2015 Oil and Gas Annual Report

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Message from the Acting Secretary

In 2015, Pennsylvania maintained its place as the second largest producer of natural gas in the nation. Despite a general downturn in new oil and gas drilling activities across the country, the total annual natural gas production rate in Pennsylvania actually increased to a record 4.6 trillion cubic feet. This is enough natural gas to power more than 62 million U.S. households annually.

With our historic natural gas production comes new challenges and opportunities for DEP and those who live and work in Pennsylvania. For example, we must plan for the effective build-out of Pennsylvania's pipeline infrastructure in a way that promotes our energy security, strengthens the economy and protects our natural resources for this and future generations. With this in mind, in May 2015, Governor Wolf announced the creation of the Pipeline Infrastructure Task Force. DEP and other agencies will spend the next year bringing the Task Force's recommendations to fruition. DEP's "**2015 Oil and Gas Annual Report**" not only summarizes the accomplishments of the 48-member Pipeline Infrastructure Task Force, but it includes other examples of what DEP is doing to ensure Pennsylvania's oil and gas resources are produced in a manner that is protective of our land, air and water resources. This report highlights ongoing data trends, outlines significant accomplishments and provides a view of what to expect from DEP during this coming year.

As oil and gas activities continue to expand, our jobs at DEP do not get easier. We will continue to work with all of our stakeholders to balance the needs of our new energy economy with the imperative that we protect our resources. DEP staff have been hard at work advancing new initiatives and promoting transparency in the way we do business. Fortunately, the men and women at DEP continually seek new ways to solve environmental problems while better serving the citizens of Pennsylvania.

Please take some time to review the critical work outlined in this report, see what has been accomplished during this past year, and learn what we are focusing on in 2016.

Sincerely,

Patrick McDonnell
Acting Secretary

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Disclaimer: The information contained in this report is based on the data contained in DEP information systems at the time of the publication of this report, including, but not limited to, DEP's enterprise-wide permitting and compliance database called eFACTS (Environment Facility Application Compliance Tracking System). As some data contained in these systems are self-reported by operators and other permitees, data in this report reflects the data as reported to the department.

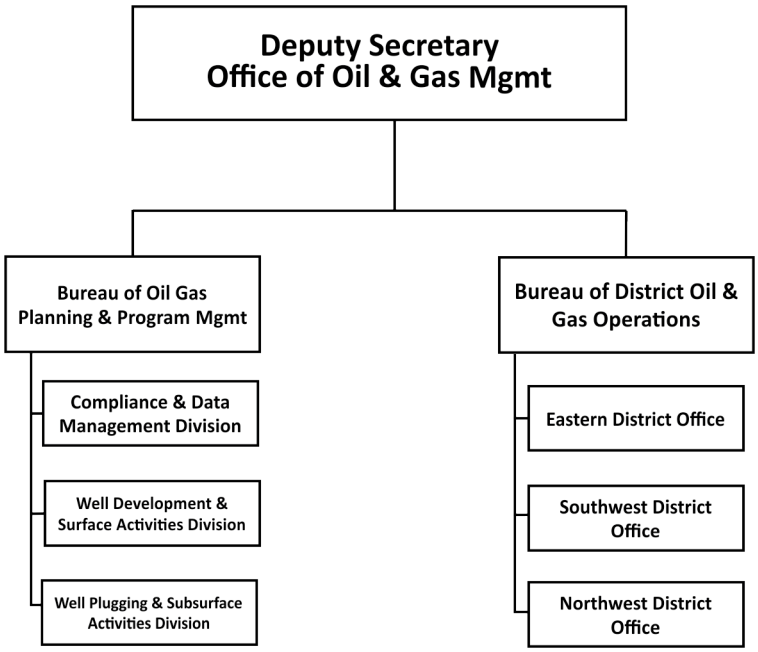
DEP's MISSION

The mission of the Pennsylvania Department of Environmental Protection (DEP) is "***to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. We will work as partners with individuals, organizations, governments and businesses to prevent pollution and restore our natural resources***."

In Pennsylvania, DEP is responsible for issuing permits and conducting inspections at oil and gas well sites, pipelines and compressor stations. The Public Utility Commission (PUC) and the federal Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) also play a vital role in the inspection of natural gas gathering and transmission pipelines in Pennsylvania for safety purposes.

DEP'S OFFICE OF OIL AND GAS MANAGEMENT

DEP's Office of Oil and Gas Management employs 227 professionals who are dedicated to administering an internationally recognized oil and gas program. The office consists of two bureaus. The organization chart for the Office of Oil and Gas Management is depicted to the right.



The Bureau of Oil and Gas Planning and Program Management is located in DEP's central office (Harrisburg) and is responsible for administrative, policy and regulatory development functions. The Bureau of District Oil and Gas Operations consists of three district oil and gas offices and is responsible for permitting, inspection, compliance and enforcement functions.

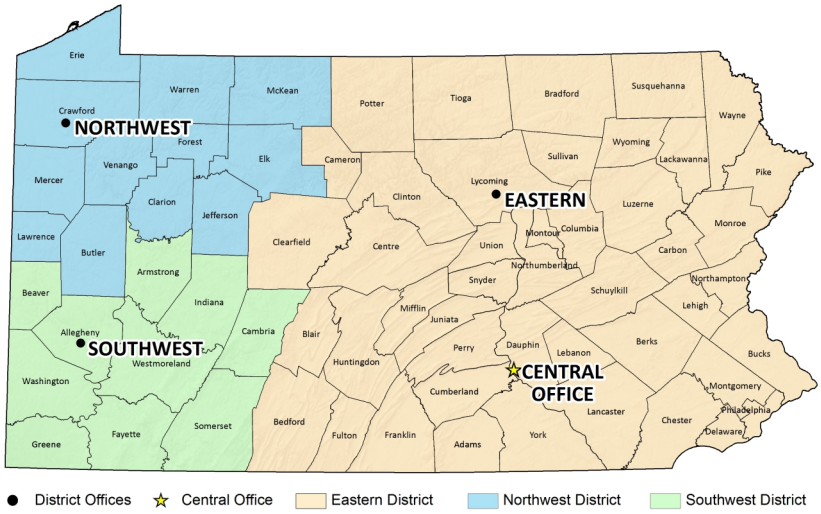
The Bureau of Oil and Gas Planning and Program Management includes the following three divisions:

- *Well Development and Surface Activities* – This division is responsible for developing policies and guidance related to surface activities associated with oil and gas well site design and construction. This includes engineered well pad components such as erosion and sediment control structures, pits and impoundments.

- *Well Plugging and Sub-Surface Activities* – This division consists of the Subsurface Activities Section and the Well Plugging Section. The Subsurface Activities Section is responsible for the management of subsurface oil and gas related program services and activities and offers expertise in the subjects of drilling, casing, cementing, completion, stimulation, workover, and production activities and operations associated with conventional and unconventional hydrocarbon formations in Pennsylvania. The Well Plugging Section maintains and implements the Orphaned and Abandoned Well Plugging Program.

- *Compliance and Data Management* – This division works closely with DEP's Bureau of Information Technology to oversee the operation and maintenance of data management systems and databases that track production data and other data that are submitted to DEP by the regulated community.

The Bureau of District Oil and Gas Operations includes three district offices that implement the operational programs in the eastern, northwest, and southwest areas of the state. Staff in the district offices are responsible for permitting and inspecting oil and gas well sites and gathering lines and responding to complaints. The district staff are also responsible for compliance and enforcement activities. The district offices are located in Williamsport, Meadville and Pittsburgh.



PENNSYLVANIA'S OIL AND GAS RESERVES

For centuries, Pennsylvania has been recognized for its abundant natural resources. During the early days of this nation, the vast forests of “Penn's woods” provided timber that was used to construct buildings and homes in towns across the Commonwealth and neighboring states. Pennsylvania's coal resources fueled industries during the late 1800s and was used in the production of steel that was critical to development of this country's infrastructure. More recently, Pennsylvania's oil and gas reserves have played a vital role in meeting the energy demands of this country.

Conventional vs. Unconventional Oil and Gas Drilling

The terms “conventional” and “unconventional” can refer to either the type of well that is drilled or the geologic formation into which drilling occurs. Both terms are specifically defined in Chapter 78, Subchapter A of Pennsylvania's oil and gas regulations.

In general, a “conventional” well is a well that is drilled into a shallow pocket of oil or gas, thereby allowing the oil or gas to flow to the surface.

An “unconventional” well typically refers to a well that is drilled much deeper into the earth's crust into a layer of shale rock that contains natural gas. Another distinction of an unconventional well is that a large amount of water is forced into the well bore under high pressure to fracture the shale to enhance the ability to capture natural gas that would otherwise be trapped in the shale rock formation. This extraction method is called hydraulic fracturing. Hydraulic fracturing is also commonly used to develop conventional wells, although there are significant differences between conventional and unconventional well fracturing. The amount of water required to hydraulically fracture a conventional well is less on a per-well basis and the geologic formations targeted are not nearly as deep below the surface.

DEP produced a short video to educate the public about the method of unconventional drilling. To view this video, go to the following link:
https://www.youtube.com/channel/UCHeQQljjdZGP4VarKQ0_VxQ/feed?view_as=public

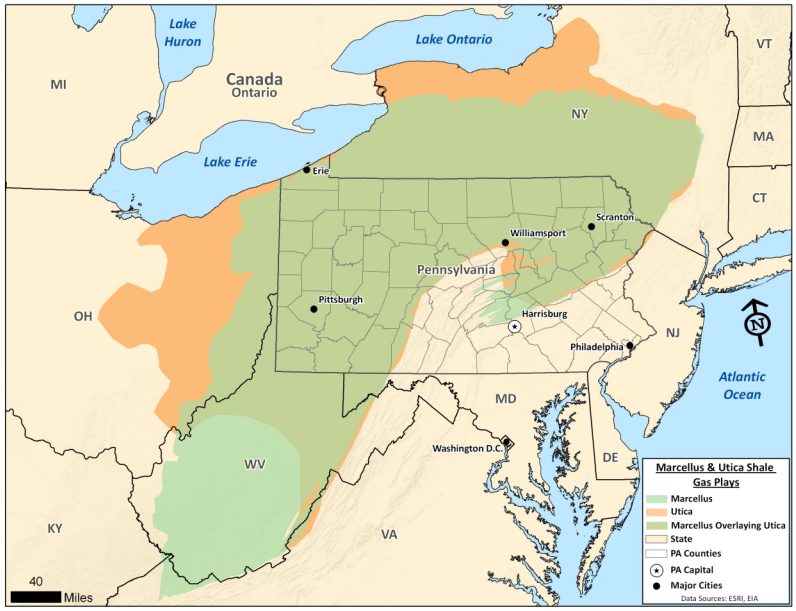
Oil
The exploration and production of oil is not new to Pennsylvania. In fact, the first commercial oil well was successfully drilled in 1859 by Edwin Drake in Titusville. This was the birth of what was to become the nation's petroleum industry. Today, much of the nation's oil production occurs in states such as Texas, North Dakota, Oklahoma, California and Alaska. However, Pennsylvania's conventional “oil patch” in the northwest corner of the state continues to yield Pennsylvania Grade crude oil. This particular oil is paraffin-based, renowned for its lubricating qualities and is used in the manufacture of petroleum lubricants such as motor oils and as an ingredient in consumer products such as cosmetics, ointments and lotions.

Natural Gas
In addition to historic oil reserves, Pennsylvania has also been a source of natural gas for more than a century. Although it had been suspected that deposits of natural gas existed within vast tight shale formations deep under Pennsylvania's surface, conventional extraction methods were unable to effectively unlock the natural gas from its source and the actual quantities were not well understood.

By 2005, horizontal drilling methods combined with high-volume hydraulic fracturing techniques were beginning to be successfully and economically deployed to capture natural gas from Pennsylvania's shale deposits. Today, Pennsylvania is the second largest producer of natural gas in the nation.

PENNSYLVANIA'S SHALE PLAYS

Unconventional shale basins are commonly characterized according to the geologic formation that serves as the source of the shale gas. The term “shale play” is used by the oil and gas exploration and development industry to identify areas of shale basins that appear to be particularly suitable for shale gas development. The current predominant shale play in Pennsylvania is the Marcellus Shale Play. However, interest is beginning to increase in the exploration and production of the Utica Shale Play and Point Pleasant Shale Play that are located well below the Marcellus Shale Play. Other less familiar shale plays in and around Pennsylvania include the Rhinestreet, Huron and a collection of less extensive formations that comprise the Upper Devonian shale formation.



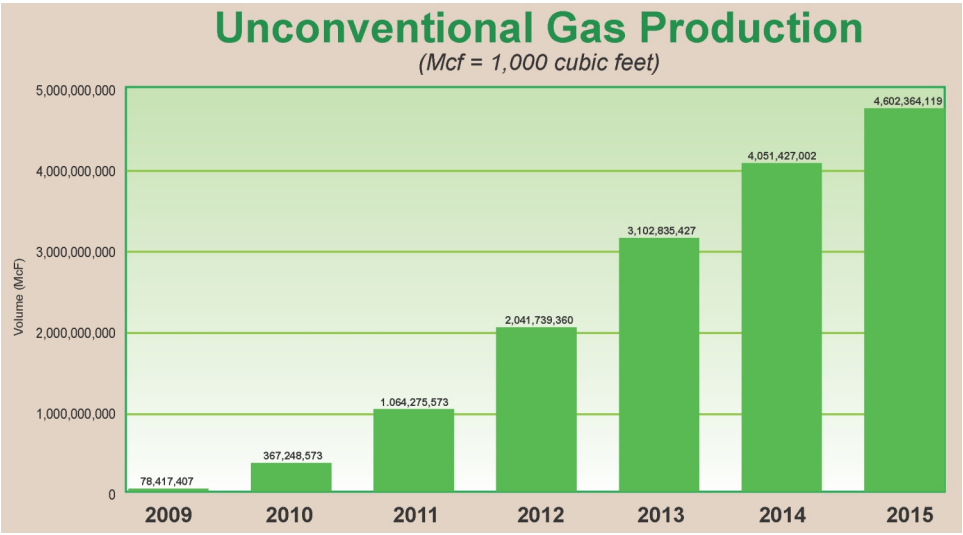
NATURAL GAS PRODUCTION IN PENNSYLVANIA

Since 2008, Pennsylvania's natural gas production has increased dramatically, resulting in increased energy security due to less dependence on fossil fuels from other parts of the world. Increased shale gas production has resulted in a number of significant benefits including less expensive energy costs and improvements to Pennsylvania's air quality as a result of the increased use of cleaner burning natural gas.

Today, vast areas of black shale deposits in Pennsylvania are yielding tremendous amounts of natural gas. Pennsylvania is the second largest supplier of natural gas in the nation, second only to the state of Texas.

Annual Natural Gas Production

In 2015, more than 4.6 trillion cubic feet of natural gas was produced in Pennsylvania. Despite the reduction in the number of natural gas wells being drilled in Pennsylvania during 2015, the overall volume of natural gas produced continued to increase.



Monthly Production Reporting for 2015

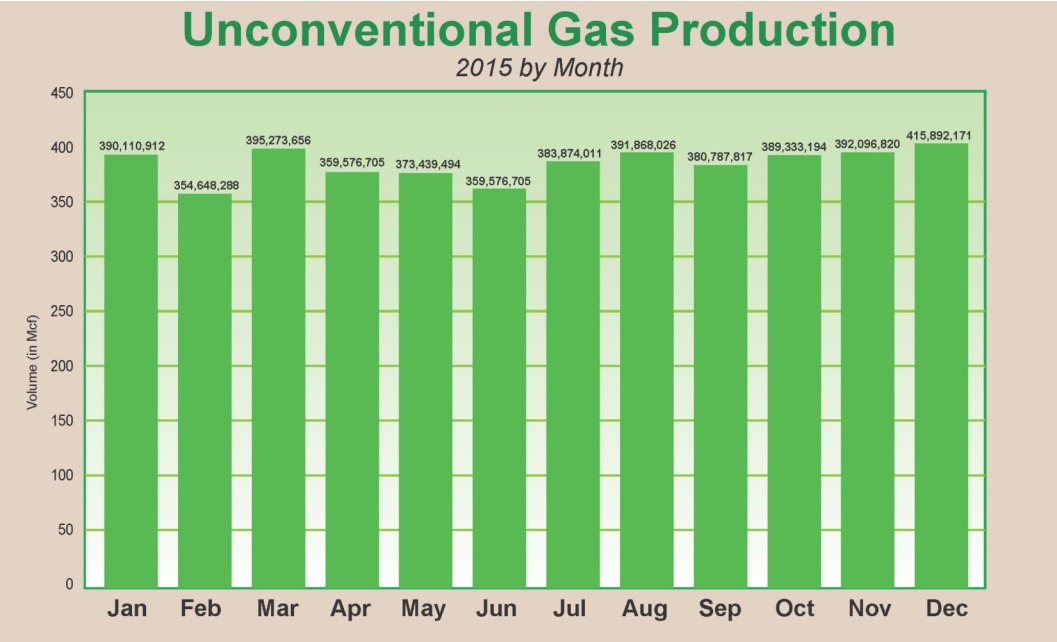
The Unconventional Well Report Act of October 2014 amended the 2012 Oil and Gas Act to require operators of unconventional wells to submit to DEP natural gas production reports on a monthly basis. Prior to this statutory amendment, operators of unconventional wells were only required to submit a report on resource production to DEP semi-annually. Unconventional operators must now report their production 45 days after the end of the month of production.

The Unconventional Well Report Act did not affect the frequency of production reporting for operators of conventional wells. Conventional well operators continue to report their production data on an annual basis.

Production data is self-reported to DEP by operators and reported data is submitted to DEP electronically. DEP conducts limited data verification of reported data mainly to ensure that data is submitted timely as required and that no gross errors are identified. DEP conducts compliance oversight of operators who fail to comply with these reporting requirements.

All production data is available to the public on DEP's website at:
https://www.paoilandgasreporting.state.pa.us/publicreports/Modules/Welcome/Welcome.aspx

Waste that is generated at unconventional well sites must be reported semi-annually, on Feb. 15 and Aug. 15 each year and operators of conventional well sites report its waste on an annual basis.



Natural Gas Production by Geologic Formation

There are more than a dozen geologic formations below Pennsylvania's land surface that contain rich deposits of natural gas. To date, the most productive formation has been the Marcellus shale formation from which almost 4.5 trillion cubic feet of natural gas was generated in 2015 alone. Although the Marcellus shale formation currently eclipses all other geologic formations combined, several other shale formations including the Utica and Point Pleasant formations may contain similar, if not larger, quantities of untapped natural gas. The table to the right lists the volume of natural gas produced from major geologic formations in Pennsylvania during 2015.

Production by Geologic Formation	
Formation	Gas Quantity (Mcf)
MARCELLUS	4,474,572,964
UTICA SHALE	53,844,990
POINT PLEASANT	26,700,402
BURKET	21,482,972
GENESEE	19,949,102
GENESEO	4,135,861
RHINESTREET SHALE	1,624,133
CABOT HEAD SHALE	41,891
MAHANTANGO	7,672
ELK	3,160
GRIMSBY	971
Grand Total	4,602,364,119

Top 25 Natural Gas Producers

The table to the right identifies the Top 25 producers of natural gas in Pennsylvania during the 2015 calendar year, based on production data reported to DEP.

A technical analysis of gas production trends was conducted by staff in DEP's Bureau of Oil and Gas Planning and Program Management that resulted in the publication of a poster presentation. The poster publication titled "Using Gas Production and Produced Water Trends to Explore Marcellus Formation Development in Pennsylvania" can be viewed on DEP's website at:

http://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/Annual_Report/2014/GSA_Poster_5_23_14_optimized.pdf

2015 Top 25 Producers of Natural Gas	
Oil and Gas Operator	Volume (Mcf)
CHESAPEAKE APPALACHIA LLC	675,870,599
CABOT OIL & GAS CORP	636,021,824
RANGE RESOURCES APPALACHIA LLC	415,052,274
EQT PRODUCTION CO	380,914,991
CHIEF OIL & GAS LLC	271,540,067
SWN PRODUCTION CO LLC	267,759,997
TALISMAN ENERGY USA INC	195,542,662
CHEVRON APPALACHIA LLC	172,360,020
SOUTHWESTERN ENERGY PROD CO	171,360,193
CNX GAS CO LLC	161,593,282
RICE DRILLING B LLC	153,171,759
ANADARKO E&P ONSHORE LLC	148,288,457
SENECA RESOURCES CORP	132,940,825
SWEPI LP	127,591,068
XTO ENERGY INC	68,485,721
VANTAGE ENERGY APPALACHIA II LLC	66,019,621
PA GEN ENERGY CO LLC	63,947,198
RE GAS DEV LLC	63,495,992
ALPHA SHALE RES LP	47,480,458
CARRIZO (MARCELLUS) LLC	47,399,909
EXCO RESOURCES PA LLC	46,513,553
ENERGY CORP OF AMER	43,998,812
WARREN E & P INC	39,105,121
NOBLE ENERGY INC	38,303,982
HILCORP ENERGY CO	35,458,939

PERMITTING

Types of Oil and Gas Permits

The Office of Oil and Gas Management is responsible for the review and approval of permit authorizations related to the construction of oil and gas wells and development of the sites on which they are constructed. Although there are many types of permit authorizations that are issued by permitting staff within the Office of Oil and Gas Management, those most commonly issued by DEP include the Erosion and Sediment Control General Permit, individual and various general permits for stream crossings and encroachments and the Drill and Operate a Well permit (commonly called the Well Drilling Permit). The Office of Oil and Gas Management also operates a well plugging program that requires entities that intend to plug an orphan or abandoned well to submit formal notification to DEP.

Erosion and Sediment Control General Permit-2

The Erosion and Sediment Control General Permit-2 (ESCGP-2) is designed to address earth disturbances at oil and gas sites where more than five acres of land are disturbed. This general permit is typically used to authorize an operator to construct unconventional gas well pads and associated pipelines.

The standard permit review timeframe for an ESCGP-2 permit is 43 business days. DEP offers an expedited review process whereby a permit decision can be reached in 14 business days provided the project achieves specific permit standards and ensures protection of the environment. In certain situations, such as when a well site is in close proximity to high quality or exceptional value waters, the expedited review process is not available to the permit applicant.

In 2015, DEP issued 203 standard ESCGP-2 permits and 258 expedited ESCGP-2 permits compared to 250 standard ESCGP-2 permits and 474 expedited ESCGP-2 permits in 2014, respectively. Since 2013 was the first year that the ESCGP-2 permit was created and in use, the department will continue to evaluate the long-term permit trends for these types of permits.

Individual and General Permits for Stream Crossings and Encroachments

Traditionally, DEP's Office of Water Management is responsible for the oversight of the permitting program related to stream crossings and encroachments that are regulated by Chapter 105 of Pennsylvania's water obstructions and encroachments regulations. In the case of pipelines, bridges and other structures associated with oil and gas activities that cross or encroach on waters of the Commonwealth, DEP's Office of Oil and Gas Management has been delegated responsibility to review and issue such permits. Depending on the nature of the stream crossing or encroachment, an oil and gas operator must either obtain an individual permit or authorization under one of several types of general permits that have been established for similar types of projects. In some cases, the U.S. Army Corps of Engineers also reviews the same encroachment permits where it maintains authority. In 2015, DEP's oil and gas program issued 82 individual permits and 600 general permit authorizations for stream crossings and encroachment activities compared to about 100 individual and 800 general permits in 2014.

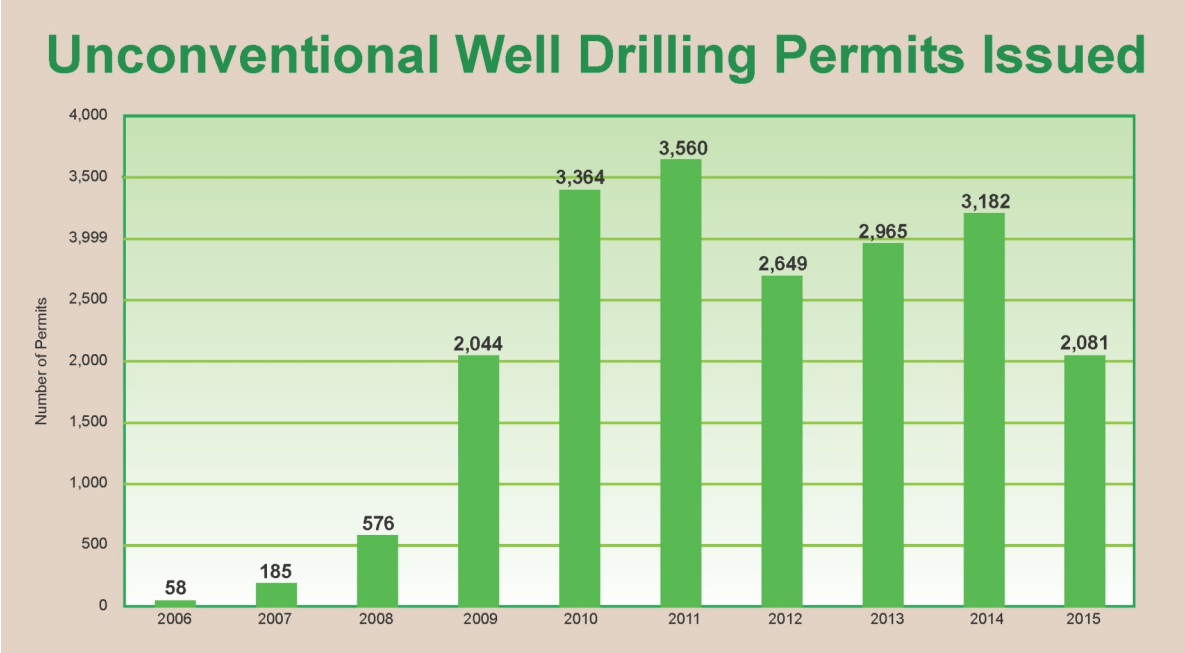
Drill and Operate a Well Permit

As the name implies, the Drill and Operate a Well Permit authorizes an operator to construct and operate a conventional or unconventional well. An unconventional well site and well pad is typically constructed to accommodate multiple wells. An operator must obtain an individual permit for each well that is constructed. A Drill and Operate a Well Permit must be submitted to DEP for each additional well that is intended to be drilled on the well pad or when an existing well is drilled deeper into the geologic formation. The Oil and Gas Act requires DEP to render a permit decision within 45 calendar days of receiving a complete permit application.

Permit Trends

Unconventional Well Drilling Permits Issued

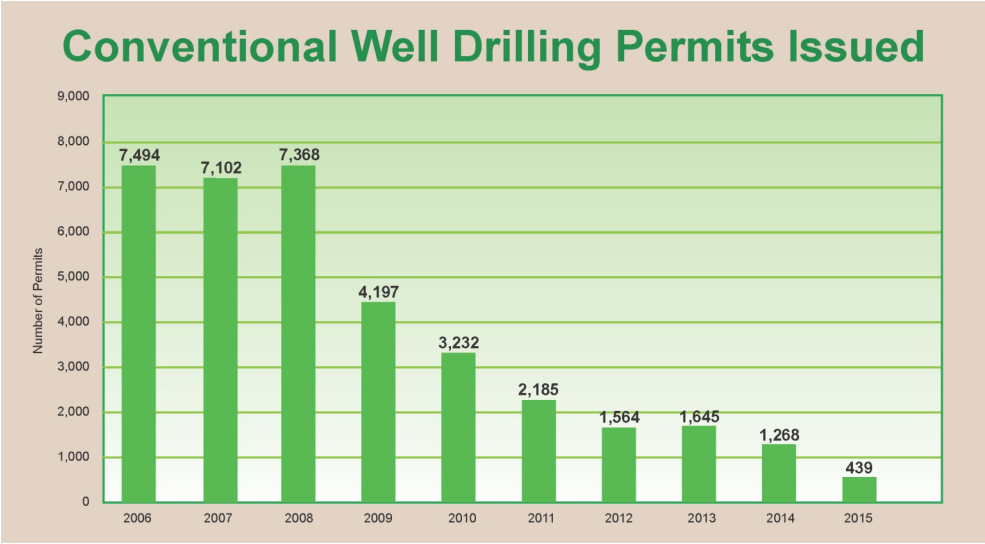
In 2015, DEP issued a total of 2,520 well drilling permits including both conventional and unconventional wells in Pennsylvania. Of this amount, DEP issued 2,081 well drilling permits for the construction of unconventional wells and 439 well drilling permits for the construction of conventional wells. The graph below shows the total number of unconventional well drilling permits issued by DEP since 2006.



The number of unconventional well drilling permits issued by DEP increased significantly from 2007 until it reached its height in 2011. After a market pull-back in 2012, the number of drilling permits continued to trend upward through 2014. In 2015, the number of unconventional drilling permits issued decreased to 2,081. This reduction is primarily due to the overall curtailment of oil and gas drilling operations in Pennsylvania. DEP expects the number of unconventional well drilling permits received during 2016 to remain low.

Conventional Well Drilling Permits Issued

Since 2008, conventional oil and gas well development has been trending steadily downward as seen in the graph below:

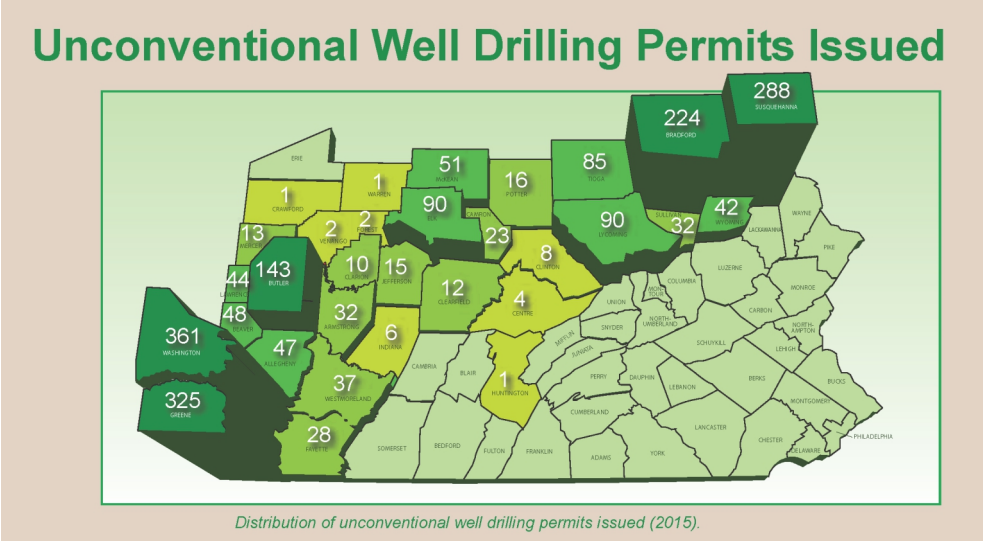


Well Drilling Permits Issued (by Type and Location)

Unconventional Well Drilling Permits

The geographic region of the state where operators have obtained well drilling permits to construct unconventional wells generally correlates to the locations of the unconventional shale plays. However, not all locations within the unconventional shale plays are equal in terms of the volume of available gas or the productivity of the wells that are constructed.

The map below identifies the distribution, by county, of the 2,081 well drilling permits issued in calendar year 2015 for the purpose of constructing unconventional gas wells. The majority of all unconventional well drilling permits issued in 2015 were for projects located in northeast and southwest Pennsylvania counties.



Distribution of unconventional well drilling permits issued (2015).

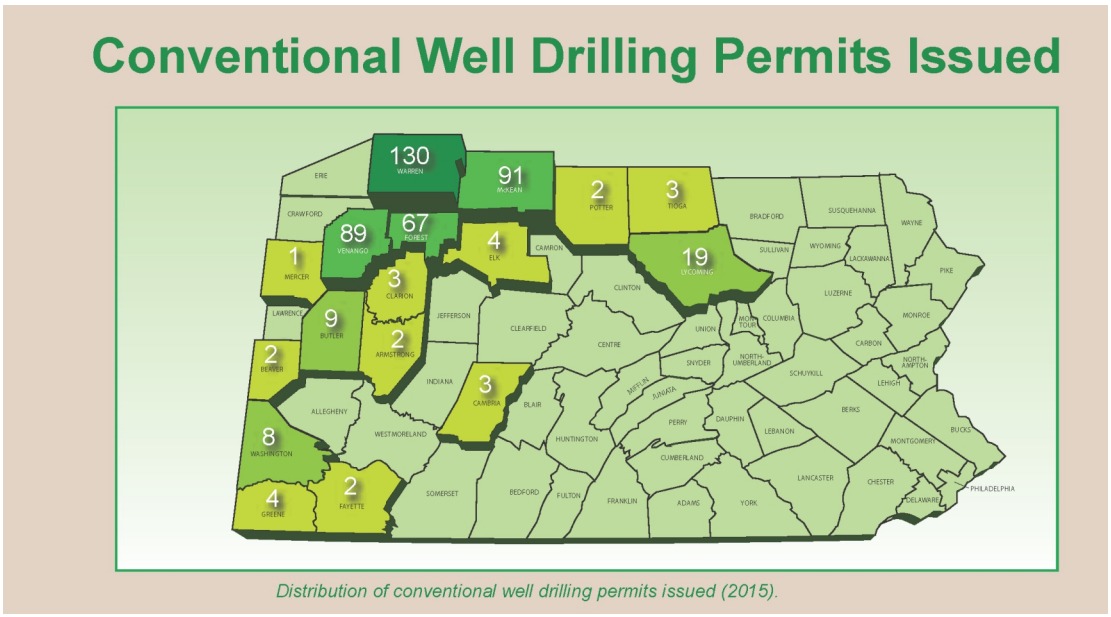
During 2015, the top five counties with the highest number of unconventional permits issued by DEP were:

Top 5 Counties - Unconventional Permits	
County	Number of Unconventional Permits Issued
Washington	361
Greene	325
Susquehanna	288
Bradford	224
Butler	143

Conventional Well Drilling Permits

The map below identifies the distribution, by county, of the 439 well drilling permits issued in calendar year 2015 for the purpose of constructing conventional oil and gas wells.

As evidenced in the map below, the majority of all well drilling permits for conventional well sites were issued to operators in Venango, Warren, McKean and Forest counties. This area is commonly called Pennsylvania's “oil patch” where Pennsylvania Grade crude oil is most prevalent.



Distribution of conventional well drilling permits issued (2015).

During 2015, the top five counties with the highest number of conventional permits issued by DEP were:

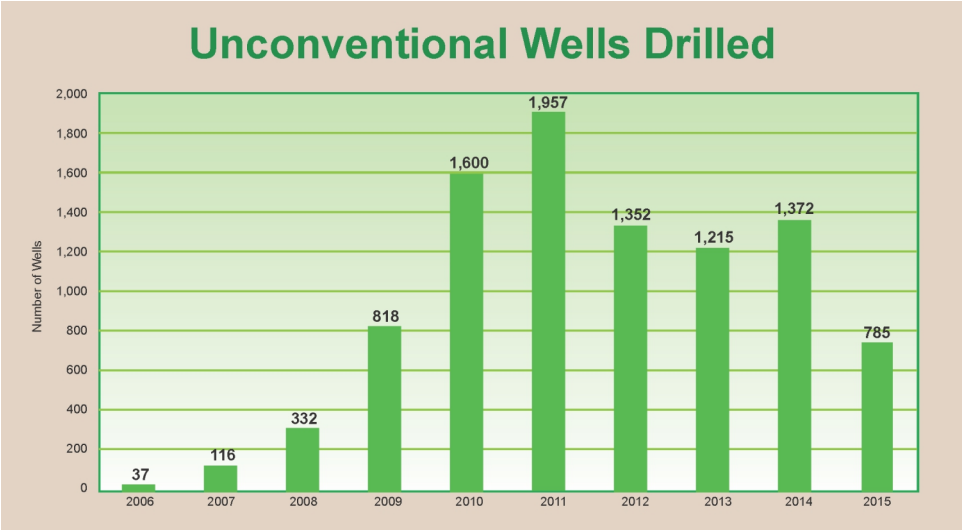
Top 5 Counties - Conventional Permits	
County	Number of Conventional Permits Issued
Warren	130
McKean	91
Venango	89
Forest	67
Lycoming	19

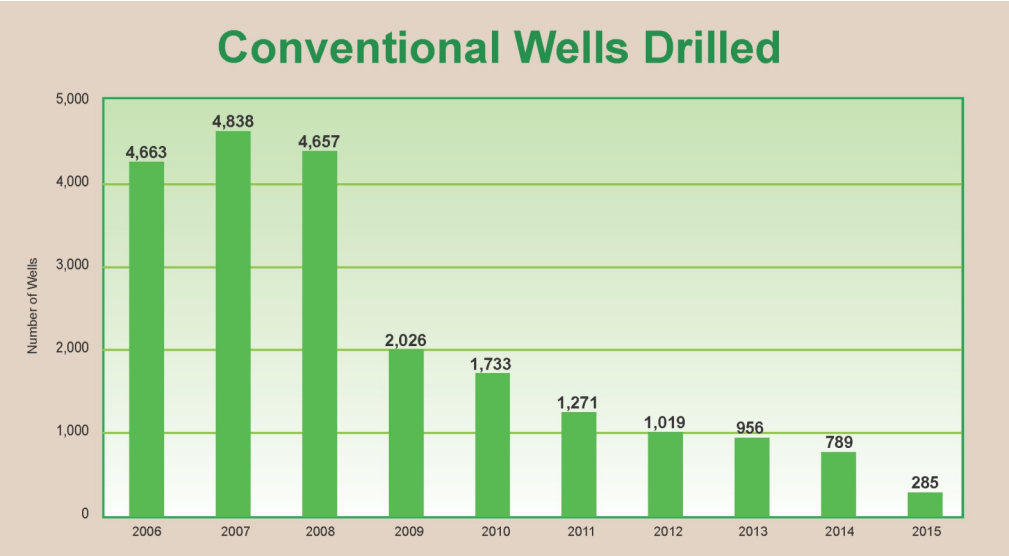
NATURAL GAS DRILLING ACTIVITIES

Well Drilling Trends

In 2015, operators drilled a total of 1,070 wells in Pennsylvania, including both conventional and unconventional wells. Of this amount, 785 were unconventional wells and 285 were conventional wells. The number of wells drilled in Pennsylvania during 2015 dropped significantly from 2014. In 2014, operators drilled a total of 2,163 wells in Pennsylvania, including both conventional and unconventional wells. Of this amount, 1,372 were unconventional wells and 789 were conventional wells. This represents more than a 50 percent reduction in the total number of wells drilled from 2014 to 2015.

The actual number of unconventional and conventional wells that are drilled in Pennsylvania varies from the number of well drilling permits that are issued by DEP. One reason for this is that a well drilling permit is valid for a full year and can be extended if approved by DEP. An operator may commence drilling at any time during the period that the permit is in effect. Depending on individual business practices, oil and gas operators may secure a well drilling permit far in advance of commencing actual drilling operations. In some cases, an operator may also determine that a site is not suitable for drilling. Due to these reasons, it is common that the number of permits issued by DEP exceeds the number of wells drilled in any given year.

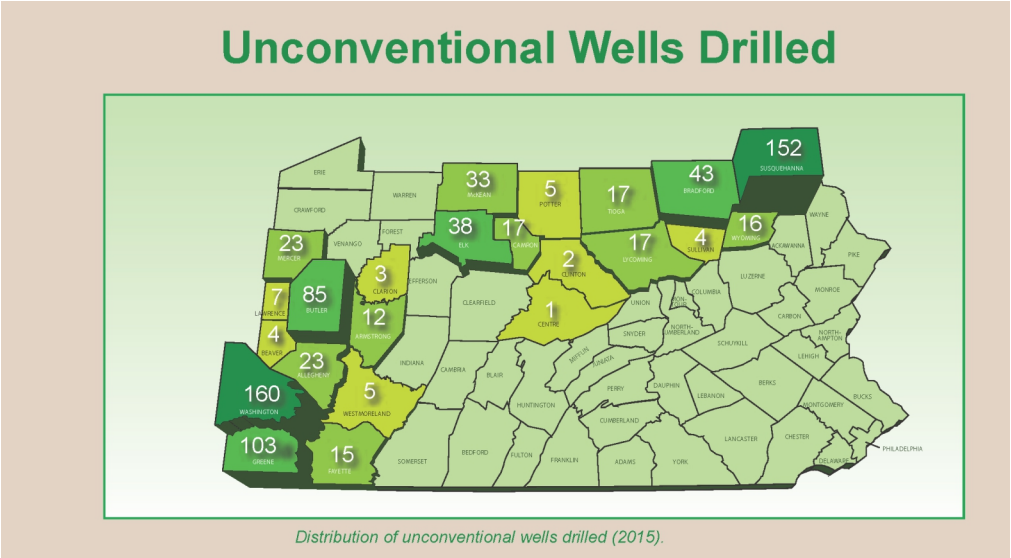




Wells Drilled (by Type and Location)

Unconventional Wells

The following map identifies the distribution, by county, of the 785 unconventional wells that were drilled in calendar year 2015.



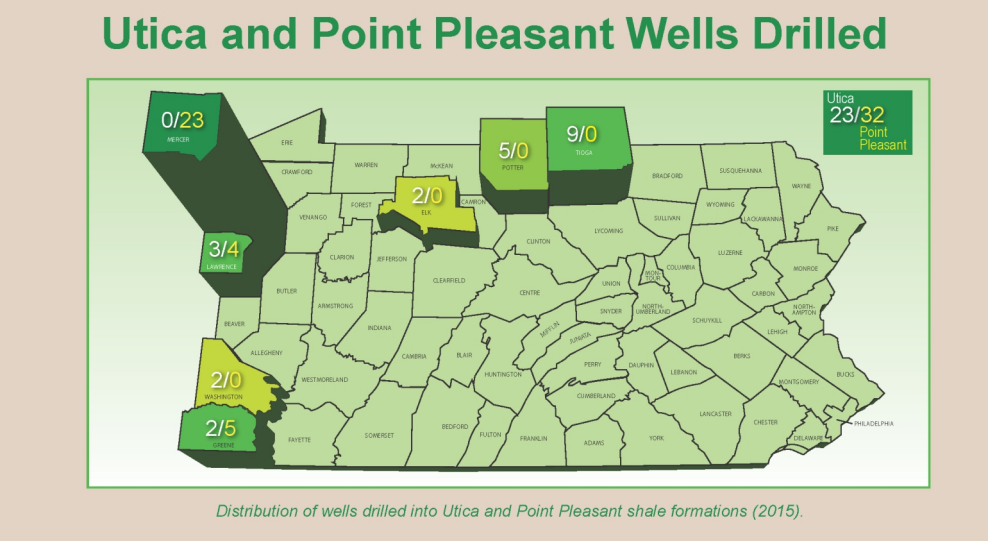
Distribution of unconventional wells drilled (2015).

During 2015, the top five counties with the highest number of unconventional wells drilled in Pennsylvania include:

Top 5 Counties - Unconventional Wells Drilled	
County	**Number of Unconventional Wells Drilled**
Washington	160
Susquehanna	152
Greene	103
Butler	85
Bradford	43

Utica and Point Pleasant Wells

Of the 785 unconventional wells that were drilled in 2014, only 23 of these wells were drilled into the Utica Shale Play and 32 wells were drilled into the Point Pleasant Shale Play. The Utica and Point Pleasant Shale Plays are much deeper below the surface than the Marcellus Shale Play, but also hold significant volumes of natural gas available for future production. It is likely that as market forces stabilize, there will be increased interest in drilling wells into the Utica and Point Pleasant shale formations. The map below depicts the unconventional wells that were drilled into the Utica and Point Pleasant shale formations during 2015.

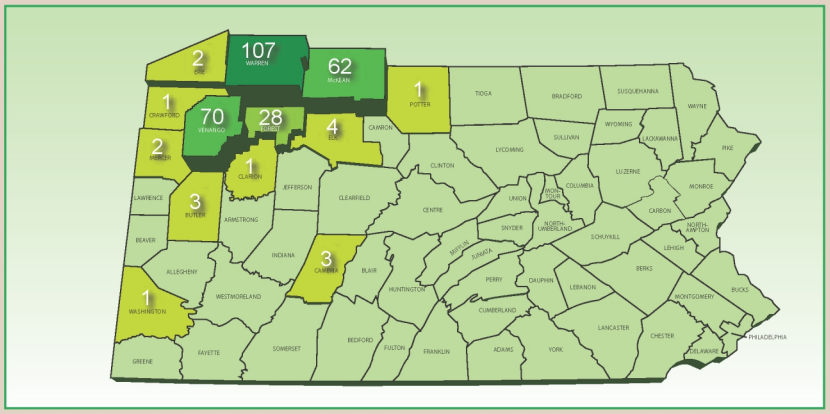


Distribution of wells drilled into Utica and Point Pleasant shale formations (2015).

2015 Utica & Point Pleasant Wells Drilled			
County			
	POINT PLEASANT	UTICA SHALE	Total Wells Drilled
Elk	0	2	2
Greene	5	2	7
Lawrence	4	3	7
Mercer	23	0	23
Potter	0	5	5
Tioga	0	9	9
Washington	0	2	2
Total	**32**	**23**	**55**

Conventional Wells

The following map identifies the distribution, by county, of the 285 conventional wells that were drilled in calendar year 2015. Of all conventional wells drilled in Pennsylvania in 2015, more than 94 percent were drilled in only four northwestern counties located in the “oil patch” region of the state.



Distribution of conventional wells drilled (2015).

During 2015, the top five counties with the highest number of conventional wells drilled in Pennsylvania were:

Top 5 Counties - Conventional Wells Drilled	
Country	**Number of Conventional Wells Drilled**
Warren	107
Venango	70
McKean	62
Forest	28
Elk	4

WELL PLUGGING PROGRAM

It is estimated that more than 350,000 wells have been drilled in Pennsylvania, since drilling began over a century ago. Some wells that are drilled produce oil and gas for many years while others do not produce enough oil or gas to be profitable over the long term. When a well ceases to produce oil or gas, it must be properly plugged.

Although stringent requirements currently exist regarding the proper methods to plug wells, this was not always the case. In fact, it was not until the passage of the Oil and Gas Act of 1984 that laws and regulations were created to ensure the safe plugging of orphan and abandoned wells. Today, Pennsylvania's oil and gas laws and regulations require wells to be properly plugged when they are no longer able to serve their intended purpose. Also, operators are now required to post bonds with DEP to ensure that wells are properly plugged at the end of their useful life.

DEP tracks all known orphan and abandoned wells; however, many thousands of wells continue to exist and their exact locations may not be known. Currently, there are 8,363 orphan and abandoned wells that are known to exist and are on record with DEP. To date, the DEP's Well Plugging Program has overseen the plugging of a total of 3,036 wells.

When a responsible owner is known to exist or is identified, the owner is legally responsible to plug a well when it is no longer capable of producing oil or gas. When orphan and abandoned wells are discovered and no responsible owner exists, those wells are placed on DEP's list of orphan and abandoned wells. DEP inspects and evaluates each newly-discovered orphan and abandoned well, and then ranks and prioritizes those wells for future plugging. Prioritization is based on health and safety criteria, environmental degradation and other potential impacts. Wells that present a high risk to human health and safety and the environment are plugged first. DEP inspectors routinely follow up to ensure that wells are plugged in accordance with DEP's regulatory requirements.

Year	No. of Wells Plugged	Cost
1989	7	$74,681.89
1990	12	$204,760.80
1991	15	$122,486.87
1992	4	$247,673.97
1993	3	$79,077.14
1994	5	$129,032.22
1995	23	$457,801.51
1996	12	$212,728.34
1997	16	$211,159.69
1998	10	$259,635.34
1999	31	$487,112.17
2000	128	$1,348,085.17
2001	340	$2,159,220.55
2002	441	$3,235,274.14
2003	222	$1,453,008.95
2004	222	$2,296,595.36
2005	95	$1,129,932.57
2006	107	$1,133,670.82
2007	353	$3,379,389.44
2008	239	$3,151,901.73
2009	201	$2,353,716.44
2010	205	$1,994,267.78
2011	163	$1,690,915.19
2012	56	$1,010,855.49
2013	38	$1,076,191.81
2014	50	$1,084,687.70
2015	38	$797,780.36
Totals	3036	$31,781,643.44

Footnote: Amount encumbered for 2015 is subject to change based on actual project/site conditions and potential contract amendments.

Funding for Well Plugging Projects

The cost to plug a well varies widely depending on the type, depth and condition of the orphan or abandoned well. The table displays the total number of wells that have been plugged annually since 1989 as well as the cost incurred for the plugging of these wells.

Funding for DEP's Orphan and Abandoned Well Plugging Program is derived from surcharges established by Section 3271 of the Oil and Gas Act of 2012. Well plugging contracts are funded by permit surcharges that are collected in addition to the well drilling permit application fee. The orphan well surcharge is $100 for an oil well or $200 for a natural gas well. A separate additional abandoned well surcharge of $50 applies to both oil and gas wells. The Orphan Well Plugging Fund and the Abandoned Well Plugging Fund are dependent on the number of new drilling permits submitted to DEP from oil and gas operators. These permit surcharge revenues have enabled DEP to plug only a limited number of wells that are known to exist in Pennsylvania. From calendar year 2000 through 2013, DEP's Growing Greener funds were used to supplement the permit surcharge revenues; however, this funding source has also dwindled.

Act 13 of 2012 allocates funds to the Commonwealth Financing Authority (CFA) and can be used to administer a grant program that includes the plugging of orphan and abandoned wells. Though DEP is currently working with the CFA to promote the plugging of high-priority orphan and abandoned wells, it is unlikely that these funds will be sufficient to address the full universe of orphan and abandoned wells that exist in Pennsylvania.

DEP Plugging Program Highlights for 2015

Although funding was constrained due to the downturn in drilling permit fees received in 2015, staff in DEP's Division of Well Plugging and Subsurface Activities were able to award five new plugging contracts that year.

Three of the well plugging contracts were awarded to plug a total of 36 abandoned oil wells in Otto Township, McKean County. The abandoned wells were leaking oil and the contaminated soil required site remediation. The well plugging projects also addressed ongoing contamination of a surface water body. Since work commenced, one property that was previously impacted has been placed back into productive use as pasture land.

The fourth well plugging contract involves the plugging of an abandoned gas well in South Fayette Township, Allegheny County, that is in close proximity of a residential property. The area immediately surrounding the well is subsiding, creating a hazardous situation for the homeowner. The well will be plugged to address safety concerns.

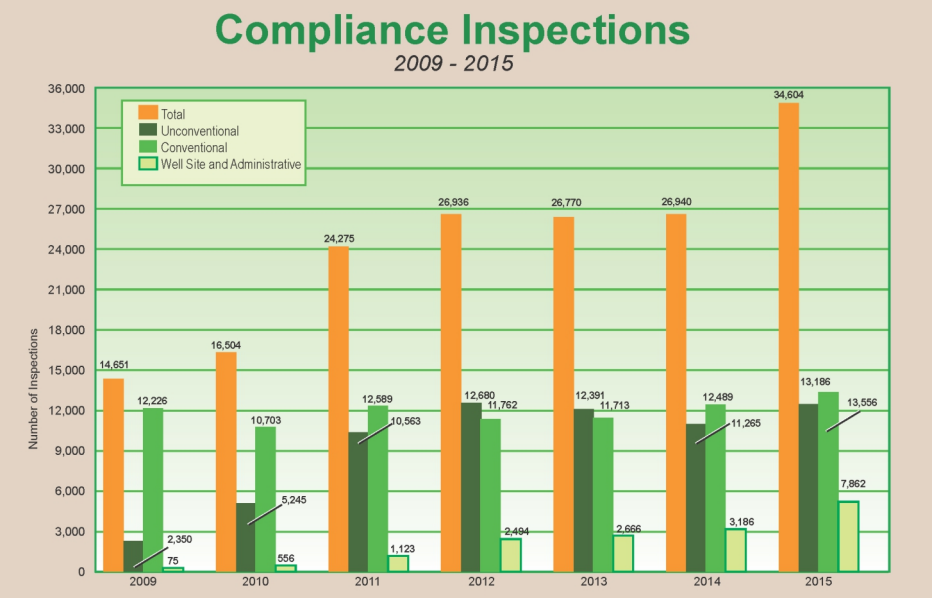
The fifth well plugging contract involves the plugging of an abandoned gas well in Clarion Borough, Clarion County. The well is located near the county courthouse and county jail property.

In addition to the award of new well plugging contracts, work continued on existing contracts.

INSPECTIONS

DEP's Office of Oil and Gas Management conducts rigorous inspections at oil and gas sites across the state. Inspections at well sites are necessary to ensure that the environment is protected, particularly during well development. Currently, DEP employs about 100 oil and gas inspectors that are responsible for ensuring oil and gas wells and well sites are constructed properly.

As depicted in the bar chart below, the total number of all well inspections has steadily increased from 2008 through 2015.



COMPLIANCE AND ENFORCEMENT

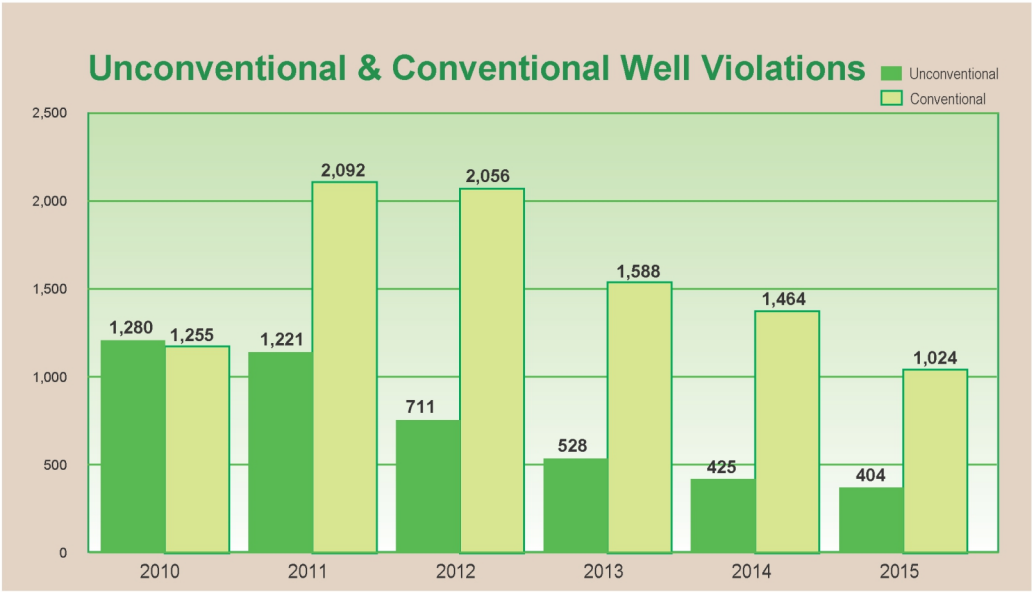
DEP has increased its efforts over the past several years to ensure improved regional consistency and continuous improvement in its compliance and enforcement programs that are administered by DEP's district oil and gas offices.

DEP focused its efforts on updating its compliance and enforcement policy titled "Standards and Guidelines for Identifying, Tracking and Resolving Oil and Gas Violations." The department published this policy in the *Pennsylvania Bulletin* on Oct. 4, 2014 and the public was provided 45 days to provide public comment. DEP responded to all comments and published the final policy in January 2015. This policy is available on the DEP website at:
http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-105828/820-4000-001.pdf

Although the number of inspections has increased since 2008, the number of violations associated with unconventional and conventional wells has steadily decreased over this same time period. The record suggests that DEP's compliance initiatives and outreach to operators are working as compliance rates are improving.

Compliance Trends
The following graph shows the number of violations that have occurred at unconventional and conventional wells from 2010 through 2015. From 2010 through 2015, the number of violations for unconventional wells decreased from 1,280 to 404. The number of violations for conventional wells decreased from 2,092 to 1,024 from 2011 through 2015. This represents a 67 percent reduction in violations during this five-year period for unconventional wells and 51 percent reduction for conventional wells during this four-year period.

Although the total number of violations continue to decline, the graph shows that the number of violations at conventional wells consistently exceeds the number of violations at unconventional wells. DEP is committed to vigorously pursuing enforcement actions as warranted and to encouraging operators to come into compliance with environmental laws and regulations.



Enhanced Administrative Inspection and Enforcement Initiative
The Unconventional Well Report Act requires unconventional operators to report natural gas production on a monthly basis and the Oil and Gas Act requires conventional operators to report natural gas production on an annual basis. Additionally, DEP's regulations require unconventional and conventional operators to report the results of mechanical integrity assessment inspections to DEP annually. These reporting requirements not only provide transparency about the volume of natural gas that is produced in Pennsylvania, but they also provide critical insight into the status of the integrity of natural gas wells throughout the commonwealth.

In the fall of 2015, the Office of Oil and Gas Management conducted an enhanced inspection and enforcement initiative that focused on administrative violations. Specifically, DEP conducted enforcement and outreach to operators that failed to submit their 2014 production data and annual well integrity reports as required by law. DEP issued 3,363 Notices of Violation to conventional operators and 83 Notices of Violation to unconventional operators that did not submit production reports. Additionally, DEP issued a total of about 400 Notices of Violation to unconventional and conventional operators for failure to submit well integrity reports.

These enforcement actions and subsequent compliance assistance from DEP resulted in over 500 new operators becoming registered to use DEP's online electronic oil and gas applications via the DEP GreenPort web portal. These newly registered operators account for over 31 percent of the total number of registered oil and gas electronic application users.

Multi-Agency Compliance and Enforcement Initiative
Between Oct. 26 - 28, 2015, the Pennsylvania State Police/Motor Carrier Enforcement (PSP/MCE), in conjunction with DEP's Northeast Regional Waste Management Program and Eastern District Oil and Gas Program, conducted a Rural Roads Detail inspection in Lackawanna, Susquehanna and Wayne Counties. On Oct. 27, 2015 Eastern District Oil and Gas staff accompanied the group in an attempt to safely sample contents of trucks reportedly hauling freshwater to oil and gas hydraulic fracturing operations in and around the US Route 11, New Milford area. This initiative was performed in response to a surge of complaints received that tanker trucks placarded as hauling freshwater were suspected to be back-hauling brine, re-used water, or flowback fluids; which is a violation of state law. On Nov. 4 - 5, 2015, DEP conducted sampling activities at four freshwater impoundments located in Bradford and Susquehanna Counties.

Analyses of all samples collected as part of this inspection event suggested that the fluids being dispersed and hauled were indeed freshwater. In order to remain vigilant, DEP intends to participate in future Rural Road Detail inspection events along with the PSP/MCE and PA DEP Northeast Region Waste Management Program to ensure continued compliance is maintained.

Fines and Penalties Collected
Since 2009, DEP has collected about $23.2 million as a result of noncompliance at oil and gas sites in Pennsylvania. These fines and penalties are used to reimburse operating costs that are incurred by DEP in the oversight of oil and gas and related environmental programs. The following table lists the amount of fines and penalties collected annually from 2009 through 2015.

Fines and Penalities	
Calendar Year	Fines and Penalties Collected
2009	$926,346
2010	$2,714,654
2011	$2,671,101
2012	$2,078,373
2013	$2,584,128
2014	$7,138,908
2015	$3,414,102

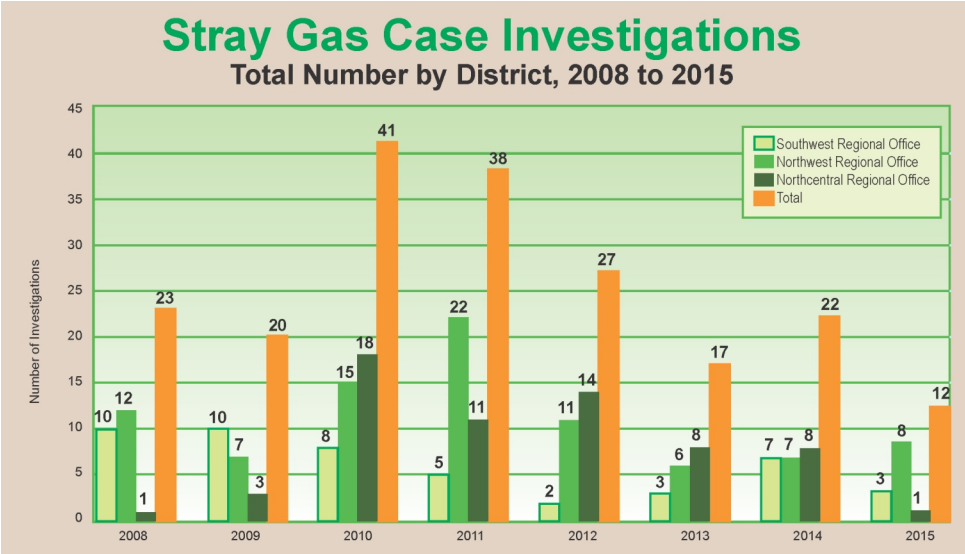
STRAY GAS INVESTIGATIONS

One of the most important issues associated with oil and gas exploration and development is the effective engineering and construction of oil and gas wells. If wells are not constructed or operated properly, there is a potential risk for natural gas to escape from the well bore into subsurface geologic strata or groundwater sources. If this happens, it is called "stray gas" migration and the responsible operator is required by law to correct the situation.

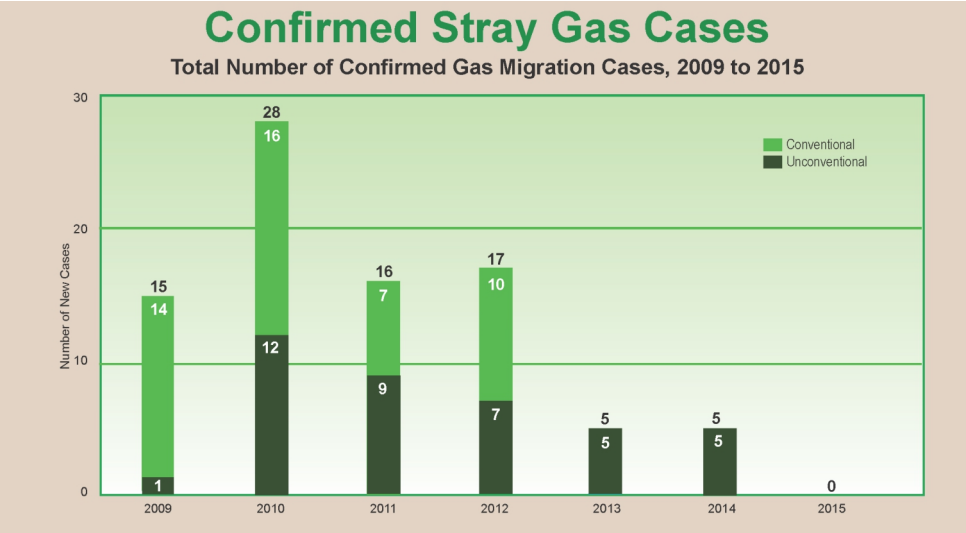
DEP's Office of Oil and Gas Management responds to stray gas complaints and conducts investigations to determine the source of gas when it occurs. DEP has the ability to conduct extensive three-dimensional modeling to visualize the site and determine the nature and source of methane contamination. DEP staff developed a technical poster titled "Application of 3D Modeling to Differentiate Naturally Occurring Methane and Methane Migration Associated with Natural Gas Development" that can be viewed on the DEP website at: http://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/Annual_Report/2014/App3DMethanePoster_34by46_optimized.pdf (Note: This poster was developed using Adobe software and may take a few moments to download).

DEP also co-authored a water resources report with the Pennsylvania Department of Conservation and Natural Resources' Geological Survey titled "W71: Groundwater and petroleum resources of Sullivan County, Pennsylvania." The report discusses mechanisms contributing to stray gas migration in detail and can be accessed at:
http://www.dcnr.state.pa.us/topogeo/publications/pgspub/water/index.htm

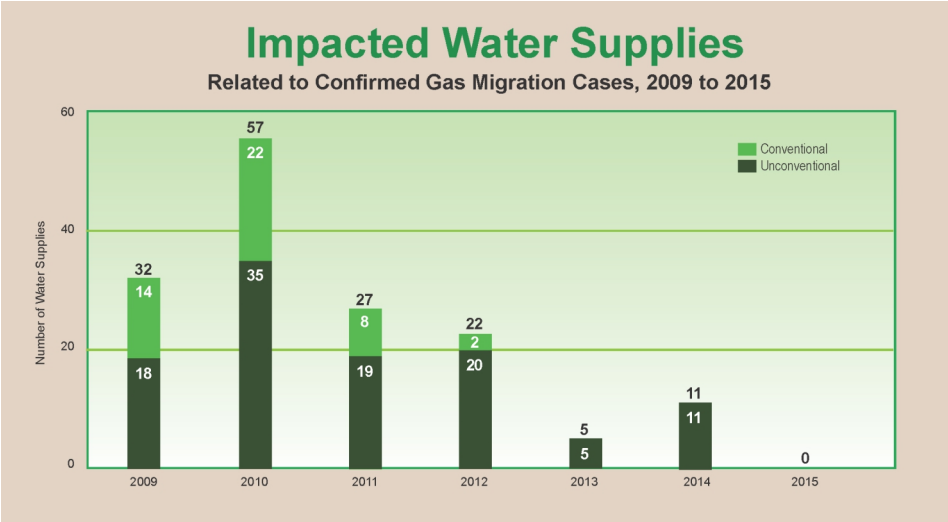
The following graph identifies the number of stray gas investigations conducted by DEP from 2008 through 2015.



The following bar chart identifies the number of confirmed positive determinations from 2008 through 2015 for gas migration cases investigated by DEP. If a stray gas investigation does not result in a confirmed positive determination, then it is not included in this bar graph. If a stray gas investigation extends from one calendar year into a future calendar year, the confirmed positive determination is reported in the year in which the investigation was initiated.



The Pennsylvania Oil and Gas Regulation at 25 Pa. Code, Chapter 78, Subchapter D provides specific requirements for the construction of oil and gas wells including, but not limited to, casing and cementing practices. It also details requirements that operators must fulfill when a potential gas migration incident has occurred. DEP updated these subsurface activities regulations to strengthen well construction practices that are required of operators and place many of the responsibilities of investigating stray gas incidents on the oil and gas industry. The revised rulemaking went into effect on Feb. 5, 2011. DEP intends to further improve these subsurface activity regulations through a subsequent rulemaking package that it plans to initiate in 2016.



The bar chart above identifies the number of drinking water supplies impacted by confirmed gas migration events. It is not uncommon for a single confirmed gas migration case to affect multiple water sources.

The Oil and Gas Act of 2012 presumes that an operator of an unconventional well is responsible for pollution of a water supply when the source is located within 2,500 feet of the unconventional well and when the pollution occurred within 12 months of the drilling, altering, stimulation or completion of the unconventional well. For conventional wells, an operator is presumed responsible for pollution of a water supply when the source is located within 1,000 feet of the conventional well and when the pollution occurred within six months of drilling or altering the well. Unless, the operator can successfully demonstrate that the pollution was not caused by its actions based on specific statutory defenses, the operator must restore or replace the affected water supply.

REGULATORY AND POLICY DEVELOPMENT

Regulatory Revisions for Surface Activities

DEP's Oil and Gas program initiated the process of developing a proposed rulemaking to amend the existing oil and gas regulations (25 Pa. Code, Chapter 78, Subchapter C) in April 2011 to address surface-related activities at well sites in Pennsylvania. In particular, these regulations will address the requirements for pits, impoundments, temporary site containment, spill reporting and cleanup, site restoration, pipelines, horizontal directional drilling, water management plans and the road spreading of brine from conventional well sites. This rulemaking also serves to codify environmental provisions mandated by the 2012 Oil and Gas Act.

DEP conducted extensive outreach on the proposal, which reflects significant input from statewide environmental organizations, local government groups, residents living near well sites and industry representatives who have met with DEP to share their expertise in shaping the proposal.

Over the course of the development of this rulemaking, DEP has incorporated an extraordinary level of transparency and outreach to the public and regulated community. During the proposed rulemaking phase of development, DEP participated in nine (9) public hearings and approximately 24,000 public comments were received. Due to the level of interest in this rulemaking and DEP's commitment to transparency, DEP chose to use an Advanced Notice of Final Rulemaking (ANFR) procedure to solicit additional feedback on the changes made to the regulation.

On April 4, 2015, DEP published notice of the ANFR for revisions to the rulemaking in the *PA Bulletin*, opening an additional 30-day public comment period. On April 6, DEP announced extension of the public comment period by an additional 15 days to close on May 19, and the addition of three public hearings.

During the ANFR comment period, DEP received a total of 4,947 additional comments from 4,601 commentators. Of the comments received, 4,516 were form letters (10 different form letters), 129 were provided via testimony at public hearings, and 302 were unique comments.

On Oct. 27 - 29, 2015, DEP presented the final form Chapters 78 and 78a Surface Activities rulemaking to the Oil and Gas Technical Advisory Board (TAB) and the Conventional Oil and Gas Advisory Committee (COGAC), respectively. This represented a culmination of over 4 years of effort by the Office of Oil and Gas Management to update the existing oil and gas regulations.

On Jan. 6, 2016, DEP submitted the final-form rulemaking to the Environmental Quality Board (EQB) for consideration at its meeting on February 3, 2016. The EQB approved the final form rulemaking by a vote of 15-4. The final-form rulemaking was approved by the Independent Regulatory Review Commission (IRRC) on April 21, 2016 by a vote of 3-2. This rulemaking will also be reviewed by the Office of the Attorney General and the standing committees in the Pennsylvania House of Representatives and Senate.

Oil and Gas Compliance and Enforcement Policy

On Jan. 17, 2015 the Office of Oil & Gas Management finalized a compliance and enforcement policy titled: *Standards and Guidelines for Identifying, Tracking, and Resolving Oil & Gas Violations, Doc. #820-4000-01*. This guidance provides direction to oil and gas program staff to ensure a consistent approach for identifying violations of applicable laws. The policy includes direction on determining appropriate actions to assist violators with returning to compliance. This policy also provides program staff with important direction on initiating, documenting, and resolving water supply investigations and provides guidance on the timeframes program staff must adhere to when conducting such investigations.

NOTABLE ACCOMPLISHMENTS

Pipeline Infrastructure Task Force

In the next decade, Pennsylvania will undergo a substantial pipeline infrastructure build-out to transport gas and related byproducts from thousands of wells throughout the state. This situation created an opportunity for Governor Tom Wolf to engage stakeholders in a collaborative process to achieve a world-class pipeline infrastructure system that adheres to high standards and reduces or avoids environmental and community impacts.

On May 27, 2015, Governor Wolf announced the creation of the Pipeline Infrastructure Task Force (PITF) that consisted of 48 task force members and more than 100 additional volunteers serving in 12 workgroups and coordinated closely with federal agencies, state partners, local governments, industry representatives, landowners and environmental advocates.

Specifically, the task force was charged with developing recommendations to define a series of best practices for: planning, siting and routing pipelines; amplifying and engaging in meaningful public participation; maximizing opportunities for predictable and efficient permitting; employing construction methods that reduce environmental impacts; and developing long-term operations and maintenance plans to ensure pipeline safety and integrity.

Beginning in July 2015, the PITF met on a monthly basis through January 2016. On Feb. 18, 2016, the PITF submitted its report to the governor. The report identified a dozen top recommendations, along with a broader set of 184 suggestions, to help Pennsylvania achieve responsible development of natural gas pipeline infrastructure in the Commonwealth.

The task force presented the recommendations in six major categories, designed to drive wider public discussion on the critical, complex, and interrelated environmental and community issues that Pennsylvania faces in the development of the infrastructure needed to transport gas to market. During 2016, recommendations that fall within the purview of Commonwealth agencies will be further assessed and evaluated for possible implementation. Industry and other agencies are encouraged to do the same for recommendations that lie within their purviews.

The final report and a full set of recommendations is available on DEP's website at:
http://www.dep.pa.gov/Business/ProgramIntegration/PipelineTaskForce/Pages/default.aspx#.V0cnCKPD-Ul

Comprehensive Oil and Gas Development Radiation Study
Generation of Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) in waste generated by the oil and gas industry has increased in Pennsylvania over the past several years due, in part, to the expansion of unconventional natural gas production.

In January 2013, DEP undertook a study to assess levels of naturally occurring radioactivity in the by-products associated with oil and natural gas development. DEP began studying radioactivity levels in flowback waters, treatment solids and drill cuttings, as well as transportation, storage and disposal of drilling wastes. This effort included a study of radon levels in natural gas to ensure that public health and the environment continue to be protected.

The Department published the TENORM report on Jan. 15, 2015. While the report outlines recommendations for further study, it concluded there is little potential for harm to workers or the public from radiation exposure due to oil and gas development.

The report was the culmination of a multi-year effort and represents what may be the most comprehensive radiological study of the oil and gas industry ever conducted. While the recommendations for future actions contained in the report call for additional studies and efforts, DEP now has data to inform the management of natural gas resources and resultant wastes for environmental and health protection.

In summary, the peer-reviewed study concluded that:

- There is little potential for additional radon exposure to the public due to the use of natural gas extracted from geologic formations located in Pennsylvania.
- There is little or limited potential for radiation exposure to the public and workers from the development, completion, production, transmission, processing, storage, and end use of natural gas.
- There is little potential for radiation exposure to workers and the public at facilities that treat oil and gas wastes.
- There is little potential for radiation exposure to the public and workers from landfills receiving waste from the oil and gas industry.
- While limited potential was found for radiation exposure to people using roads treated with brine from conventional natural gas wells, further study of radiological environmental impacts from the use of brine from the oil and gas industry for dust suppression and road stabilization should be conducted.

To read the entire report and a complete list of recommendations, go to the following link:

http://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/Oil-and-Gas-Related-Topics/Pages/Radiation-Protection.aspx#.VzTgDBzD-po

Mechanical Integrity Assessment Reporting and Audit

When an operator constructs a well to deliver oil and gas from deep beneath the ground to the surface, it is critical that the well be constructed in a manner that prevents communication between the well bore and shallower sub-surface geologic strata. A properly constructed well also helps to prevent the potential migration of oil and gas into groundwater sources that supply drinking water wells.

To ensure well construction materials are functioning as intended over the life of the well, Pennsylvania's Oil and Gas Regulation (25 Pa. Code, Chapter 78, Section 78.88) includes requirements for regular inspections of the well components accessible at the surface. Specifically, operators are required to conduct quarterly inspections to ensure all operating wells are in compliance with well construction and operating standards described in the regulations. If a well is not in compliance, the responsible operator is required to notify DEP and take corrective actions to repair or replace defective equipment or mitigate any excess pressure on the surface casing strings through which gas is being produced.

The quarterly inspection program began in the fourth quarter of 2013. The due date of the first annual inspection report, consisting of quarterly inspection data for the 2014 calendar year, was Feb. 15, 2015. As of April 2015, reports had been filed for 7,756 unconventional well sites (99.6% of sites) and 72,365 conventional well sites (60% of sites). DEP took enforcement action against operators who failed to submit these reports as described in the “Compliance and Enforcement” section of this annual report.

After program implementation and to identify potential issues with operator reported Mechanical Integrity Assessment Program data, DEP conducted both office audits and field audits. The office audits involved the review of well records and completion reports to determine if the correct data was reported on mechanical integrity inspection forms. The field audits were implemented to verify the actual physical condition of the wells as compared to what was originally reported by the operator.

Well verification activities were completed in select counties for logistical purposes. A total of 287 wells were randomly selected for review as part of the auditing program. This included 95 unconventional well reports and 96 conventional well reports for the office audits, as well as 48 unconventional wells in Greene, Lycoming and Washington counties; and 48 conventional wells in Indiana and McKean counties for the field audit. The results of DEP's auditing program will be published in a separate report in 2016.

DEP Secretary's Award for Excellence

The development of DEP's Mechanical Integrity Assessment program required the efforts of many staff within the Office of Oil and Gas Management. Several staff members from the Office of Oil and Gas Management received the "Secretary's Excellence Award for Outstanding Team" as a result of the efforts in developing and implementing the Mechanical Integrity Assessment program.

Enhanced Statewide Seismic Monitoring Network

In April 2015, DEP partnered with the Department of Conservation and Natural Resources (DCNR) and the Pennsylvania State University (PSU) to expand Pennsylvania's statewide seismic monitoring network.

The current statewide seismic network in Pennsylvania consists of 18 stationary seismic monitoring stations (10 operated by PSU and 8 operated by other organizations). The expanded seismic network will add 20 seismic monitors for a total of 38 permanent stationary monitoring stations. Also, five portable seismic stations will be available as part of this partnership and positioned at strategic locations as necessary. An additional 19 permanent seismic monitors are located in adjacent states in close proximity to Pennsylvania's border.

This expanded seismic network will provide a better understanding of seismic events that occur throughout Pennsylvania on an annual basis.

Area of Review (AOR) Technical Workgroup

In October 2015, DEP formed a technical workgroup to address the complexities associated with implementing the Area of Review (AOR) component of the Chapters 78 and 78a Surface Activities rulemaking. The AOR will require operators to identify and monitor other oil and gas wells within prescribed distances of their well to prevent environmental impacts from hydraulic fracturing activities. The workgroup consists of conventional and unconventional oil and gas industry representatives, consultants, and DEP staff. A draft technical guidance has been developed and DEP intends to publish the guidance in the *Pennsylvania Bulletin* in the Spring of 2016 and will invite public comment.

Well Completion Report

Within 30 days after completion of when a well is capable of production, well operators are required to submit a Completion Report to DEP. Completion operations include, but are not limited to, perforation activities, notching activities, and/or stimulation activities. Completion operations include both initial activities and any subsequent activities such as re-stimulation of a wellbore.

The Bureau of Oil and Gas Planning and Program Management released a revised Well Completion Report form that is available on DEP's eLibrary webpage. The form was revised to capture completion data in a more detailed format and to capture additional data elements. This data will be used in DEP's decision making processes to help ensure optimal development of oil and gas resources while protecting the health, safety, and property of citizens and the natural resources of the Commonwealth. Additionally, a new "Registration of Trade Secret/Confidential Proprietary Stimulation Fluid Chemical Information" form has been developed and is also available on the eLibrary webpage. This form is used by well operators, well service providers, and chemical manufacturers to register trade secret/confidential chemical information with DEP. Submitted chemical registration forms will be appropriately managed to ensure maintenance of confidentiality and to better facilitate responses to Right-to-Know requests. DEP's Bureau of Oil and Gas Planning and Program Management will conduct outreach and training to the regulated community regarding the availability and use of these forms throughout 2016.

Program Clarification Memo Published – Oil and Gas Conservation Law Waiver Process

On July 15, 2015, the Office of Oil and Gas Management published a Program Clarification Memo (PCM) outlining the process to be used when a permit applicant requests a waiver from setbacks under the Oil and Gas Conservation Law (OGCL). The PCM was developed with significant input from DEP's Bureau of District Oil and Gas Operations as well as DEP's Office of Chief Counsel.

The OGCL became law in 1961 and its fundamental purpose is to prevent waste in the recovery of oil and gas from formations below the Onondaga geologic formation and to protect correlative rights and the rights of royalty interest owners and producers. Regulations implementing the OGCL exist in 25 Pa. Code Chapter 79.

Only wells that penetrate the Onondaga formation are subject to the OGCL. Because the Onondaga is located directly *beneath* the Marcellus shale, application of the OGCL, to date, has been relatively infrequent. There is growing interest in exploration and production of the Utica shale; however, and any well drilled to the Utica shale formation will necessarily penetrate the Onondaga and be subject to the OGCL.

To meet its purposes, the OGCL requires a 330-foot setback from the nearest outside boundary of the lease on which the well is located, or if the lease is included in a voluntary unit, the well must be located at least 330 feet from the nearest unit line. The OGCL provides that the permit applicant may request a waiver from this setback. The OGCL requires DEP to provide notice of the request and hold a public hearing before the waiver request can be granted.

The PCM outlines the process by which applicants may request waivers, including necessary information to be submitted with the waiver request. The PCM also outlines how DEP will handle notice of the request, including *Pennsylvania Bulletin* notice and direct notice to all affected property owners, and the process for holding the public hearing and announcing the DEP's decision on the waiver request. DEP conducted outreach to inform and assist the regulated community. The PCM document is available on DEP's Conservation Law website at http://files.dep.state.pa.us/oilgas/bogm/bogmportalfiles/ConservationLaw/Conservatrion_law_%20Waiver_Request_Process.pdf

Erosion & Sedimentation Control Model Plan
In 2014, DEP initiated the development of a Model Erosion and Sediment Control Plan (Model E&S Plan) for use by ESCGP-2 permit applicants. The purpose of the model plan is to provide oil and gas operators and their consultants a standardized format for the submission of Erosion and Sediment Control plan information to DEP. Use of the Model E&S Plan will increase consistency in the data submitted to DEP regarding oil and gas activities. During the development of the Model E&S Plan, staff in the Office of Oil and Gas Management collaborated with DEP's Bureau of Waterways Engineering and Wetlands, DEP's District Oil and Gas staff and industry representatives. The Model E&S Plan was piloted at the end of 2014 to a small number of operators and their consultants and was released for general use in 2015.

Public Outreach Regarding Oil and Gas Legacy Issues
The Division of Well Plugging and Subsurface Activities staff participated in a collaborative workshop with Penn State's Marcellus Center for Outreach and Research (MCOR) on Sept. 12, 2015 at the Allegheny National Forest (ANF). Division staff gave presentations discussing DEP's Plugging Program, Plugged/Abandoned and Orphan Well Study, and field safety. Presentations were followed by a field trip to ANF to locate and assess conditions at plugged wells. Representatives from DEP, MCOR, Indiana University of Pennsylvania (IUP), Sierra Club, and the community participated in the event. Locating abandoned wells and ensuring that conditions at known sites are not changing in a way that could cause environmental impacts is something the Oil and Gas Program has done in the past by coordinating with well-trained voluntary “citizen scientist” groups. By taking the time to develop effective outreach efforts, DEP is creating a way to focus on internal priorities and rely on trained individuals to help address other matters. The MCOR group has located a number of plugged wells in ANF that were not previously mapped. DEP staff have also been invited to promote this effort by serving on the steering committee with the Shale Network, a National Science Foundation (NSF) funded project at the Pennsylvania State University that coordinates significantly with volunteer citizen scientist groups throughout the commonwealth.

WHAT'S NEXT FOR 2016?

Methane Reduction Initiative
Methane is a significant contributor to climate change and the warming of the earth's atmosphere. In fact, methane is the second-most prevalent greenhouse gas emitted in the United States and is estimated to be significantly more potent at warming the earth's atmosphere than carbon dioxide. It is also estimated that about 25 percent of methane emissions nationwide are a result of leaks from pipeline infrastructure and activities associated with the oil and natural gas industry.

Governor Wolf announced a plan that is designed to protect the environment and public health, reduce climate change, and help businesses reduce the waste of a valuable product by reducing methane leaks and emissions from natural gas well sites, processing facilities, compressor stations and along pipeline routes. The strategy will be implemented in 2016 and will reduce emissions during development and gas production, processing, and transmission by requiring leak detection and repair (LDAR) measures, efficiency upgrades for equipment, improved processes, implementation of best practices, and more frequent use of leak-sensing technologies. DEP anticipates these measures will pay for themselves in recovering saleable product that would otherwise be lost.

The four-point plan aims to:

1. Reduce leaks at new unconventional natural gas well pads. DEP will develop a new general permit for oil and gas exploration, development, and production facilities, requiring Best Available Technology (BAT) for equipment and processes, better record-keeping, and quarterly monitoring inspections.
2. Reduce leaks at new compressor stations and processing facilities. DEP will revise its current general permit, updating BAT requirements and applying more stringent LDAR and other requirements to minimize leaks. A new permit condition will require the use of Tier 4 diesel engines that reduce emissions of particulate matter and nitrous oxide by about 90 percent.
3. Reduce leaks at existing unconventional natural gas facilities. DEP will develop a regulation for existing sources for consideration by the Environmental Quality Board.
4. Reduce emissions along production, gathering, transmission and distribution lines. DEP will establish best management practices, including leak detection and repair programs.

More information concerning DEP's methane reduction initiative is available on the DEP website at: http://www.dep.pa.gov/Business/Air/Pages/Methane-Reduction-Strategy.aspx#.V0cGIhzD-pp

Regulatory Revisions for Subsurface Activities

DEP's Bureau of Oil and Gas Planning and Program Management intends to advance a proposed rulemaking during 2016 to update Subchapters D, E and H of 25 Pa. Code, Chapter 78.
The rulemaking will include revisions to these subchapters that regulate the drilling, casing, cementing, completion, operation, production and plugging of wells in Pennsylvania as well as other subsurface activities associated with oil and gas exploration and development. Specifically, the regulatory amendments will include revisions to well plugging procedures, coalbed methane development, and well drilling, cementing and hydraulic fracturing procedures. DEP presented a concept paper to the Oil and Gas Technical Advisory Board that outlines the anticipated regulatory changes. The concepts paper is available at:

http://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/OilGasTech/2014/Pages/default.aspx#.V0cCwRzD-po

Water Supply Complaint Tracking System

Currently, DEP tracks general complaints that are received across all programs through an internal complaint tracking system. In an effort to capture information that is solely related to complaints from individuals who suspect that their drinking water supply has been affected by oil and gas related activities, DEP plans to develop and deploy an oil and gas "Water Supply Complaint Tracking System". This tool will collect a variety of data that is more expansive than the information that is currently collected in the DEP's general complaint tracking system.

As an interim measure, the Office of Oil and Gas Management developed a list of positive water supply determinations and posted the list on its website. Redacted copies of letters that were mailed to each affected water supply owner since 2008 are also available to the public through this list of positive water supply determinations. This list of "Water Supply Determination Letters" can be accessed at the following web link:

http://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/OilGasReports/Determination_Letters/Regional_Determination_Letters.pdf

Electronic Completion Reporting
Within 30 days after completion of when a well is capable of production, well operators are required to submit a Completion Report to DEP. Completion operations include, but are not limited to, perforating activities, notching activities, and/or stimulation activities. Completion operations include both initial activities and any subsequent activities (e.g., re-stimulation of a wellbore).

During 2016, DEP plans to develop an electronic reporting tool that will enable operators to submit completion reports to DEP in an electronic format.

Electronic Well Record Reporting
Pennsylvania's oil and gas regulations require that within 30 days of the end of drilling a well, operators are required to submit a Well Record to DEP. The Well Record includes detailed information about the well such as the type and amount of cement used in the construction of the well, the source, size and depth of various casings used and a driller's log that includes the geologic formations that were encountered during the drilling process.

Currently, operators are required to submit this record to DEP in a paper format; however, DEP plans to develop an electronic reporting tool in 2016 that will enable this information to be reported more efficiently and accurately.

Evaluation of Oil and Gas Permit Fees
Pennsylvania oil and gas regulations require that at least every three years DEP provide the Environmental Quality Board (EQB) an evaluation of the oil and gas fees and recommend regulatory changes to address any disparity between the program income generated by fees and DEP's cost of administering the program. The purpose of the evaluation is to ensure that fees meet all program costs and that the oil and gas program is self-sustaining. During 2016, DEP intends to evaluate the existing oil and gas fee structure in comparison to its ongoing program activities. This will enable the Office of Oil and Gas Management to meet its obligation to conduct a fee evaluation for submittal to the EQB for consideration.

Business Process and Program Efficiencies
In 2016, tablet computers will be deployed to all oil and gas inspectors in order to enable inspectors the ability to capture inspection results in a real-time manner. This will significantly increase operational efficiencies since it will eliminate the need for inspectors to capture inspections via a paper form and then expend additional time inputting the same data into DEP's enterprise-wide compliance data management system.

In addition to equipping oil and gas inspectors with the latest computing technology, DEP also plans to revise its current policy on the home storage of commonwealth vehicles so that oil and gas inspectors will have the flexibility to travel directly to site inspection locations rather than expending unnecessary time traveling to the district or satellite office in order to obtain a commonwealth vehicle before traveling to the site of inspection. This modification to the current policy will result in significant efficiencies in DEP's ability to deploy staff more rapidly to locations where daily site inspections are scheduled.