,000 to plug. Bonding of roads is typically handled by local municipalities and involves the posting of acceptable weight limits following the completion of an engineering and traffic study as per PennDOT regulations (Chapter 49: Size, Weight and Load).

- **Environmental degradation, precipitation, landscape – How are wells being designed to minimize issues in the environment of Pennsylvania vs. that of Texas?** They are working to find plateau areas to place pads. The target slope for placement is 0-5%.
- **What is the experience and track-record of the company in areas similar to the climate, conditions, and geology of Pennsylvania?** They have operational experience in many different climate situations that exist throughout the world. They are bringing that experience to bear here in Pennsylvania. Many employees bring experience from other areas of the country and companies as well.
- **Quality, training, experience, and accountability of subcontractors was questioned.** They take subcontracting seriously as well and look at the track record and past experience of these companies as well. They would like to be contacted with any specific issues or concerns.
- **Where is your market; Pennsylvania, the continental United States?** The gas may be used here in Pennsylvania or some of the larger northeastern U.S. gas markets, (i.e. New York, Boston, etc). It is expected that Pennsylvania will be a net exporter of natural gas within the next 10 years.
- **Do the high chloride concentrations in frac water flow-back affect reuse capability?** Flow-back water will be pre-treated and blended with fresh water as necessary prior to its reuse in subsequent fracturing operations.
- **Water sources and management plans– How much are you using, what are your reuse and recycle expectations? Are you trucking the water out or treating it on-site?** Anadarko is looking to reuse and recycle as much water as they can. They have 2.7 million gallons per day approved through the SRBC. Each well will take 4-5 million gallons of water to complete. They are seeing about 30% of frac water flow-back. Short-term they are looking at DEP approved disposal sites. Long-term options include deep brine disposal. Eventually they hope to treat the water on-site and have up to 100% of the flow-back recycled. They are also talking with DCNR about putting in water impoundments.
- **Who is responsible to monitor and maintain wells over their active life?** This would be handled by Anadarko field operations. They are working with local colleges on curriculum to properly train individuals for oil and gas related occupations.
- **Any difference between your operational procedures on state vs. private land?** For Anadarko the answer is no.
- **Local involvement and communication with advisory groups –** Anadarko has actively engaged local watershed groups and is working to meet with them regularly.

Anadarko provided all members in attendance with a thumb drive with fact sheets, information on fracturing technologies, and other information from the PA Marcellus Shale Committee and Independent Petroleum Association of America.

## **2009 CAC/CNRAC Joint Informational Session Panel Discussion Summary**

### **Panel #2 – Local – Community Impacts**

Panelists consisted of: DEP Regional Director – Robert Yowell, DCNR District Forester – Doug D’Amore, Clinton County Conservation District, District Manager – Mary Ann Bower, Lycoming County – Director of Planning – Kurt Hausamman, Jr., Chesapeake Bay Foundation – Matt Royer, and Wyalusing Twp. Supervisor – Marvin Meteer.

Each panelist was invited to provide a 5-10 minute presentation on the impacts being observed from the influx of Marcellus play related activities.

#### **Bob Yowell, DEP NorthCentral Regional Director**

Since 2007 (the beginning of the Marcellus boom) almost 1500 active gas wells have been permitted in the region; 741 of these are Marcellus wells.

The region has been allotted 17 new Oil & Gas positions. Fifteen of these positions have been filled. Efforts to fill the remaining two positions are ongoing.

There are currently 38 distinctly different gas companies operating in the region; 13 of which are “big” companies. These companies have 38 rigs working and 326 holes drilled. Projections for 2010 indicate there will be approximately 71 rigs actively working in the region resulting in approximately 963 holes drilled.

DEP is out-manned. The staffing situation has been recognized and even in the difficult budget situation, DEP is working to find ways to provide the much-needed increase in staffing to meet the growing demand on the program.

Companies are handling erosion and sediment control very well. Water withdrawals are highly regulated and impoundments are being built for storage. As technologies progress frac water treatment is being dealt with more and more through reuse and recycle.

The real issue seems to be handling the movement and spilling of various drilling fluids and chemicals. Things are occasionally going to happen which is why having good Preparedness Prevention, and Contingency Plans in place is very important.

Gas migration into ground-water is another significant environmental contamination issue. Proper casing is extremely important and can go a long way in minimizing many of the gas contamination and migration issues being experienced.

Locals are starting to realize positive economic impacts as well. Gas companies are beginning to hire local professionals. Hotels in the area are doing good business as well.

Restoration of pads and access roads will be increasingly important moving forward. He would like to see industry leaders step-up and set the bar higher in these areas than established regulation.

Companies should begin monitoring fluctuations in pressure upon well completion to allow for early detection of possible problems.

It would be beneficial for industry to implement broader pre-testing parameters in both documentation area and water quality (i.e. methane content), and where appropriate quantity as well.

**Doug D'Amore - DCNR District Forester, Sproul State Forest**

Doug reported that three companies are drilling in Sproul State Forest (both Marcellus and others); Anadarko is the primary Marcellus lessee. Pads are being approved for plateau tops and level areas.

A drilling site has a footprint of approximately 5 acres. Once DCNR approves a pad location, the gas company then proceeds to apply for a permit from DEP. DCNR is trying to plan the pipelines to run along existing corridors and roads. They are attempting to minimize forest de-fragmentation through consolidation of open areas and locating well pads near existing roads. There may be a need to relocate snowmobile traffic as forest roads will need to be maintained year-round.

Marcellus drilling activities are creating water management issues the state forest system has not had to deal with before, resulting in new policies.

With the current state budget climate and the implementation of the Marcellus leasing contracts, something is going to have to give. Adequately staffing Marcellus activity will probably mean reductions to recreation-related programs.

The Marcellus play will fundamentally change the state forest. Once leasing is complete and the gas pads in place, it is estimated that Sproul State Forest could contain up to 500 pads and 3,000 gas wells in production.

**Mary Ann Bower – District Manager, Clinton County Conservation District**

Mary Ann expressed concern over forest fragmentation resulting from drilling activities. This region is part of the Pennsylvania Wilds and derives a lot of income from tourism.

Attention needs to be given to the potential impacts of these earth disturbances. We must ensure that the regulations are followed.

Many Conservation Districts are concerned over their removal from the oil and gas drilling permitting process and the “fast-tracking” of some of these permits. The Conservation Districts would like to continue to partner with DEP on E&S control on these sites. It is important to the districts that they be kept informed on what is going on within their counties.

The Conservation Districts feel that DEP will have a lot to deal with across the state and in light of budget cuts, it would make sense for the Conservation Districts to partner with them and help where they can.

They are glad to see some of the gas companies working to partner with local watershed groups. Local partnerships are very important, and districts can help companies make these connections.

**Kurt Hausemann, Jr. – Director of Planning, Lycoming County**

The Lycoming County Commissioners created a task force. The task force visited several companies and local government in Texas for a crash course on gas drilling. The task force and county commissioners worked to be proactive in identifying and dealing with potential issues and gaps in ordinances, (i.e. requiring drilling sites to have a 911 address prior to permitting.) They have held practice training exercises for emergency personnel.

Local Technical Assistance Training was provided through PennDOT. Engineering studies have been completed on municipal roads. Traffic weight limits have been posted where appropriate. The gas companies are required to bond the roads to protect the taxpayers in the municipality. To date, all damaged roads have been repaired by the gas companies and the bonds have not been necessary.

They are looking at updating their zoning ordinances and comprehensive plans. Residents want the quality of life in the area protected. The power of the land-owner is in the lease. Land-owners are able to work out restrictions that can go above and beyond what zoning can do.

The task forces are most concerned with dealing with the frac water. He is glad to hear that industry is being proactive in finding ways to handle this water.

Lycoming County is centrally located within the Marcellus Play. As a result, many gas and drilling industry related service companies are locating in the area. Most of the county's rail serve sights have now been developed. Municipal officials are looking for locations that may be appropriate to place new rail serve development to meet the needs of the growing support industry.

Some of their local concerns are pad restoration, access road cutback, and remaining as green as possible.

**Matt Royer - Staff Attorney, PA Office of the Chesapeake Bay Foundation**

CBF is concerned about and following Erosion and Sediment Control and Stormwater permitting issues with Marcellus closely.

In March, the department issued a memo that stripped E&S permitting review and approval authority from the Conservation Districts. The same memo also announced the department was working on revisions to E&S permitting that would provide for an expedited review process. They are concerned about this policy shift and the expedited permitting option, as it no longer requires a technical review, only an administrative review.

They feel that the Conservation Districts have local ties, local knowledge of resources, and the appropriate experts within their staff to be effective in reviewing these permits.

Chesapeake Bay Foundation is not against streamlining the permitting process, but there needs to be a technical review to the E&S and stormwater permits. They have three appeals of these permits before the EHB. Permits are being issued with no technical review, no evaluation of sub and cumulative impacts, and are not being prepared by licensed P.E.'s.

## **Marvin Meteer – Wyalusing Township Supervisor**

Local governments are starting to become concerned with zoning ordinances and conflicts due to the arrival of Marcellus related support companies. They seem to show-up overnight and the community is finding itself reacting after the fact. They are concerned with what the area might look like in the future if development is not managed properly.

There are road issues. A number of municipalities have reached maintenance agreements with drilling companies. The townships are also concerned about pipeline crossings.

Hotels and motels in the area are typically full. There are issues with people violating zoning restrictions by renting out rooms in their homes, with travel trailers, and “man-camps” being created. There has been an impact to the pricing of rentals in the area. This has made it difficult for locals to find reasonably priced rental properties.

Marcellus related development and activity are costing municipalities money. However, local governments have not realized any new revenue from Marcellus at this point.

They are observing growth in pipelines in both pipe diameter and in numbers. These pipelines are raising right-of-way issues as well as future land use issues.

Positive local economic impacts have been realized by hotels, restaurants, and auto parts stores, etc. However, most labor for gas companies is still coming from Texas and Oklahoma.

## **Q & A**

### **Will the development of the Marcellus play in the Sproul State Forest affect the forest certification?**

Doug doesn't know for sure but doesn't think the development will be an issue. They are trying to anticipate areas where there may be problems and take steps to proactively deal with them.

### **Increased workload on staff?**

In light of current budget limitations, State Forest management will become increasingly problematic. Recreation areas may need to give as more staffing resources are required to deal with Marcellus related activities.

### **Who's looking at impacts of forest fragmentation, impact on interior species, and controlling invasive species?**

They are trying to be proactive by managing the development, have created seed mixtures to be used, and a PNDI search is required by the DEP permitting process. The foresters have control over where industry can place a well pad within the state forest and are looking at these type issues when approving pad placement.

### **Posting limits on roads—How are these affecting local companies, such as trash collectors, loggers, delivery services, etc?**

Once a road is posted, this posting applies to any vehicle that exceeds the weight limit. Some local municipalities are looking into granting local waivers for vehicles doing local deliveries such as garbage trucks that can exceed the limit.

**Are we asking this industry to step up to the plate and be more accountable? With those that show themselves accountable, can we perhaps give them expedited service as incentive?**

Perhaps we could handle responsible, reputable companies differently than those that have a more problematic history.

**Can the bar for the industry be raised and they be provided a list of what we would like to see them do in going above compliance?**

They are trying to be a good neighbor, perform testing when appropriate, and working to address concerns.

**What is your position on the severance tax?**

No official position has been taken at this time. They are very early in their development of the play. Any additional tax makes a project less competitive.

**Is Anadarko paying corporate income taxes in PA? Are gas companies interested in being good corporate citizens in Pennsylvania? How much of the tax burden for the development of the Marcellus Shale are the citizens going to have to subsidize?**

The representatives committed to research and respond to the Councils with this information. They recognize that this issue will come back. They are willing to discuss it moving forward and hope to get to a point where there can be a reasonable solution.

**What's your incentive to train and hire local labor?**

In the long-term development, there are not going to be enough people willing to re-locate. They are very interested in building up the local expertise to assist in their long-term development of the Marcellus Shale.

## Identified Issues of Concern

As a result of our conversations with industry representatives, agency staff, and citizens we compiled a short list of issues that rose to the top of items of interest and are areas that the CAC and CNRAC will want to continue to track and evaluate over time. These issues include:

- Defining and explaining the need for more agency staff both within DEP and DCNR to manage Marcellus Shale natural gas development.

### **Resultant Actions**

- ✧ The Governor's proposed 2010-2011 budget provides for DEP to begin hiring 68 new personnel who will ensure that drilling companies comply with state laws and act responsibly to protect water supplies. DEP also will strengthen oil and gas regulations to improve well construction standards. These critical upgrades are designed to prevent gas leaks that can pose risks to the public and its water supply.
  - ✧ DCNR is also authorized to hire 12 additional staff, most of whom would be located in district forestry offices and would be charged with overseeing and managing new natural gas development occurring on state forest lands.
- Understanding the impacts of natural gas migration.

### **Resultant Actions**

- ✧ The Oil and Gas Technical Advisory Board is working with DEP on revisions to Chapter 78 regulations dealing with oil and gas well construction. One of the primary concerns is to reduce the number of stray gas issues in the state by tightening cement casing requirements.
- Reviewing ideas regarding a fair and responsible severance tax program.

### **Resultant Actions**

- ✧ The CAC and CNRAC co-hosted a severance tax educational forum where discussion occurred regarding severance taxing in other states, and the proposed natural gas severance tax for Pennsylvania.
  - ✧ The CNRAC has adopted a support statement for a Pennsylvania natural gas severance tax. The support letter for this tax was distributed to the Governor, all Pennsylvania legislators, and gubernatorial candidates.
- Identifying other technical and programmatic concerns during the joint CAC/CNRAC sessions, and relaying these concerns to the OGTAB, DEP and DCNR for their consideration, and possible future regulatory and management revisions:
    - ✧ Strong oversight and emergency response plans for drilling fluid used in the extraction process, both on-site and during transportation
    - ✧ Adequacy of bonding
    - ✧ The importance of well pad and access road restoration
    - ✧ The need for industry to step up and establish a high standard of operation and maintenance
    - ✧ The importance of monitoring fluctuations in well pressure as a way of detecting possible well construction problems.

- ✧ The value in industry adopting and implementing broader parameters in documenting pre- and post conditions for water quality and quantity.
- ✧ Impacts of natural gas migration on ground water and existing drinking water wells