

*Environmental
Protection and
Marcellus Shale Well
Development*

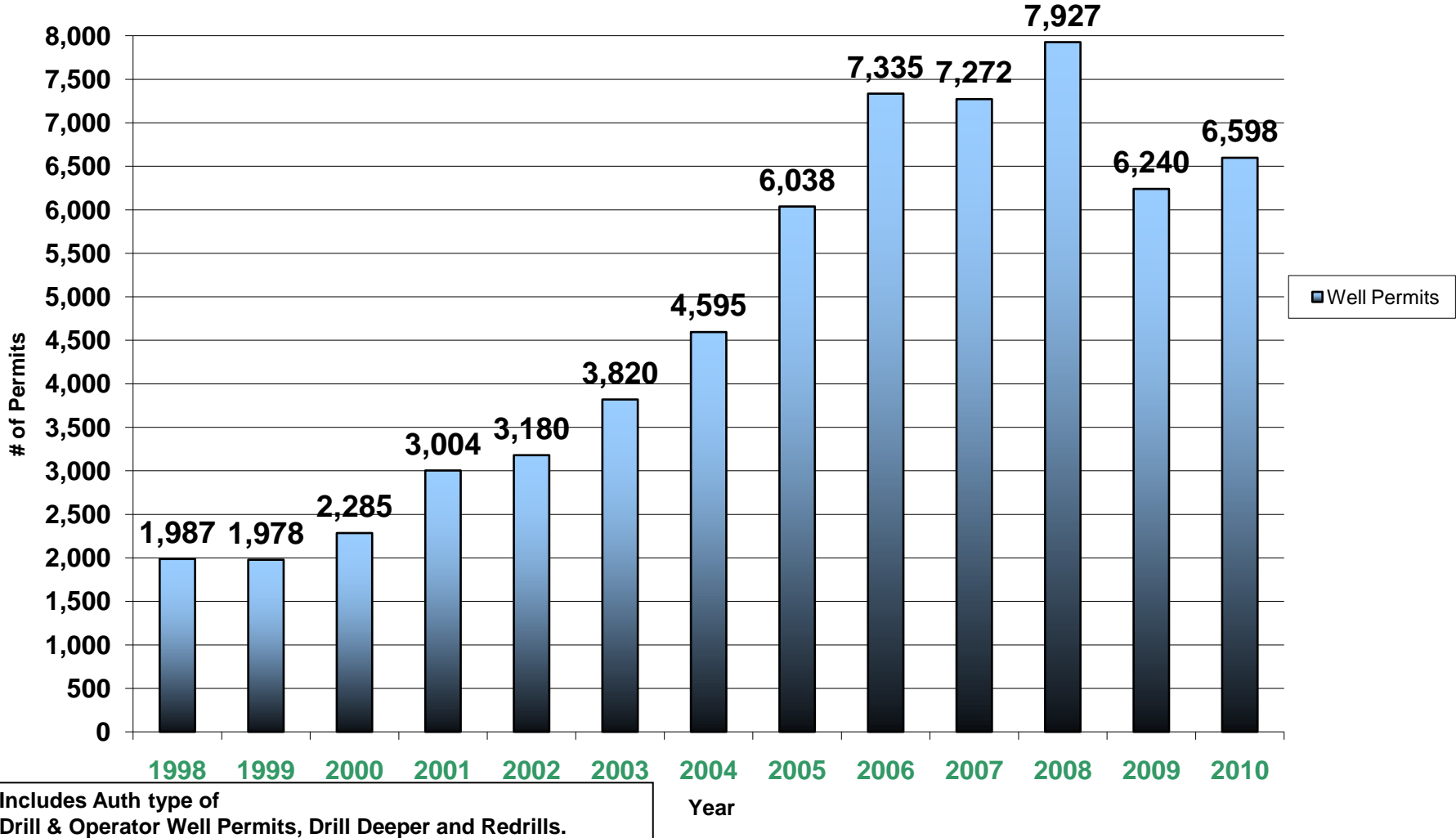


Scott Perry
Director
Bureau of Oil and Gas Management

Department of Environmental Protection
Bureau of Oil and Gas Management
Year End Workload Report
(January 1, 2010 thru December 31, 2010)

Well Permits Issued by Year

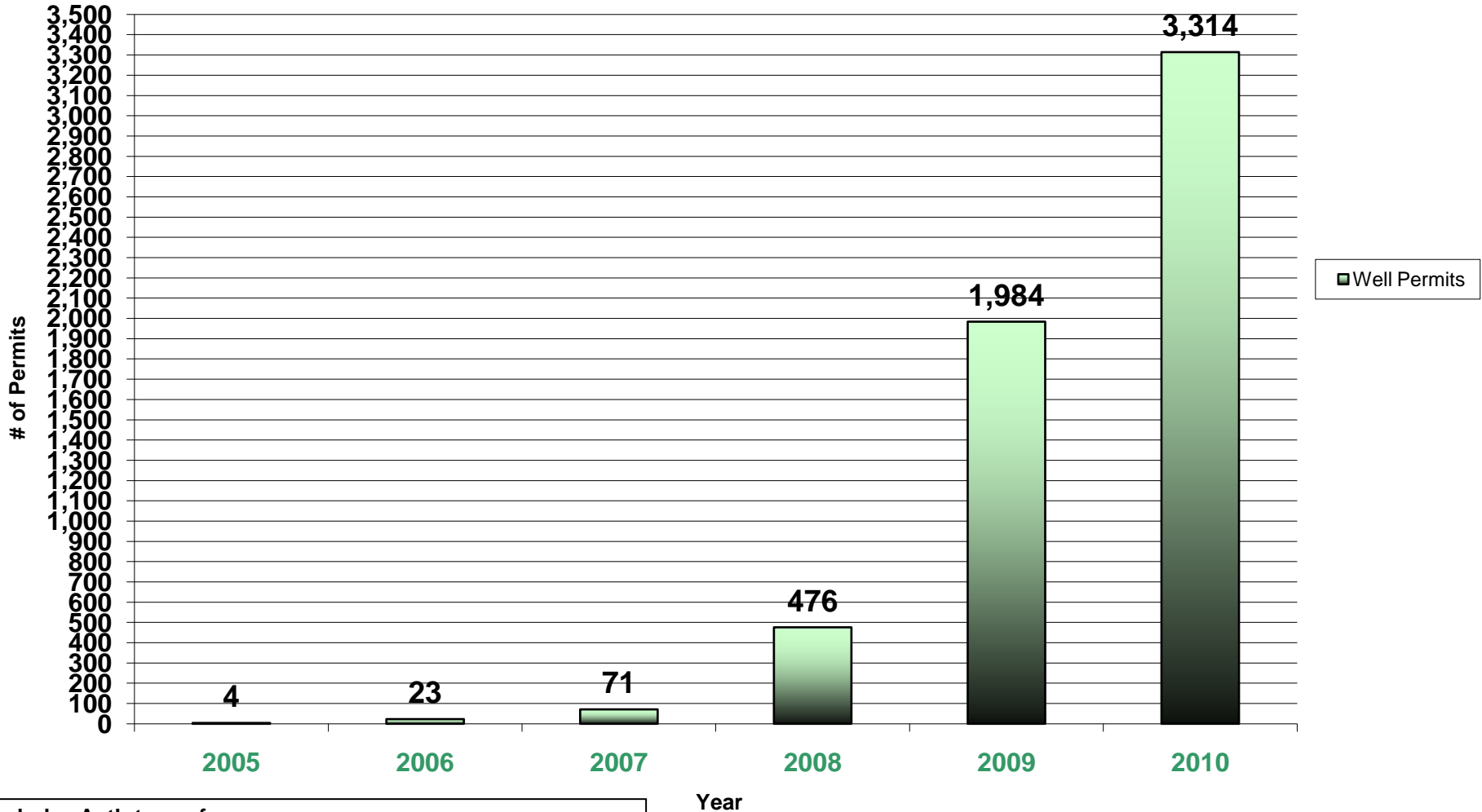
01/06/2011



Department of Environmental Protection
Bureau of Oil and Gas Management
Year End Workload Report
(January 1, 2010 thru December 31, 2010)

Marcellus Shale
Well Permits Issued by Year

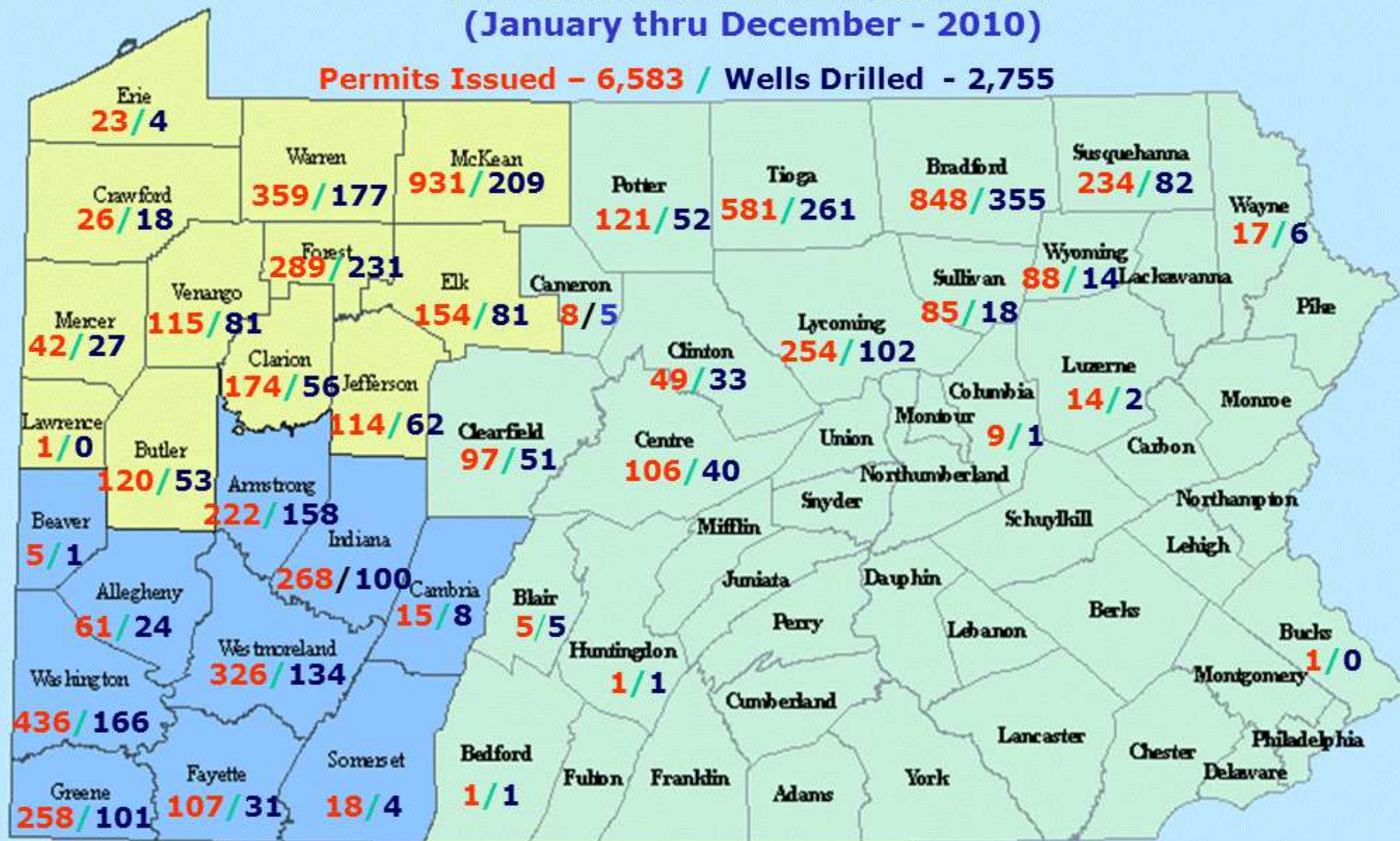
01/06/2011



Includes Auth type of
Drill & Operator Well Permits, Drill Deeper and Redrills.

**Department of Environmental Protection
Bureau of Oil and Gas Management
All Permits Issued & Wells Drilled
(January thru December - 2010)**

Permits Issued - 6,583 / Wells Drilled - 2,755

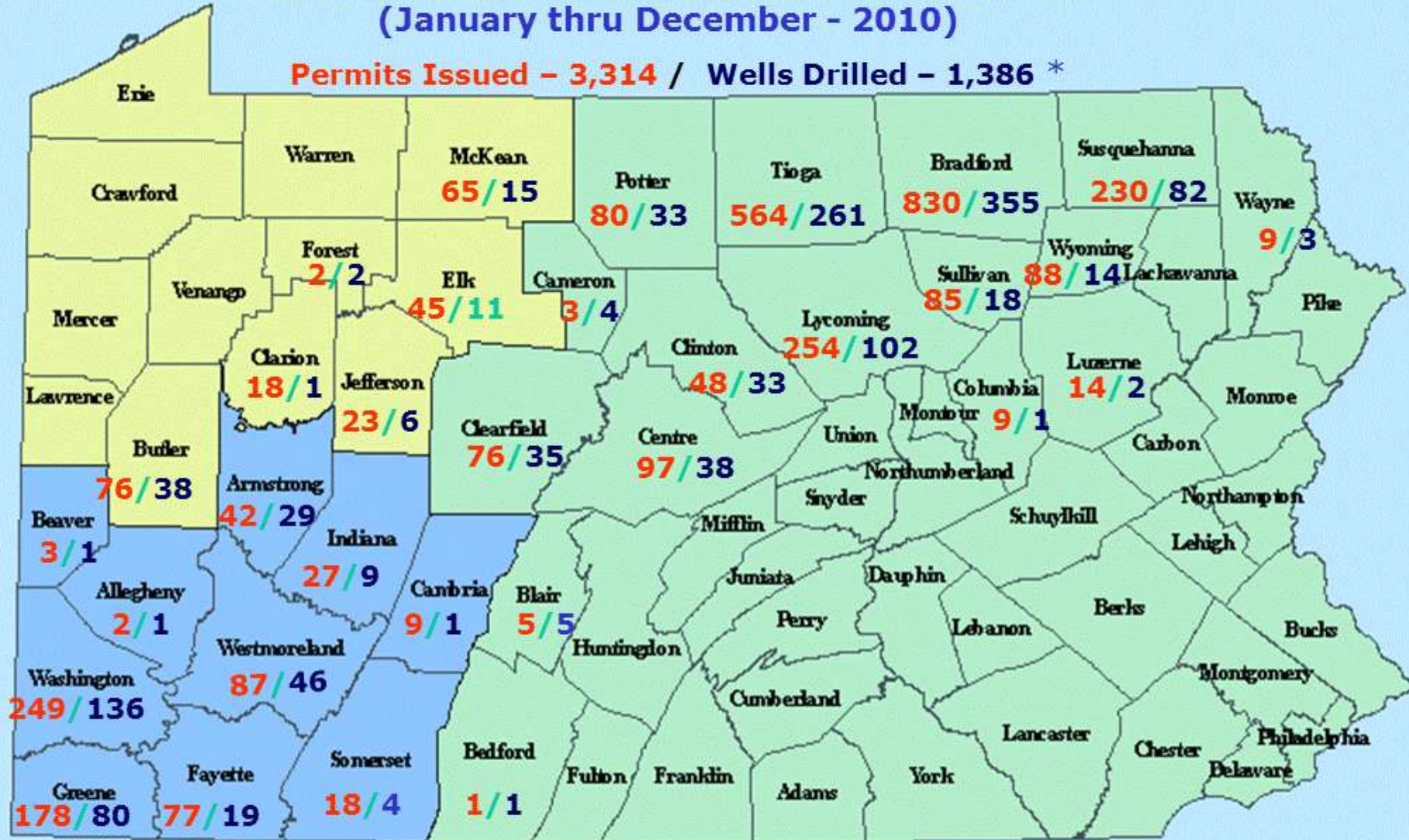


Updated 01/05/2011

* As reported by Operators

Department of Environmental Protection
 Bureau of Oil and Gas Management
 Marcellus Shale Permits Issued & Wells Drilled
 (January thru December - 2010)

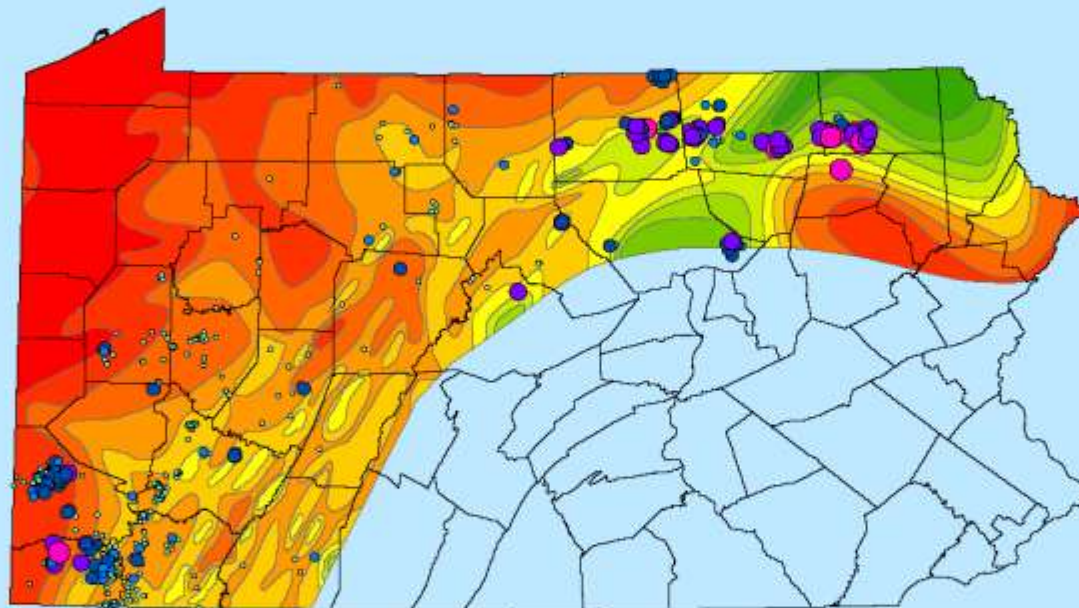
Permits Issued - 3,314 / Wells Drilled - 1,386 *



Updated 01/05/2011

* As reported by Operators

Marcellus Shale July 2009 to June 2010 Production Data (Basemap Depicts Thickness of Target Formation)



Legend

Production Data

Mcf/d

- >0 to 1,000
- >1,000 to 2,000
- >2,000 to 4,000
- >4,000 to 8,000
- >8,000 to 12,000

□ Counties

Marcellus Shale Isopach Data

Thickness (Feet)

- >250
- 225-250
- 200-225
- 175-200
- 150-175
- 125-150
- 100-125
- 75-100
- 50-75
- 25-50
- 0-25



Surface Control Issues Associated with Hydraulic Fracturing

- Water withdrawal.
- PPC Plan.
- Pits, tanks and centralized impoundments.
- Hydraulic fracturing wastewater management.

Water Withdrawal

- Single water management plan covers multiple well sites.
- Applies in Ohio, Susquehanna and Delaware basins.
- Required to protect existing and designated uses – 25 Pa. Code Chapter 93.
- Water Resources Planning Act (Act 220) registration.
- Use of alternative water sources.
 - AMD-impacted water.
 - Treated effluent.

PPC Plan

- Operators must review their operations and identify all pollutional substances and wastes that will be used or generated, as well as identify the methods for control and disposal of these substances or wastes.
- Operators are required to identify potential risks and plan for the possibility of an accident occurring at the well site during hydraulic fracturing operations.

Pits, Tanks and Centralized Impoundments

- All pits and impoundments must be impervious and structurally sound.
- Low impact centralized impoundments that store wastewater are permitted by regional oil and gas staff.
- High impact impoundments permitted by dam safety.
 - Impact wetlands, on streams, breach threatens welfare/property.

Hydraulic Fracturing Wastewater Management, continued

- TDS strategy
- New and Expanded Sources Only
 - 500 Mg/l TDS
 - 250 Mg/l Chlorides
 - 10 Mg/l Barium and Strontium
- Underground Injection Control Program
 - EPA administers
 - Only 7 class II UIC disposal wells in PA.
 - Over 20 injectivity applications before EPA

Subsurface Control Issues Associated with Hydraulic Fracturing

- Planning and preparation: well drilling, completion, stimulation, production and plugging.
- Well construction practices: structural integrity of the well is essential in containing hydraulic fracturing fluids within the wellbore.
- Reporting requirements.

Final Rulemaking 25 Pa. Code

Chapter 78- Background

- Initial draft presented to TAB September 17, 2009.
 - DEP met with TAB and subcommittee four additional times (10/28/09, 1/14/10, 1/21/10, 3/25/10).
- DEP used Advanced Notice of Proposed Rulemaking to solicit public comments.
 - Published in Pa. Bul. Jan. 30, 2010, ended Mar.2, 2010.
- TAB unanimous recommendation to proceed to Proposed Rulemaking - March 25, 2010.
- EQB unanimous recommendation to proceed to Proposed Rulemaking - May 17, 2010.
- Published in PA Bulletin July 10, 2010. 30-day public comment period.
- Final Rule adopted at the October 12 EQB Meeting.

Well Construction Planning and Preparation

- Casing and cementing plan
 - Must be on site for review by DEP.
 - DEP may request submittal of plan for approval.
 - Revisions to plan can be made on site to meet well conditions.
 - Plan includes casing type and specifications; location of centralizers; anticipated depth and pressure of producing formations; cement type, yield, additives and volume.

Well Construction Planning and Preparation, continued

- Cement job log
 - Documents the actual procedures and specifications of the cementing operation.
 - Must be maintained by the operator .
 - Record includes cement type, additives, volume, yield and density, and amount returned to the surface.
 - Record also includes cementing procedural information such as pumping rates, pressures, cementing procedure time and sequence of events.

Well Construction Practices

- Enhances blow-out prevention equipment requirements.
- Decreases allowable pressure on surface casing seat.
- Prohibits the use of surface casing as production unless it is an oil well that does not produce gas or an operator can demonstrate pressure limits will not be exceeded.

Well Construction Practices (continued)

- Surface hole must be drilled with air or freshwater-based fluids.
- Centralizers must be placed 50' from the surface casing seat and every 150 ' above.
- New subsections on lost circulation and intermediate and production casing.
- New provision to allow DEP to designate areas of alternative methods, requiring well drilling practices beyond those required in Chapter 78.

Well Construction Practices

- Upgrades casing standards: pressure ratings for new casing; and pressure testing of new and welded casing.
- Upgrades cement standards: clarifies and defines eight-hour cement set period; requires one day notice before cementing surface casing; and requires cement job log be available at site.
- Requires mechanical integrity testing of operating wells.

Reporting Requirements- Proposed

- Requires mandatory electronic production reporting to DEP.
- New well record and completion reporting requirements submitted by the operator as part of the stimulation record include pump rates, pressure, total volume and list of hydraulic fracturing chemicals used, the volume of water used, and the identification of water sources used pursuant to an approved water management plan.

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