

Shale Gas Roundup



Potter County, Pa.

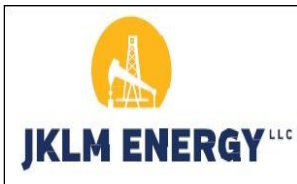
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Tale of Two Shale Gas Companies

JKLM Energy has been moving forward with its incremental plan to produce a significant volume of natural gas from deep shale layers in Potter County. Another significant player in the region is Seneca Resources. A subsidiary of National Fuel Gas Company, Seneca is slowly ramping up its gas production on holdings across seven counties.

JKLM Energy



While most shale gas drillers with holdings in Potter County have been idle, JKLM Energy

continues to move forward with an ambitious plan to deliver natural gas found in Utica Shale formations far underground to the national pipeline network.

JKLM is unique, in that all of its operations are in Potter County, where the company has about 120,000 acres under lease. At the midpoint of 2017, JKLM officials report, the plan to drill approximately a dozen more wells this year is on course. Six of those have been drilled and three have been completed as of mid-June. That brings the company's total activity in Potter County to 14 wells drilled, six completed, and four now producing gas.

“By the end of the 2017, the company plans on drilling seven more wells, completing 10 wells, and putting two more wells into sales,” a JKLM spokesman said. “Additionally, we plan to commence several pipeline projects this fall.”

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Seneca Resources

Signs that shale gas development is going to rebound – at least modestly – in

the region has prompted increased activity by Seneca Resources. The company has been active in Potter, Tioga, Cameron, Elk and three other Pennsylvania counties. Spokesman Rob Boulware said Seneca recently added a second deep drilling rig to its Appalachian Basin operations. “Seneca continues to benefit from improving natural gas prices and greater pipeline capacity,” Boulware noted. Seneca has been holding billions of cubic feet of gas underground, in anticipation of better market conditions and increased pipeline capacity. The company owns 20,000 acres of rights in northwestern Cameron County, on which it has drilled about two dozen shale gas wells.

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Potter Co. Natural Gas Resource Center resurrected

Potter County is resurrecting the award-winning Natural Gas Resource Center (NGRC). It will be jointly administered by the county's Planning and Community Development departments and supported by the Potter County Board of Commissioners.



An advisory committee comprised of environmental, educational, energy industry and government representatives has been reassembled. Members are Will Hunt, Potter County Planning/GIS Director; Jason Childs, manager of the Potter County Conservation District; Kim Rees, executive director of the Potter County Education Council; Bryan Phelps, police/emergency services; Commissioners Susan Kefover, Doug Morley and Paul Heimel; Jennifer Rossman, Potter County Community Development Director; Terry Cole, Pennsylvania CareerLink; Curt Weinhold, Potter County Planning Commission; and industry representatives Scott Blauvelt from JKLM Energy and Al Haney from Gas Field Specialists Inc. A seat on the committee is also being held open for the new water resources educator to be hired soon by Penn State Extension. The NGRC leadership will also confer with the Pa. Dept. of Environmental Protection, the Potter County Water Quality Work Group, the Triple Divide Watershed Coalition, Penn State University Marcellus Center for Outreach and Research, and other resources.

A new website, recently launched at naturalgasresourcecenter.com, will be built incrementally. Potter County Education Council oversaw the NGRC for several years. It was recognized as a model by the County Commissioners Assn. of Pa. and the National Assn. of Counties. The center is designed as a one-stop shop for all kinds of information about the region's gas industry. At its peak, NGRC had about 560 businesses and agencies signed on to be listed on the center's website. Public education, as well as development of business liaisons, will remain high priorities. The advisory committee will be reviewing possible topics to be covered when NGRC resumes its public meetings about gas drilling issues and concerns later this year.

DEP posts data online, increases inspections



Pa. Dept. of Environmental Protection confirms a rebound in shale gas drilling around Potter County that began last year. Since January 2016, some 21 new "unconventional" wells have been drilled in the county and there are more coming.

Pa. Dept. of Environmental Protection is now putting more shale gas data online in a publicly accessible format (dep.pa.gov). It includes GIS information on well sites, waste reports, and charts outlining trends over the past ten years. DEP has faced criticism in the past for not providing accessible, current information on well sites. The change is part of a broader push from DEP to upgrade its technological capabilities. Earlier this year, the agency's oil and gas inspectors received iPads, after years using paper and clipboards.

The department also reports that its inspections are on the rise. For both conventional (shallow, non-shale) gas wells, and unconventional shale wells, DEP inspectors made 35,556 visits in 2016, more than double the number of inspections conducted in 2010. Environmental violations resulted in record fines for 2016, totaling

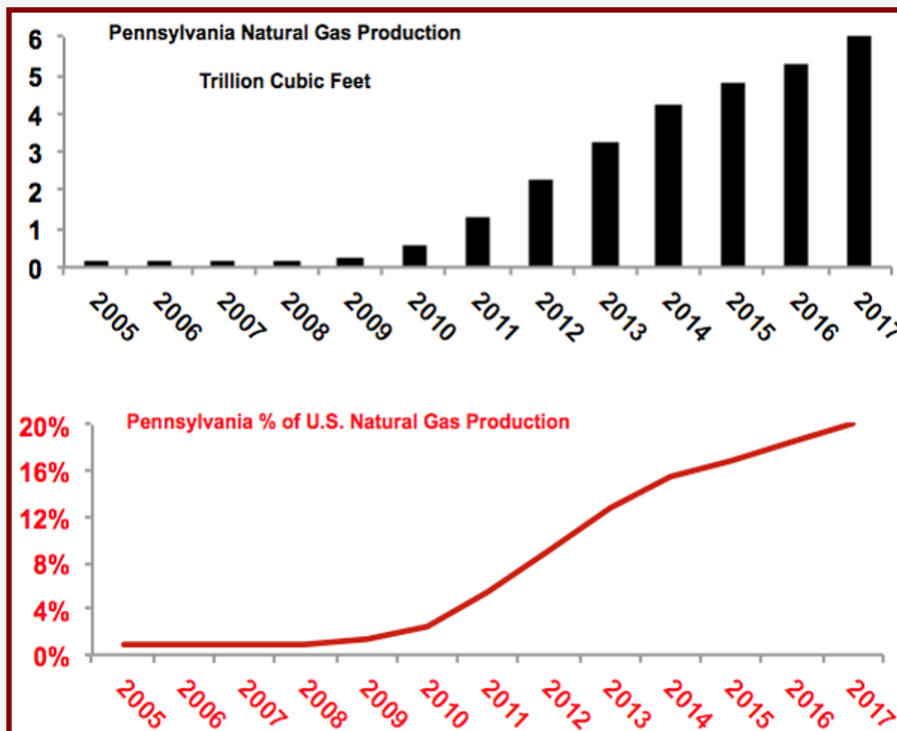
\$9,688,573. The majority of those penalties resulted from nine significant incidents. The number of violations cited by DEP to shale gas drillers had been trending downward with a slight uptick in 2016. Meanwhile, conventional wells have seen a significant increase in sanctions, with 1,834 last year, up from 1,024 in 2015.

Fewer wells drilled, but gas flow breaks records

Pennsylvania's shale gas drillers continued to break records for production in 2016, tapping about 5.1 trillion cubic feet of natural gas.

Although the increase in production was not as high as in previous years, it still represents an upward trend, even as the number of new well permits is declining, according to data published this week by the Pa. Dept. of Environmental Protection. Pennsylvania still ranks second behind Texas in total volume of natural gas production. Drilling of new shale gas wells has been on the decline since 2014. The state issued permits for 1,321 wells in 2016. At the height of the shale gas drilling boom in 2011, DEP recorded 3,560 well permits. For more shallow, conventional wells, the downward trend is even more significant. DEP granted 4,197 conventional well permits in 2009, and just 158 in 2016.

Built on coal, Pennsylvania has increasingly become a natural gas state. In 2016, natural gas supplied almost 33 percent of Pennsylvania's electricity, compared to just 8 percent in 2007. Looking forward, there's a \$20 billion investment in new gas plants in Pennsylvania, not to mention a goal across the state to seek ways of boosting natural gas service in rural communities – referred to by public policy planners as “gasification.”



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Along the way, the spokesman added, the company has supported several community organizations and causes, including a \$40,000 donation to the Coudersport Community Swimming Pool restoration project.

JKLM officials said they're pleased with the volume of gas that is being found and the company expects to have a presence in the county for years to come. Drilling areas have included a 13-acre tract located on privately owned forest land off Pa. Rt. 44, not far from Patterson State Park in Summit Township; the Fox Hill area, in Ulysses Township; and Sweden Township in the Reese Hollow.

For now, the company is concentrating its efforts on Sweden, Summit, Ulysses and Eulalia townships. Additional locations could be developed in the future. JKLM is currently embroiled in a legal battle in Hector Township involving sections of the 7,000-acre Big Level Wind project, which includes a projected two dozen turbines being erected to generate electricity. JKLM claims the plan would deny the company its rights to produce gas from some areas proposed for turbine construction.

DEP Regional Representative Mark Accettulla, who's the man on the ground for the Pa. Dept. of Environmental Protection in Potter and Tioga counties, introduced himself to Triple Divide Watershed Coalition members at a recent meeting. He's in charge of inspections and related field activities. Accettulla said he wants to have regular contact with water system operators and others to assure compliance and avoid escalation of issues with DEP when possible.

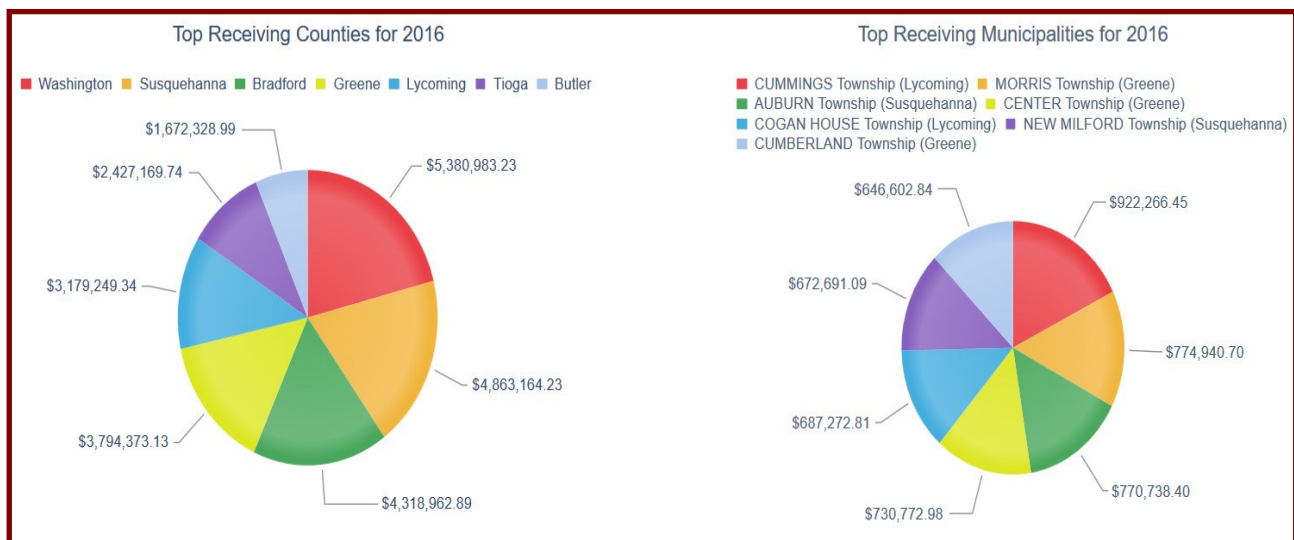
Shale gas pays local dividends via impact fee

Local governments now know how much money they'll get this year as a result of the "impact fee" on shale gas drilling. Potter County's allotment is \$226,437 -- up by \$36,000 from the 2016 and close to the amount received in 2015. The county will receive another \$25,000 that can be used only for certain environmental and/or recreational projects.



At the local level, top recipients are West Branch Township at \$53,687; Sweden Township, \$39,329; Eulalia Township, \$31,570; and Clara Township, \$26,743. Other Potter County municipal allotments are: Abbott, \$6,261; Allegany, \$22,756; Austin, \$3,702; Bingham, \$8,292; Coudersport, \$14,761; Galeton, \$6,872; Genesee, \$6,936; Harrison, \$13,184; Hebron, \$8,517; Hector, \$9,254; Homer, \$4,843; Keating, \$17,171; Oswayo Borough, \$582; Oswayo Township, \$5,162; Pike, \$3,369; Portage, \$1,362; Roulette, \$8,491; Sharon, \$9,535; Shinglehouse, \$3,162; Stewardson, \$1,708; Summit, \$22,846; Sylvania, \$9,170; Ulysses Borough, \$3,886, Ulysses Township, \$14,970; and Whar-ton, \$18,217.

Amount of each allocation is based on gas production that took place in 2016. Separate shale gas impact fee allotments will go to County Conservation Districts, Pa. Conservation Commission, PUC, DEP, Fish and Boat Commission, Emergency Management Agency, Dept. of Transportation and Office of State Fire Commissioner.



Under Act 13, 60 percent of the total fees collected go to counties and local governments and 40 percent to the state. The state's portion is to be used for emergency response planning, training and other activities; water, storm water, and sewer system construction and repair; infrastructure maintenance and repair; as well as environmental initiatives. County and local governments can use the funds for preservation and reclamation of water supplies; improvements to local roads and bridges; construction and repair of water and sewer systems; delivery of social services; local tax reduction; housing; conservation districts; emergency preparedness and flood plain management.

The 60 percent of the fees not retained by the state are distributed as follows: 36 percent to county governments with wells subject to the fee; 37 percent for host municipalities with wells subject to the fee; and 27 percent for all local governments in counties with wells. Both the PUC and the Pa. Dept. of Environmental Protection have posted information about the Act 13 impact fee and related topics on their websites.

Monitors Coming To Potter County's Public Water Supplies

Monitoring equipment will be installed on nearly every source of public drinking water in Potter County no later than mid-July. Details were reported at a recent meeting of the Triple Divide Watershed Coalition by chair Charlie Tuttle.

Sixteen monitors are available for installation on wells, springs and surface water sources feeding the other 10 public water systems in the county. The monitors will capture and archive data on water temperature, flow, and contents to create a baseline and sound an early warning in the event of contamination. Shinglehouse Borough is the only TDWC affiliate not participating. Equipment and technical assistance have been provided by Campbell Scientific.



Federal funding to protect drinking water has allowed the Pa. Dept. of Environmental Protection to assist local governments. As a result, Mark Stephens, a geologist from DEP's regional office in Williamsport, has become a familiar figure in Potter County.

The state's settlement with JKLM Energy for its 2015 environmental violation at a shale gas drilling site off North Hollow Road has yielded \$100,000 for the monitoring systems.

On a related note, coalition members discussed the need to update each system's certified Sourcewater Protection Zone Plan. Mark Stephens, a geologist with the Pa. Dept. of Environmental Protection (DEP) regional office in Williamsport, said most of the elements in the current plans will not change and updating them should not pose a stiff challenge. Assistance is available through the Potter County Planning/GIS Department and the Pa. Rural Water Assn.

Stevens said that the plans will be taking on increased importance when DEP begins to incorporate Sourcewater Protection Zone Plans into the department's permit review process and other maps/records maintained by the department.

Historic Water Study Continues

A research project of historic proportions is now underway in Potter County. Details were reported at last month's meeting of the county's Water Quality Work Group. A state grant is covering the bulk of expenses for a detailed study that will document where much of the county's groundwater comes from, its characteristics, and its movement patterns. The information will be invaluable for public policy-makers, industries, regulatory agencies and many others.

Through the testing of between 45 and 50 wells in strategic locations, the U.S. Geological Survey (USGS) will be able to amass and share detailed data. This will be an important tool for protecting water when sites are chosen for certain types of development.

Well data will be assembled and analyzed in a cumulative fashion, with the identity of individual well owners protected. Confidential findings from the analysis will be provided to each owner.

Groundwater can contain a variety of suspended and dissolved substances such as bacteria, minerals and gases. These substances are often naturally occurring, but can also be influenced by activities occurring on the land surface. A comprehensive list of water quality parameters will be analyzed for each well.



Justin Boatwright

In other business, Justin Boatwright, waterways conservation officer with the Pa. Fish & Boat Commission, has joined the work group. Since his assignment to Potter County last summer, Boatwright has also been working with the Potter County Conservation District and local watershed associations to coordinate their activities with the commission's work.

Coudersport eyed for prototype water treatment

A company that has proposed locating a small-scale shale gas drilling wastewater treatment facility in west Coudersport hopes to have the unit in place by the end of the year. Tom Joseph, a principal with Epiphany Environmental, believes his company's prototype cellular water treatment (CWT) system is an environmentally sound alternative for dealing with contaminated water that comes to the surface during



Epiphany's Tom Joseph addresses a meeting of the County Commissioners Assn. of Pa. Natural Gas Task Force earlier this year in Hershey.

natural gas production. Epiphany has been negotiating with the Coudersport Area Municipal Authority to construct its facility on that agency's property and discharge the purified water into the borough's sewage treatment plant.

Salt that's removed from the water would be sold for commercial use, such as highway application, and the remaining material that includes heavy metals would be trucked to a permitted disposal site. Joseph said the Pa. Dept. of Environmental Protection (DEP) sees the system as a potential solution to nagging water disposal issues. Much of the contaminated water is currently trucked to Ohio and injected underground.

Epiphany Environmental's first CWT units are being assembled and will be ready for in-house testing by early July, Joseph said. He added that the Coudersport facility would have an initial capacity of 500 barrels (20,100 gallons) per day, and it could be expanded as more wells are developed in the region. JKLM Energy, which is active in Potter County, has an interest in using the Epiphany systems. Epiphany expects to accelerate deployment of several additional CWT facilities throughout the Marcellus/Utica Shale region. "By analyzing the DEP well data and creating our own model, we have developed a rollout plan for more than three dozen CWT facilities," Joseph said. "We believe that we are unequivocally the market leader at this point in time. We have already signed letters of intent with four additional municipal sewer authorities and we are working on getting long-term customer contracts signed before we build equipment for each site."

In April, Joseph spoke at DEP's regional office in Williamsport during the annual Amalgamated Sourcewater Coalition meeting. "Our message of providing a sustainable solution to produced water treatment, while also benefitting our environment was praised by both regulators and environmental advocacy groups," he reported. "We believe that it is important that we continue to maintain transparency and further strengthen our relationship with the DEP and environmental advocacy groups as we progress through the impending rapid expansion of our CWT facilities."

‘Countless’ abandoned gas, oil wells in Pa.

Countless abandoned gas and oil wells are not in any official state database and their locations have not been verified in the field. This issue has become more troublesome as signs continue to point to additional drilling across much of Pennsylvania to tap into natural gas trapped in shale formations. Failure to identify and remediate an abandoned well can result in serious environmental damage, as well as a risk to public safety.

Pa. Dept. of Environmental Protection (DEP) recently released results of a year-long study that helped clarify how hard the wells are to find based on old records in a changing landscape; how often they might be leaking; and how much it might cost to plug them to modern standards. Estimates put the number of unaccounted-for wells in the state somewhere between 100,000 to 560,000. DEP predicts it would cost as much as \$8 billion to plug 200,000 of them.

Since the 1980s, DEP has plugged 3,066 legacy wells that don't have current owners. But what the agency calls "gross underfunding" of its well plugging program has caused a steady decline in the number of wells decommissioned during the past decade -- from a peak of about 350 wells in 2007 to 2016, when no routine plugging contracts were issued. The wells are remnants of a century of oil and gas drilling before wells needed to be registered or permitted. They were often left unplugged or stoppered with items like pieces of wood. Solutions to the state's legacy well problem "will not be possible without finding new sources of revenue for the plugging program," which now relies almost exclusively on surcharges attached to drilling permits, the study says. DEP expects the state's inventory of orphaned and abandoned wells will grow by thousands as newly discovered legacy wells are added.

After money, a second hurdle to plugging the wells is finding them. DEP set out to study 207 wells in Western Pennsylvania that are representative of the thousands in its databases, but researchers could find only 136 of them in the field. Some were as far as 500 feet from where old records had marked them. Others have been covered over or were cut off below ground. DEP is particularly concerned with abandoned wells that intersect with population centers or places where people rely on wells for drinking water.



Maps are inaccurate and many records – if they ever existed – have disappeared as DEP tries to track down abandoned gas and oil wells. Signs to look for include steel casings, valves, pump jacks, small-diameter gathering pipelines, tanks and isolated areas of subsidence. The best bet is to report them to DEP so an inspector can assess them. The telephone number is 1-888-723-3721.

Pa. DEP photo

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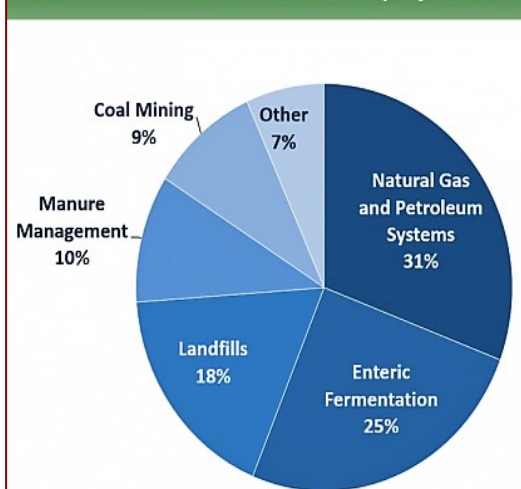
A concentrated effort is imminent in Tioga County, where a deep Utica Shale test well drilled on state forest land produced eye-opening results.

"This is among the most productive wells in northeastern Pennsylvania," Boulware said. "It is flowing into the Tennessee pipeline line at about 15 million cubic feet per day, and the potential of that tract is estimated at more than 1.1 trillion cubic feet over 75-plus well locations." Financial implications are eye-opening. Seneca has paid nearly \$223 million in royalty payments across the seven counties since 2012. The company has also paid \$45 million in "impact fees" levied by the state, and has spent more than \$711 million with Pennsylvania businesses.

Capital for the expanded activity is in place. Last year, Seneca Resources reworked an arrangement with the Texas firm that has been fueling its shale gas production in northcentral Pennsylvania. Seneca's parent company, National Fuel Gas Company, modified its deal with IOG Capital LP of Dallas for upwards of 80 joint development wells. IOG holds an 80-percent financial interest. Ronald Tanski, National Fuel's president and CEO, said the IOG partnership allows the company to tap more shale gas while expanding its pipeline network to usher the product into a growing marketplace.

State's methane regulation battle heating up

2015 U.S. Methane Emissions, By Source



Energy companies are warning of dire economic consequences and questioning the environmental benefits of air pollution regulations that Pennsylvania seeks to implement, but the Pa. Dept. of Environmental Protection (DEP) is holding its ground.

Proposed permit requirements for new shale wells, compressor stations and some pipeline equipment are part of a strategy to reduce methane emissions from natural gas operations. DEP is proposing to revise an existing “general permit” for natural gas compressor stations (known as GP-5) and create a new general permit for well pads (known as GP-5A), removing an exemption for managing well site air pollution that has been in place since 2013.

DEP Secretary Patrick McDonnell insists that the rules “balance the needs of industry for cost-effective operations and the needs of the public for enhanced environmental protection.” Companies in Potter County have spoken out in opposition.

“The cost, unreasonable standards, and permitting uncertainty further erodes Pennsylvania’s competitiveness, while providing little if any tangible environmental benefit,” said Seneca Resources spokesman Rob Boulware. “Simply put, operators will look to other states.”

“The proposed GP-5a is a preconstruction permit, effectively shutting down the industry for one to two years while permits are applied for and approved,” said a JKLM Energy spokesman. “Tanker truck load-out requirements will prevent produced water from being transported from well sites, forcing production to be shut in until compliant equipment can be obtained.”

Pipelines, community impacts detailed

Two significant reports are available online dealing with major topics of local interest related to shale gas development in the region. Penn State Extension has compiled a detailed summary titled, “Negotiating Pipeline Rights-of-Way In Pennsylvania.” It’s a valuable tool for property owners, elected officials, community leaders and others who could be affected by pipeline construction. Energy industry experts have been forecasting a dramatic increase in transportation infrastructure as companies become more active in drilling wells and sending their produced gas to market. Copies of the summary and other information can be found at naturalgas.psu.edu.

The other report, compiled for the Center for Rural Pennsylvania, is titled, “The Marcellus Shale Impact Study Wave 2: Chronicling Social and Economic Change in Northern and Southwestern Pennsylvania.” Copies are available at rural.palegislature.us, or by calling 717-787-9555.



This publication is produced by the Natural Gas Resource Center in Coudersport, Pennsylvania. Previous editions are available on the website, pottercountypa.net. Anyone with story ideas or comments should contact Paul Heimel (pheimel@pottercountypa.net).