

# Regulatory Analysis Form

(Completed by Promulgating Agency)



# IRRC

Independent Regulatory Review Commission

## SECTION I: PROFILE

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INDEPENDENT REGULATORY  
REVIEW COMMISSION

(1) Agency:

Environmental Protection

(2) Agency Number:

Identification Number: #7-459

IRRC Number:

2857

(3) Short Title:

Oil and Gas Well Technical Amendments

(4) PA Code Cite:

25 Pa. Code Chapter 78

(5) Agency Contacts (List Telephone Number, Address, Fax Number and Email Address):

**Primary Contact:**

Michele Tate, 783-8727; fax: 783-8926; [mtate@sate.pa.us](mailto:mtate@sate.pa.us); RCSOB 16<sup>th</sup> Fl., Harrisburg, PA 17105

**Secondary Contact:**

Duke Adams, 783-8727; fax: 783-8926; [ranadams@state.pa.us](mailto:ranadams@state.pa.us); RCSOB 16<sup>th</sup> Fl., Harrisburg, PA 17105

(6) Primary Contact for Public Comments (List Telephone Number, Address, Fax Number and Email Address) – Complete if different from #5:

EQB

P.O. Box 8477

Harrisburg, PA 17105-8477

[regcomments@state.pa.us](mailto:regcomments@state.pa.us)

(All Comments will appear on IRRC'S website)

(7) Type of Rulemaking (check applicable box):

- Proposed Regulation
- Final Regulation
- Final Omitted Regulation
- Emergency Certification Regulation
- Certification by the Governor
- Certification by the Attorney General

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(8) Briefly explain the regulation in clear and nontechnical language. (100 words or less)

The proposed rulemaking would incorporate and update existing requirements, with modifications regarding the drilling, casing, cementing, testing, monitoring and plugging of oil and gas wells, and the protection of water supplies. The new or amended sections are §§78.1, .51, .52, .71-.73, .76, .81-.85, .88, .89, .91-.96, .121 and .122. The proposed modifications include updated material specifications and performance testing, and revised design, construction, operational, monitoring, plugging, water supply replacement, and gas migration reporting requirements. With this proposed rulemaking, the Department is adding additional measures that will further minimize the concerns associated with gas migration.

(9) Include a schedule for review of the regulation including:

- |   |                    |
|---|--------------------|
| A. The date by which the agency must receive public comments:                               | <u>Summer 2010</u> |
| B. The date or dates on which public meetings or hearings will be held:                     | <u>N/A</u>         |
| C. The expected date of promulgation of the proposed regulation as a final-form regulation: | <u>Fall 2010</u>   |
| D. The expected effective date of the final-form regulation:                                | <u>Fall 2010</u>   |
| E. The date by which compliance with the final-form regulation will be required:            | <u>Fall 2010</u>   |
| F. The date by which required permits, licenses or other approvals must be obtained:        | <u>Fall 2010</u>   |

(10) Provide the schedule for continual review of the regulation.

This regulation will be reviewed in accordance with the sunset review schedule published by the Department to determine whether the regulation effectively fulfills the goals for which it was intended.

## SECTION II: STATEMENT OF NEED

(11) State the statutory authority for the regulation. Include specific statutory citation.

This proposed rulemaking is being made under the statutory authority of the following:

Section 604 of the Oil and Gas Act (58 P.S. § 601.604) which directs the Board to adopt regulations necessary to implement the Act.

The Administrative Code of 1929 (71 P.S. §§510-1 - 510-27), which at Section 1917-A (71 P.S. §510-17) authorizes and requires the Department to protect the people of this Commonwealth from unsanitary conditions and other nuisances, including any condition that is declared to be a nuisance by any law administered by the Department; and Section 1920-A (71 P.S. 510-20), which grants the Board the power and duty to formulate, adopt, and promulgate such rules and regulations as may be determined by the Board for the proper performance of the work of the Department.

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(12) Is the regulation mandated by any federal or state law or court order, or federal regulation? Are there any relevant state or federal court decisions? If yes, cite the specific law, case or regulation as well as, any deadlines for action.

The proposed regulations are not mandated by any federal or state law, court order or federal regulation.

(13) State why the regulation is needed. Explain the compelling public interest that justifies the regulation. Describe who will benefit from the regulation. Quantify the benefits as completely as possible and approximate the number of people who will benefit.

The proposed rulemaking will amend the current oil and gas well regulations as well as add additional controls to the construction and operation of a well. The residents of the Commonwealth and the regulated community will benefit from this rulemaking since it further defines the necessary standards needed to safely construct and operate oil and gas wells. The proposed regulation will give the citizens of Pennsylvania additional safety measures that will continue to aid in the protection of the health, safety, environment and property of the Commonwealth while still allowing for the development of the state's oil and gas resources.

The updated casing and cementing requirements will provide an increased degree of protection for homeowners and both public and private water supplies. The proposed construction standards will align Pennsylvania's regulations with other states' rules as well as current industry standards. Casing and cement testing will detect construction deficiencies before a well could create a potential safety or environmental problem. Minimizing annular pressure will reduce the potential for gas migration. The new quarterly inspections and annual reporting for operating wells will be a vital tool for operators to use in detecting potential safety or environmental impacts before they may become a public health or safety issue.

The proposed regulations outline the procedures the operator and the Department will utilize if there is a reported gas migration event.

The citizens of the Commonwealth will be better served by the amendments being proposed in this rulemaking, which are summarized as follows:

- Improved well casing and cementing practices to prevent gas migration into homes and other occupied structures, water supplies and groundwater.
- Implementation of testing wellhead pressures for all operating wells and annual reporting; retrofitting existing wells that exceed required casing seat pressures; setting new standards for casing seat pressures; new requirements for casing and cementing plans to be located on site; welding casing required to be performed by a qualified welder; moving the cement plug to be situated across the producing formations; enhanced options for blow out prevention (BOP) control and availability in the event of an emergency; and increased cement set time for proper setting and corrective actions for lost circulation of cement on surface casing.
- Department notification when a gas migration occurrence is noted or reported in an area of wells and follow-up actions required by the operator.
- Quarterly surveys of all operating wells to ensure they are structurally sound and the integrity of the well has not been compromised.

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(14) If scientific data, studies, references are used to justify this regulation, please submit material with the regulatory package. Please provide full citation and/or links to internet source.

A considerable body of scientific research has been developed by various parties over many years regarding the construction of natural gas wells and, specifically, casing and cementing standards, BOP operation safety, training and groundwater protection. The Department monitors the development and requirements of other states and reviews that research and resulting reports and has taken those efforts under consideration in formulating these proposed regulations. The American Petroleum Institute (API) standards and recommended practices have been updated and are reflected in the proposed regulation. They are available at: <http://api-ec.api.org/Standards/>

(15) Describe who and how many will be adversely affected by the regulation. How are they affected?

Any person who currently has a well producing natural gas or oil or intends to drill and develop a well with the intention of producing natural gas or oil will be required to comply with the updated standards and practices proposed in these regulations. There are about 74,000 wells across the Commonwealth that are actively producing oil and gas under existing regulatory provisions. The Department anticipates it will permit 7,500 wells in 2010 and projects approximately 7,500 to 9,000 wells in 2011, which must meet the new casing and cementing requirements.

The changes proposed in this rulemaking package reflect the updates needed to the Commonwealth's oil and gas program to bring well construction practices into line to be comparable with other states' requirements. Many of these requirements are already standard construction and operating practices for drilling operations in Pennsylvania.

The proposed regulation further delineates the necessary requirements for designing, constructing and operating oil and gas wells and responding to emergency situations that may be related to their well operations. Most of the updates are codifying existing best management practices that are already being utilized by numerous operators. The proposed regulations are expected to significantly reduce the risk of gas migration. The rulemaking will also minimize the cost to the operator; minimize their liability and the Department's compliance cost by minimizing the potential for a stray gas occurrence. If there is a stray gas situation, the proposed regulations outline the procedures for quickly identifying the source, and expedite remedying the situation.

## SECTION III: COST AND IMPACT ANALYSIS

(17) Provide a specific estimate of the costs and/or savings to the regulated community associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

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The Department finds that most migrations issues stem from inadequate cement procedures, cement returns, or combinations of inadequate casing and cementing or over-pressured casing seats. Because the Department is proposing regulations that generally codifying existing industry standards, any increased cost associated with drilling and operating oil and gas well will be minimal. All of the potential increases in cost to an operator will be associated with assuring a well is properly constructed.

The Department is proposing to require an eight hour Wait On Cement (WOC) set time. During the WOC a well driller can not disturb the casing or the cement as it sets. The elimination of any movement of the casing in the cement sheath will allow the cement to achieve a higher compressive strength without excessive accelerators being added to the cement. This will help ensure the cement maintains the integrity necessary to prevent the formation of preferential gas migration pathways in the annulus. The WOC cost is estimated to be about \$1,000 because the rig must be idle during this period and can not couple with the casing.

All of the additional measures are proposed to reduce the potential for gas mitigation. If an operator fails to prevent a pollution event of a water supply, the anticipated cost to permanently replace one private water supply would be approximately \$30,000 or greater. The cost would only occur if an operator fails to meet a construction requirement.

The operator must install casing that can withstand the effects of tension, and prevent leaks, burst and collapse during its installation, cementing and subsequent drilling and producing operations. The proposed regulations require the casing strings to pass maximum pressure testing. Used casing, welded casing and casing attached to a high pressure blow out preventer must be pressure tested to demonstrate its ability to withstand the highest anticipated working pressures to which the casing will be exposed. If the casing fails this test, the operator must repair or replace the casing and ultimately pass the pressure test. Less than 5% of the casing used is anticipated to fail a pressure test. The cost to repair or replace the defective casing is overwhelmingly outweighed by the environmental damage that would result from a failed string of casing and the fact that the casing would still need to be repaired or replaced. The construction cost for the new casing for a situation when the original casing string failed the pressure test is about \$10,000 per well. The Department anticipates approximately 5% of the wells drilled in Pennsylvania will have casing fail the pressure test.

Another potential cost to an operator will be the use of an additional string of casing for situations when the cement is not returned to the surface. The proposed regulations will require an operator to install an additional string of casing past the bottom of the surface or coal protective casing. This requirement helps minimize the potential for stray gas migration. The construction cost for the additional string of casing for situations when the cement is not returned to the surface is about \$10,000 per well. Lost circulation of cement happens to approximately 5% of the wells drilled in Pennsylvania.

The proposal includes language requiring operators to survey their wells on quarterly bases. This requirement is proposed to aid in the early detection of potential gas migration issues. This requirement would only add a nominal cost to the operation of a well. Currently, all wells are tended to and this

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would only add a few additional items for the operator to inspect.

The potential increase in cost is minor when compared to the overall cost of well construction. The typical cost to develop a Marcellus Shale well is around \$5,000,000. The typical cost to develop a shallow gas well is \$250,000 and the typical cost to develop an oil well is \$200,000. The first two fiscal years the Department anticipates a high compliance cost for operators to review and repair any old wells that may pose a safety hazard.

(18) Provide a specific estimate of the costs and/or savings to **local governments** associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

The proposed rulemaking has no compliance, legal, accounting, or consulting effects on local governments. Local governments will benefit from this rulemaking because of the decrease incidents of gas migration.

(19) Provide a specific estimate of the costs and/or savings to **state government** associated with the implementation of the regulation, including any legal, accounting, or consulting procedures which may be required. Explain how the dollar estimates were derived.

Current Department expenditures for individual gas migration cases vary considerably, generally ranging from as little as \$1000 to over \$150,000. Collectively, the components of these cases include isotopic composition analyses, combustible gas monitoring, installation of monitoring points, geophysical testing and logging, installation of alarms, and active or passive venting of impacted sites. The proposed regulations will reduce this cost by streamlining the inspecting, investigating, reporting and litigating of gas migration problems. The overall saving is difficult to estimate because of the uniqueness of each investigation.

(20) In the table below, provide an estimate of the fiscal savings and costs associated with implementation and compliance for the regulated community, local government, and state government for the current year and five subsequent years.

	Current FY Year	FY +1 Year	FY +2 Year	FY +3 Year	FY +4 Year	FY +5 Year
<b>SAVINGS:</b>	\$	\$	\$	\$	\$	\$
Regulated Community	\$0	\$0	\$0	\$0	\$0	\$0
Local Government	\$0	\$0	\$0	\$0	\$0	\$0
State Government	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total Savings</b>	\$0	\$0	\$0	\$0	\$0	\$0
<b>COSTS:</b>						
Regulated Community	\$6,300,000	\$6,675,000	\$3,375,000	\$3,375,000	\$3,375,000	\$3,375,000

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<b>Local Government</b>	\$0	\$0	\$0	\$0	\$0	\$0
<b>State Government</b>	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total Costs</b>	\$6,300,000	\$6,675,000	\$3,375,000	\$3,375,000	\$3,375,000	\$3,375,000
<b>REVENUE LOSSES:</b>						
<b>Regulated Community</b>	0	0	0	0	0	0
<b>Local Government</b>	0	0	0	0	0	0
<b>State Government</b>	0	0	0	0	0	0
<b>Total Revenue Losses</b>	0	0	0	0	0	0

(20a) Provide the past three year expenditure history for programs affected by the regulation.

<b>Program</b>	<b>FY -3</b>	<b>FY -2</b>	<b>FY -1</b>	<b>Current FY</b>
Environmental Program Management	\$36,868,000	\$39,685,000	\$37,664,000	\$32,694,000
Environmental Protection Operations	\$89,847,000	\$98,574,000	\$98,544,000	\$85,069,000
Well Plugging	\$746,000	\$1,043,000	\$950,000	\$9,920,000

(21) Explain how the benefits of the regulation outweigh any cost and adverse effects.

The new construction standards and the well retrofit will far outweigh the liability to the operator from loss of life, personal, property and environmental damages that may result without these additional precautions.

Most of the updates are codifying existing best practices of the industry used by prudent operators. The increased cost of constructing the well in time and materials will decrease the risk of gas migrations resulting from defective casing or cementing. As new areas of the Commonwealth are developed for natural gas, these proposed regulations will preemptively abate many potential health, safety and environmental issues.

(22) Describe the communications with and input from the public and any advisory council/group in the development and drafting of the regulation. List the specific persons and/or groups who were involved.

The proposed rulemaking was presented to the Oil and Gas Technical Advisory Board (TAB) for their consideration on September 17, 2009. Due to the scope of the changes, TAB requested additional time to review and provide comment. As part of their review, TAB formed a technical review committee, with representatives from various companies, trade groups and consultants. Since the initial meeting in

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September, the Department met with TAB and their subcommittee on October 28, 2009, January 14, 2010, January 21, 2010 and March 25, 2010.

In addition to TAB's input, the Department received additional input from industry representatives, consultants and environmental groups. On January 30, 2010 the Department published an Advanced Notice of Proposed Rulemaking for a 30-day comment period. The Department received comments from 87 individuals representing industry, consultants and environmental groups, as well as private citizens. The current proposal is based on the comments received during the public comment period, comments submitted by TAB and comments developed by TAB's sub-committee members.

(23) Include a description of any alternative regulatory provisions which have been considered and rejected and a statement that the least burdensome acceptable alternative has been selected.

There are no alternative regulatory provisions that achieve the same level of safety, health and environmental protection.

(24) Are there any provisions that are more stringent than federal standards? If yes, identify the specific provisions and the compelling Pennsylvania interest that demands stronger regulations.

No.

(25) How does this regulation compare with those of other states? How will this affect Pennsylvania's ability to compete with other states?

The changes proposed in this rulemaking package reflect the updates needed to the Commonwealth's oil and gas program to bring well construction practices into line to be comparable with what other states and prudent operators implement as best practices. Comparison with the regulatory requirements of EPA as well as those of New York, West Virginia, Ohio, Texas, Oklahoma, Louisiana, Kansas and Montana were made while taking into consideration the differences in those areas with Pennsylvania geology, producing formations and historical practices. A side-by-side comparison with these states indicates that Pennsylvania's proposed cementing and casing standards would be in line with those states with similar operations. There is not a comparable regulation for any of the state oil and gas programs reviewed regarding the gas migration response requirements for the operator as proposed by this regulation. Due to the potential risk of harm or death, Pennsylvania has taken the lead on this issue of safety. The Department believes the proposed rulemaking reflects a combination of the best practices of those states as applied to the peculiarities of Pennsylvania geology, producing formations and historical practices of the industry.

(26) Will the regulation affect any other regulations of the promulgating agency or other state agencies? If yes, explain and provide specific citations.

No.

(27) Submit a statement of legal, accounting or consulting procedures and additional reporting,

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recordkeeping or other paperwork, including copies of forms or reports, which will be required for implementation of the regulation and an explanation of measures which have been taken to minimize these requirements.

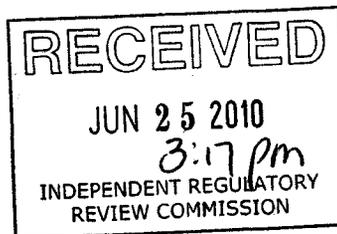
Operators will need to visit each well site to check the status of the annulus and record and report the annular pressure on the annual well production and waste report. Two fields will be added to the current annual production and waste report form for reporting open annulus or wellhead pressure.

(28) Please list any special provisions which have been developed to meet the particular needs of affected groups or persons including, but not limited to, minorities, elderly, small businesses, and farmers.

Not Applicable



FACE SHEET  
FOR FILING DOCUMENTS  
WITH THE LEGISLATIVE REFERENCE  
BUREAU



(Pursuant to Commonwealth Documents Law)

DO NOT WRITE IN THIS SPACE

Copy below is hereby approved as to form and legality.  
Attorney General

*[Signature]*

By: (Deputy Attorney General)

**JUN 22 2010**

DATE OF APPROVAL

Check if applicable  
Copy not approved. Objections attached.

Copy below is hereby certified to be true and  
correct copy of a document issued, prescribed or  
promulgated by:

DEPARTMENT OF ENVIRONMENTAL  
PROTECTION  
ENVIRONMENTAL QUALITY BOARD

(AGENCY)

DOCUMENT/FISCAL NOTE NO. 7-459

DATE OF ADOPTION MAY 17, 2010

BY *John Hanger*

TITLE JOHN HANGER  
CHAIRMAN

EXECUTIVE OFFICER CHAIRMAN OR SECRETARY

Copy below is hereby approved as to form and legality  
Executive or Independent Agencies

BY *[Signature]*

Andrew C. Clark

DATE OF APPROVAL **MAY 17 2010**

(Deputy General Counsel)  
(~~Chief Counsel - Independent Agency~~)  
(Strike inapplicable title)

Check if applicable. No Attorney General Approval  
or objection within 30 days after submission.

NOTICE OF PROPOSED RULEMAKING

DEPARTMENT OF ENVIRONMENTAL PROTECTION  
ENVIRONMENTAL QUALITY BOARD

OIL AND GAS WELL CASING AND CEMENTING

25 Pa. Code, Chapter 78



**Notice of Proposed Rulemaking**  
**Department of Environmental Protection**  
**Environmental Quality Board**  
**25 PA Code Chapter 78**  
**(Oil and Gas Wells)**

**Preamble**

The Environmental Quality Board (Board) proposes to amend 25 PA Code Chapter 78 (relating to Oil and Gas Wells). The proposed rulemaking would update existing requirements regarding the drilling, casing, cementing, testing, monitoring and plugging of oil and gas wells, and the protection of water supplies. The new and amended sections are §§78.1, .51, .52, .71-.73, .81-.85, .88, .89, .92-.96, .121 and .122. The proposed modifications include updated material specifications and performance testing and revised design, construction, operational, monitoring, plugging, water supply replacement, and gas migration reporting requirements. The additional requirements will minimize gas migration and will provide an increased degree of protection for both public and private water supplies.

This proposal was adopted by the Board at its meeting of May 17, 2010.

**A. Effective Date**

The amendments will go into effect upon publication in the *Pennsylvania Bulletin* as final rulemaking.

**B. Contact Persons**

For further information contact Scott Perry, Director, Bureau of Oil and Gas Management, Rachel Carson State Office Building, 5<sup>th</sup> floor, 400 Market Street, P.O. Box 8765 Harrisburg, PA 17105-8461, 717-772-2199; or Doug Brennan, Director, Bureau of Regulatory Counsel, P.O. Box 8464, Rachel Carson State Office Building, Harrisburg, PA 17105-8464, (717) 787-7060. Persons with a disability may use the AT&T Relay Service by calling (800) 654-5984 (TDD users) or (800) 654-5988 (voice users). This proposed rulemaking is available on the Department of Environmental Protection's (Department) web site: [www.depweb.state.pa.us](http://www.depweb.state.pa.us).

**C. Statutory Authority**

This proposed rulemaking is being made under the authority of Section 604 of the Oil and Gas Act (58 P.S. § 601.604) which directs the Board to adopt regulations necessary to implement the Act, and Sections 1917-A and 1920-A of The Administrative Code (71 P.S. §§ 510-17 and 510-20). Section 1917-A authorizes and requires the Department to protect the people of this Commonwealth from unsanitary conditions and other nuisances, including any condition that is declared to be a nuisance by any law administered by the Department. Section 1920-A authorizes the Board to promulgate regulations of the Department.

#### **D. Background of the Amendments**

A properly cased and cemented oil and gas well is critical to protecting fresh groundwater and public safety. Many of the regulations governing well construction and water supply replacement were promulgated in July 1989 and remain largely unchanged. New well drilling and completion practices used to develop Marcellus Shale wells, as well as recent impacts to drinking water supplies by both traditional and Marcellus Shale wells, caused the Department to re-evaluate the existing requirements.

With the development of the oil and gas industry in Pennsylvania, the potential exists for natural gas to migrate from the wellbore (via either improperly constructed or old, deteriorated wells). This stray gas may adversely affect water supplies, as well as accumulate within or adjacent to structures such as residences and businesses. If a well is not properly constructed and operated there could be potential threat of a fire or explosion. These situations represent a threat to public safety, health and welfare.

It was determined that many, if not all, Marcellus well operators met or exceeded the current well casing and cementing regulations. However, it was also determined that the current regulations were not specific enough in detailing the Department's expectations of a properly cased and cemented well. Finally, the Department determined that the existing regulations did not address the need for an immediate response by operators to a gas migration complaint nor did they require routine inspection of existing wells by the operator.

A draft of the proposed rulemaking was presented to the Oil and Gas Technical Advisory Board (TAB) for their consideration on September 17, 2009. Because of the scope of the proposed changes, TAB requested additional time to review and provide comment. As part of their review, TAB formed a technical committee with representatives from various companies, trade groups and consultants. Since the initial meeting in September, the Department has met with TAB and their subcommittee on October 28, 2009, January 14, 2010, January 21, 2010 and March 25, 2010. At the March 25 meeting, TAB voted unanimously to recommend that the Environmental Quality Board offer these regulations as a proposed rulemaking.

In addition to developing the proposed regulations through TAB, the Department solicited comments from the public. On Saturday January 30, 2010, the Department published a notice in the Pennsylvania Bulletin soliciting comments to proposed revisions through the Advanced Notice of Proposed Rulemaking process see 40 *Pa.B.* 623. The public comment period closed March 2, 2010.

The Advanced Notice of Proposed Rulemaking ("ANPR") procedure is an optional process, as it is not required by either the Regulatory Review Act or the Commonwealth Documents Law. The purpose of using the process is to solicit public comment on the proposed regulatory changes prior to presenting a proposed rulemaking to the Board. Through the ANPR process, the Department obtained valuable comments that warrant additional consideration by interested stakeholders as the regulations move through the formal rulemaking process.

## **E. Advanced Notice of Proposed Rulemaking**

### **Summary of Comments and Responses**

The ANPR process is used to solicit public comment on proposed regulatory changes before the Department presents a rulemaking package to the Environmental Quality Board. Through the ANPR process, the Department obtained valuable comments that warrant additional consideration by interested stakeholders as the regulations move through the formal rulemaking process.

The Department received comments from 87 individuals, businesses, trade organizations and public interest groups. A summary of the comments received was presented to TAB at its March 25, 2010 meeting for the members' review. The Department received a wide range of comments on the topic of water quality and quantity of replacement water supply. A second area of comments focused on the proposed cementing standards and cementing practices. It is the Department's experience that poorly cemented casing is the reason for many gas migration cases. Many of the commentators offered suggested language for cement standards and for testing cementing jobs. Closely associated with the cement and cementing standards is casing and casing standards. The Department received comments on the pressure testing requirements for the various casing strings as well as the use of centralizers and safety equipment associated with the individual strings.

The Department also received numerous comments concerning issues beyond the scope of these proposed changes or beyond the scope of the Department's statutory authority. It is important to note that these proposed regulatory changes are limited to protecting public safety and groundwater resources through proper well construction, water supply replacement or restoration, well inspection, gas migration investigation and response, and well plugging.

The Department has determined that these issues must be addressed expeditiously. While other potential impacts to the environment from oil and gas well development warrant consideration, such an evaluation will unduly delay the promulgation of these important regulations. The Department intends to engage in another round of rulemaking to address additional issues presented by development of the Marcellus Shale and other unconventional resources such as coalbed methane. To the extent that commentators do not believe their comments have been sufficiently addressed, they may submit additional comments on the regulation as part of the formal rulemaking process and the Department will address them through a formal comment/response document.

## **F. Summary of Proposed Rulemaking**

### **§ 78.1 Definitions**

Definitions for "cement job log", "conductor pipe" and "intermediate casing" were added to strengthen new and existing provisions within Chapter 78. The definitions for "casing seat", "cement" and "surface casing" were amended to reflect current requirements. Finally, the

definition of “retrievable” was removed and the substantive portion of the definition was inserted into the appropriate plugging regulations.

The Board is specifically requesting comments on the definition of “deepest fresh groundwater” which is defined as “the deepest fresh groundwater bearing formation penetrated by the wellbore as determined from drillers logs from the well or from other wells in the area surrounding the well or from historical records of the normal surface casing seat depths in the area surrounding the well, whichever is deeper.” Ascertaining the deepest fresh groundwater zone is important because this is the depth to which surface casing must be set.

#### § 78.51 Protection of water supplies

This section has been significantly amended to reflect current case law on the requirements for operators to restore or replace a water supply that has been polluted or diminished as a result of gas or oil well drilling. The proposed regulation does not impose new or expanded duties on well operators but does clarify their responsibilities.

Water supplies that are polluted or diminished must be restored or replaced. If the existing supply did not meet safe drinking water standards, the operator must supply a water source that is as good as the preexisting supply. If a supply exceeded safe drinking water standards, the operator need only provide a supply that meets those standards. The owner of the supply may still seek an appropriate legal remedy to obtain a supply that meets preexisting standards if so warranted.

Any increase in operating and maintenance costs must be provided by the operator in perpetuity. If the supply was reasonably intended to provide a greater quantity than was currently used (and was capable of doing so), the operator must provide a supply to meet the anticipated need.

Finally, if an operator is notified by an affected user of the supply that it has been impacted by drilling, the operator must notify the Department in 10 days.

#### § 78.52 Predrilling or prealteration survey

Operators must now provide DEP and water supply owners with the results of their predrilling surveys within 10 days of receipt of the results.

#### § 78.71 Use of safety devices – well casing

The changes clarify that the casing to which the blow-out prevention equipment may be attached must be cemented in place.

#### § 78.72 Use of safety devices – blow-out prevention equipment

The proposed revisions more clearly define when blow-out preventer equipment must be used, where the controls of such equipment must be located in a manner that allows operation in case of an emergency, how defective equipment must be treated and the training a person must have

in order to operate the equipment. The Board is specifically requesting comments on establishing requirements for additional safety equipment and procedures.

#### § 78.73 General provision for well construction and operation

The proposed revisions reduce the allowable pressure that may be exerted on the surface casing seat. This proposal will significantly reduce the possibility of a gas migration event by adding a margin of error onto the assumed hydrostatic pressure being exerted on the surface casing seat. A new requirement for check flow valves that prevent backflow from the pipeline has been included.

#### § 78.75a Area of alternative methods

Section 211 of the Oil and Gas Act provides that any well construction or plugging regulation may be modified by an alternative method approved by the Department. This new section will broaden the Department's ability to use the "area of alternative methods" for geological regions where existing regulations do not necessarily provide sufficient protection of the environment. This procedure would be used to establish environmentally necessary protective measures on an area wide basis as opposed to a well by well basis. Establishing such an area requires notice in the *Pennsylvania Bulletin* and an opportunity for the public to comment.

#### § 78.76 Drilling within a gas storage reservoir area

The amendments would require operators to submit a casing and cementing plan to the Department for approval prior to drilling through a gas storage reservoir area or protective area.

#### § 78.81 General provisions

The amendments would delete subsection (c), which stated that certain sections of the regulation do not apply to production or intermediate casing, to reflect new requirements.

#### § 78.82 Use of conductor pipe

The amendments would further delineate the requirements for conductor pipe that is used to stabilize the top hole of a well such that it protects fresh groundwater.

#### § 78.83 Surface and coal protective casing and cementing procedures

The amendments would prohibit the use of surface casing as production casing and requires an additional string of casing to be installed in a well unless the well is only used to produce oil that does not present a threat to groundwater or if the operator of a gas well demonstrates that all gas and fluids will be contained in the well.

Additional amendments require the use of air or freshwater based fluids when drilling through the fresh groundwater zone; delete subsection (c) that gives operators the ability to drill to producing zones prior to isolating fresh groundwater under certain circumstances; and mandate

the use of centralizers to position the casing in the wellbore.

The Board is specifically requesting comments on the placement of centralizers to ensure that the casing is properly located within the wellbore and that the well bore is sufficiently wide to ensure proper placement of cement. General references to API standards are not as helpful as these standards are not generally available to the public.

#### § 78. 83a Casing and Cementing Plan

This new section requires operators to develop a casing and cementing plan that the Department can review at the well site. The plan must describe the casing used and the cementing practices to be employed. The Department can request submittal of the plan for approval prior to drilling.

#### § 78. 83b Casing and cementing – lost circulation

This new section requires operators to notify the Department when cement used to protect fresh groundwater is not returned to the surface despite pumping more than 120% of the estimated required volume.

If cement is not returned to the surface, unless the well only produces oil off a vented production pipe, additional strings of casing must be run and cemented.

#### § 78.83c Intermediate and production casing

This new section specifies the cementing requirements for intermediate and production casing and specifies the pressure limitation for wells that produce gas off the annulus of the intermediate casing string.

#### § 78. 84 Casing standards

This section has been significantly revised to require pressure testing of casing attached to a blow out preventer with a pressure rating of 3,000 psi, as well as pressure testing for used or welded casing. For casing attached to a blow-out preventer, a passing pressure test is holding 120% of the maximum anticipated working pressures to which the casing will be exposed for 30 minutes without a 10% decrease in pressure. Passing pressure tests for other casing is holding the maximum anticipated working pressures to which the casing will be exposed for 30 minutes without a 10% decrease in pressure. The 10% decrease is included to account for normal variation in pressure gauges.

Additional welded casing standards include requiring 3 welded passes and certification for welders who do not have 10 years of experience welding casing.

#### § 78. 85 Cement standards

This section was amended to provide additional objectives for well casing cement to meet as well as to reference new ASTM standards in addition to American Petroleum Institute standards.

Subsection (b) was amended to eliminate actions that could disturb the cement while it sets over the mandated 8 hour wait time. New subsections (d) and (e) were added to require notification to the Department prior to cementing operations to ensure proper inspection of the cement job and to require the availability of the cement job log at the well site for inspection.

The Board is requesting additional comments on the concept of creating a zone of critical cement at the casing seat. Commentators in the ANPR process proposed that the zone of critical cement would include a 72-hour compressive strength standard of 1,200 psi. The zone of critical cement would also be required to meet the API free water separation standard conformance standard of no more than six milliliters per 250 milliliters of cement tested in accordance with the current API RP 10B.

The Board is also requesting additional comments on a provision providing the Department the ability to set more stringent local standards if needed for pollution prevention, and to establish quantitative temperature limits for water used in cement mixing.

#### § 78.88 Mechanical integrity of operating wells

This new section requires operators to inspect their wells at least quarterly for signs of physical degradation of the well in addition to determining whether the pressure in the well is within allowable limits. Wells that fail inspection must be attended to immediately and the Department must be notified.

#### § 78.89 Gas migration response

This new section requires well operators to notify the Department if the operator is notified or becomes aware of a gas migration event and to take investigative and corrective measures if so required by the Department. The section specifies that emergency responders and the Department must be notified immediately if the level of natural gas detected is greater than 10% of the lower explosive limit of natural gas.

#### § 78.92 – 78.95 Plugging

These sections have been modified to incorporate the substantive requirements of the eliminated definition of “retrievable” along with requiring an additional attempt to remove uncemented casing prior to plugging a well. The revised sections also require cement to be placed across the formerly producing formation as opposed to placing the cement plug on top of the formation as is the current requirement.

#### § 78.96 Marking the location of a plugged well

The amendments to this section permit the use of materials other than cement and metal to mark and hold a marker for a plugged well.

## § 78.121 Annual production report

This section has been amended to incorporate the requirements of Act 15 of 2010 which requires semi-annual production reporting of Marcellus Shale wells. The reporting date for all wells has been changed from March 31 to February 15 to match Act 15. Marcellus operators must also report on August 15 each year. The Department is required to post the production of Marcellus wells on its website. To accomplish this reporting requirement, the Department is mandating electronic production reporting.

## § 78.122 Well record and completion report

This section has been amended to require certification by the operator of the proper construction of the well and to require additional information in the stimulation record including water source identification and volume as well as a list of chemicals used to stimulate the well.

### **G. Benefits, Costs and Compliance**

#### **Benefits**

Both the residents of this Commonwealth and the regulated community will benefit from this regulation.

The public will benefit in several ways. The updated casing and cementing requirements will provide an increased degree of protection for homeowners and both public and private water supplies. The proposed construction standards will align Pennsylvania's regulations with other states' rules as well as current industry standards. Pressure testing the casing and certain casing seats will detect construction deficiencies before a well could create a potential safety or environmental problem. Minimizing annular pressure will reduce the potential for gas migration. The new quarterly inspections and annual reporting will be a vital tool for operators to use in detecting potential safety or environmental impacts before they may become an issue. The proposed regulations also outline the procedures the operator and the Department will utilize if there is a reported gas migration event.

The new construction standards and the well remediation measures will far outweigh the liability to the operator from the potential impacts to public safety and harm to the environment from gas migration or from polluting water resources that may result without these additional precautions.

Most of the updates are codifying existing best practices employed by prudent operators. These operators should not see much, if any, increased cost as a result of the regulation. Any increased cost of constructing the well in time and materials will decrease the risk of gas migrations resulting from defective casing or cementing. As new areas of the Commonwealth are developed for natural gas, these proposed regulations will avoid many potential health, safety and environmental issues.

## **Costs**

This rulemaking will impose minimal additional costs on the Department. This proposal will help the Department offset the potential health, safety and environmental issues.

The Department finds that most gas migration issues stem from inadequate cement procedures, cement returns, or combinations of inadequate casing and cementing or over-pressured casing seats. Because the Department is proposing regulations that are predominately codifying existing industry standards, any increased cost associated with drilling and operating oil and gas wells will be minimal. All of the potential increases in cost to an operator will be associated with assuring a well is properly completed, operated and plugged.

The potential increase in cost is minor when compared to the overall cost of well construction. Where cement is not returned to the surface or when excessive pressure is placed on the surface casing seat, the revised regulations require the operator to install an additional string of casing. The construction cost for the additional string of casing is about \$10,000 per well.

Used casing, welded casing and casing attached to a high pressure blow out preventer must be pressure tested to demonstrate its ability to withstand the highest anticipated working pressures to which the casing will be exposed. If the casing fails this test, the operator must repair or replace the casing and ultimately pass the pressure test. In the Department's estimation, less than 5% of the casing used is anticipated to fail a pressure test. The cost to repair or replace the defective casing is completely outweighed by the environmental damage that would result from a failed string of casing and the fact that the casing would still need to be repaired or replaced.

The typical cost to develop a Marcellus Shale well is around \$5,000,000. The additional cost of compliance would only be approximately 0.2% of the overall cost to develop a Marcellus Shale well.

The typical cost to develop a shallow gas well is \$250,000 and the typical cost to develop an oil well is \$200,000. In either situation, the additional cost of compliance would only be approximately 4% to 5% of the overall cost of the well.

All of the additional measures are proposed to reduce the potential for gas mitigation. If an operator fails to prevent a pollution event of a water supply, the anticipated cost to permanently replace one private water supply would be approximately \$4,000 to drill a new water well or \$30,000 to provide and permanently pay for a treatment system.

## **Compliance Assistance Plan**

The Department has worked extensively with representatives from the regulated community and leaders from the several industry trade organizations have attended the advisory committee meetings where these regulations have been discussed. Therefore the requirement of the proposed regulation are well known.

However, the Department has scheduled several training sessions for the regulated community

that address the Department's regulatory requirements. The Department will use these training sessions as an opportunity to further educate the industry about the new requirements.

### **Paperwork requirements**

Annual well inspection report, the semi-annual production report mandated by Act 15, and the additional information required in the well completion report will require the submittal of two additional forms and additional information on an existing form.

### **H. Pollution Prevention**

The Federal Pollution Prevention Act of 1990 established a national policy that promotes pollution prevention as the preferred means for achieving state environmental protection goals. DEP encourages pollution prevention, which is the reduction or elimination of pollution at its source, through the substitution of environmentally-friendly materials, more efficient use of raw materials, or the incorporation of energy efficiency strategies. Pollution prevention practices can provide greater environmental protection with greater efficiency because they can result in significant cost savings to facilities that permanently achieve or move beyond compliance.

This proposed rulemaking will continue to assure that the citizens and the environment of this Commonwealth experience the advantage of our oil and gas resources. The proposed regulations will minimize gas migration and will provide an increased degree of protection for both public and private water supplies.

The proposed modifications include updated material specifications and performance testing. The proposal adds more specific design, construction, operational and monitoring requirements. The plugging, water supply replacement, and gas migration reporting regulations have been modified to ensure that public safety and fresh groundwater are protected.

### **I. Sunset Review**

These regulations will be reviewed in accordance with the sunset review schedule published by the Department to determine whether the regulation effectively fulfills the goals for which it was intended.

### **J. Regulatory Review**

Under Section 5(a) of the Regulatory Review Act (71 P.S. § 745.5(a)), on June 25, 2010, the Department submitted a copy of these proposed amendments to the Independent Regulatory Review Commission (IRRC) and the Chairpersons of the House and Senate Environmental Resources and Energy Committees. In addition to submitting the proposed amendments, the Department has provided IRRC and the Committees with a copy of a detailed regulatory analysis form prepared by the Department. A copy of this material is available to the public upon request.

Under section 5(g) of the Regulatory Review Act, IRRC may convey any comments, recommendations or objections to the proposed regulations within 30 days of the close of the public comment period. The comments, recommendations or objections shall specify the regulatory review criteria that have not been met. The Act specifies detailed procedures for review of these issues by the Department, the General Assembly and the Governor prior to final publication of the regulations.

#### **K. Public Comments**

**Written Comments** – Interested persons are invited to submit comments, suggestions, or objections regarding the proposed regulation to the Environmental Quality Board, P.O. Box 8477, Harrisburg, PA 17105-8477 (express mail: Rachel Carson State Office Building, 16<sup>th</sup> Floor, 400 Market Street, Harrisburg, PA 17101-2301). Comments submitted by facsimile will not be accepted. Comments, suggestions or objections must be received by the Board on or before August 9, 2010. Interested persons may also submit a summary of their comments to the Board. The summary may not exceed one page in length and must also be received by the Board on or before August 9, 2010. The one-page summary will be provided to each member of the Board in the agenda packet distributed prior to the meeting at which the final regulation will be considered.

**Electronic Comments** – Comments may be submitted electronically to the Board at [RegComments@state.pa.us](mailto:RegComments@state.pa.us) and must also be received by the Board on or before August 9, 2010. A subject heading of the proposal and a return name and address must be included in each transmission.

#### **L. Public Hearings**

The Board will hold four public hearings for the purpose of accepting comments on this proposed rulemaking. The hearings will be held as follows:

July 19, 2010 7:00 p.m.	Tunkhannock Area High School Auditorium 120 West Tioga Street Tunkhannock, PA 18657
July 21, 2010 7:00 p.m.	Lycoming College Heim Science Center Building Room G-11 700 College Place Williamsport, PA 17701
July 22, 2010 7:00 p.m.	Department of Environmental Protection Northwest Regional Office 1 <sup>st</sup> Floor Conference Room 230 Chestnut Street Meadville, PA 16335

July 22, 2010  
7:00 p.m.

Department of Environmental Protection  
Southwest Regional Office  
Waterfront Conference Room A and B  
400 Waterfront Drive  
Pittsburgh, PA 15222-4745

Persons wishing to present testimony at a hearing are requested to contact the Environmental Quality Board, P.O. Box 8477, Harrisburg, PA 17105-8477, (717) 787-4526, at least 1 week in advance of the hearing to reserve a time to present testimony. Oral testimony is limited to 10 minutes for each witness. Witnesses are requested to submit three written copies of their oral testimony to the hearing chairperson in order to aid in transcribing the hearing. Organizations are limited to designating one witness to present testimony on their behalf at each hearing.

Persons in need of accommodations as provided for in the Americans With Disabilities Act of 1990 should contact the Board at (717) 787-4526 or through the Pennsylvania AT&T Relay Service at (800) 654-5984 (TDD) or (800) 654-5988 (voice users) to discuss how the Board may accommodate their needs.

BY:

JOHN  
HANGER  
Chairperson  
Environmental Quality Board

ANNEX A

Title 25. Environmental Protection

Part I. Department of Environmental Protection

Subpart C. Protection of Natural Resources

Article I. Land Resources

CHAPTER 78. OIL AND GAS WELLS

Subchapter A. GENERAL PROVISIONS

§ 78.1. Definitions.

(a) The words and terms defined in section 103 of the act (58 P. S. § 601.103), section 2 of the Coal and Gas Resource Coordination Act (58 P. S. § 502), section 2 of the Oil and Gas Conservation Law (58 P. S. § 402), section 103 of the Solid Waste Management Act (35 P. S. § 6018.103) and section 1 of The Clean Stream Law (35 P. S. § 691.1), have the meanings set forth in those statutes when the terms are used in this chapter.

(b) The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise:

\* \* \* \* \*

*Casing seat*—The depth to which the surface casing or coal protection casing [is run] **or intermediate casing is set.** In wells without surface casing, the **surface casing seat shall be considered to be equal to 50 feet below the deepest fresh groundwater [the depth of casing which is normal for wells in the area].**

\* \* \* \* \*

*Cement*—A mixture of materials for bonding or sealing that attains a 7-day maximum permeability of 0.01 millidarcies and a 24-hour compressive strength of at least 500 psi in accordance with applicable [API] standards and specifications.

**Cement job log – a written record that documents the actual procedures and specifications of the cementing operation. The record must include the type of cement with additives, the volume, yield and density in pounds per gallon of the cement and the amount of cement returned to the surface, if any. Cementing procedural information must include a description of the pumping rates in bbls per minute, pressures in psi, time in minutes and sequence of events during the cementing operation.**

\* \* \* \* \*

Conductor pipe – a short string of large-diameter casing used to stabilize the top of the wellbore in shallow unconsolidated formations.

\* \* \* \* \*

Intermediate casing – a string of casing other than production casing that is used in the wellbore to isolate, stabilize or provide well control to a greater depth than that provided by the surface casing or coal protection casing.

\* \* \* \* \*

[Retrievable—When used in conjunction with surface casing, coal protective casing or production casing, the casing that can be removed after exerting a prudent effort to pull the casing while applying a pulling force at least equal to the casing weight plus 5000 pounds or 120% of the casing weight, whichever is greater.]

\* \* \* \* \*

Surface Casing—[A string of pipe which extends from the surface and that segregates and protects fresh groundwater and stabilizes the hole]. Casing used to isolate the wellbore from fresh groundwater and to prevent the escape or migration of gas, oil and other fluids from the well bore into fresh groundwater. The surface casing is also commonly referred to as the water string or water casing.

\* \* \* \* \*

Subchapter C. ENVIRONMENTAL PROTECTION  
PERFORMANCE STANDARDS

§ 78.51. Protection of water supplies.

(a) A well operator who affects a public or private water supply by pollution or diminution shall restore or replace the affected supply with an alternate source of water adequate in quantity and quality for the purposes served by the supply as determined by the Department.

\* \* \* \* \*

(d) [The operator shall affirmatively demonstrate to the Department's satisfaction that the quality of the restored or replaced water supply to be used for human consumption is at least equal to the quality of the water supply before it was affected by the operator. If the quality of the water supply before it was affected by the

operator cannot be affirmatively established, the operator shall demonstrate that the concentrations of substances in the restored or replaced water supply do not exceed the primary and secondary maximum contaminant levels established under § 109.202 (relating to State MCLs and treatment technique requirements).] A restored or replaced water supply shall include any well, spring, public water system or other supply approved by the Department, which meets the criteria for adequacy as follows:

(1) Reliability, cost, maintenance and control. A restored or replaced water supply, at a minimum, must:

(i) Be as reliable as the previous water supply.

(ii) Be as permanent as the previous water supply.

(iii) Not require excessive maintenance.

(iv) Provide the owner and the user with as much control and accessibility as exercised over the previous water supply.

(v) Not result in increased costs to operate and maintain. If the operating and maintenance costs of the restored or replaced water supply are increased, the operator shall provide for permanent payment of the increased operating and maintenance costs of the restored or replaced water supply.

(2) Quality. The quality of a restored or replaced water supply will be deemed adequate if it meets the standards established pursuant to the Pennsylvania Safe Drinking Water Act (35 P. S. § § 721.1—721.17), or is comparable to the unaffected water supply if that water supply did not meet these standards.

(3) Adequate quantity. A restored or replaced water supply will be deemed adequate in quantity if it meets one of the following as determined by the Department:

(i) It delivers the amount of water necessary to satisfy the water user's needs and the demands of any reasonably foreseeable uses.

(ii) It is established through a connection to a public water supply system which is capable of delivering the amount of water necessary to satisfy the water user's needs and the demands of any reasonably foreseeable uses.

(iii) For purposes of this paragraph and with respect to agricultural water supplies, the term reasonably foreseeable uses includes the reasonable expansion of use where the water supply available prior to drilling exceeded the actual use.

**(4) Water source serviceability. Replacement of a water supply includes providing plumbing, conveyance, pumping or auxiliary equipment and facilities necessary for the surface landowner or water purveyor to utilize the water supply.**

(e) If the water supply is for uses other than human consumption, the operator shall demonstrate to the Department's satisfaction that the restored or replaced water supply is adequate for the purposes served by the supply.

(f) [The oil or gas well operator's duty to replace or restore a water supply includes providing plumbing, conveyance, pumping or auxiliary equipment and facilities necessary for the surface landowner or water purveyor to utilize the water supply.]

[(g)] Tank trucks or bottled water are acceptable only as temporary water replacement for a period approved by the Department and do not relieve the operator of the obligation to provide a restored or replaced water supply.

[(h)] (g) If the well operator and the landowner, water purveyor or affected person are unable to reach agreement on the means for restoring or replacing the water supply, the Department or either party may request a conference under section 501 of the act (58 P. S. § 601.501).

**(h) A well operator who receives notice from a landowner, water purveyor or affected person that a water supply has been affected by pollution or diminution, shall report receipt of such notice to the Department within 10 calendar days of receiving the notice.**

§ 78.52. Predrilling or prealteration survey.

(a) A well operator who wishes to preserve its defense under section 208(d)(1) of the act (58 P. S. § 601.208(d)(1)) that the pollution of a water supply existed prior to the drilling or alteration of the well shall **[cause] conduct** a predrilling or prealteration survey **[to be conducted]** in accordance with this section.

\* \* \* \* \*

(d) An operator electing to preserve its defenses under section 208(d)(1) of the act shall provide a copy of the results of the survey to the Department and the landowner or water purveyor within 10-calendar days of **receipt [being notified by the Department to submit a copy]** of the results.

\* \* \* \* \*

## Subchapter D. WELL DRILLING, OPERATION AND PLUGGING

### GENERAL

Sec.

- 78.71. Use of safety devices—well casing.
- 78.72. Use of safety devices—blow-out prevention equipment.
- 78.73. General provision for well construction and operation.
- 78.74. Venting of gas.
- 78.75. Alternative methods.
- 78.75a. Area of alternative methods.**
- 78.76. Drilling within a gas storage reservoir area.
- 78.77. Wells in a hydrogen sulfide area.
- 78.78. Pillar permit applications.

### CASING AND CEMENTING

- 78.81. General provisions.
- 78.82. Use of conductor pipe.
- 78.83. Surface and coal protective casing and cementing procedures.
- 78.83a. Casing and cementing plan.**
- 78.83b. Casing and cementing – lost circulation.**
- 78.83c. Intermediate and production casing.**
- 78.84. Casing standards.
- 78.85. Cement standards.
- 78.86. Defective casing or cementing.
- 78.87. Gas storage reservoir protective casing and cementing procedures.

### OPERATING WELLS

- 78.88. Mechanical integrity of operating wells.**
- 78.89. Gas migration response.**

\* \* \* \* \*

Subchapter D. WELL DRILLING, OPERATION AND  
PLUGGING

GENERAL

§ 78.71. Use of safety devices—well casing.

(a) The operator shall equip the well with one or more strings of casing of sufficient **cemented** length and strength to **attach blow-out prevention equipment and** prevent blowouts, explosions, fires and casing failures during installation, completion and operation.

\* \* \* \* \*

§ 78.72. Use of safety devices—blow-out prevention equipment.

(a) The operator shall use blow-out prevention equipment [when well head pressures or natural open flows are anticipated at the well site that may result in a blow-out or when the operator is drilling in an area where there is no prior knowledge of the pressures or natural open flows to be encountered.] **in the following circumstances:**

**(1) When drilling a well that is intended to produce natural gas from the Marcellus Shale formation;**

**(2) When well head pressures or natural open flows are anticipated at the well site that may result in a loss of well control;**

**(3) When the operator is drilling in an area where there is no prior knowledge of the pressures or natural open flows to be encountered;**

**(4) On wells regulated by the Oil and Gas Conservation Law (58 P.S. §§ 401 – 409);**

**(5) When drilling within 200 feet of a building.**

(b) Blow-out prevention equipment used shall be in good working condition at all times.

**(c) Controls for the blow-out preventer shall be accessible to allow actuation of the equipment. Additional controls for a blow-out preventer with a pressure rating of greater than 3,000 psi not associated with the rig hydraulic system shall be located away from the drilling rig such that the blow-out preventer can be actuated if control of the well is lost.**

[(c)] (d) \* \* \* \* \*

[(d)] (e) The operator shall conduct a complete test of the ram type blow-out preventer and related equipment for both pressure and ram operation before placing it in service on the well. The operator shall test the annular type blow-out preventer in accordance with the manufacturer's published instructions, or the instructions of a professional engineer, prior to the device being placed in service. **Blow-out prevention equipment that fails the test shall not be used until it is repaired and passes the test.**

[(e)] (f) When the equipment is in service, the operator shall visually inspect blow-out prevention equipment during each tour of drilling operation and during actual drilling operations test the pipe rams for closure daily and the blind rams for closure on each round trip. When more than one round trip is made in a day, one daily closure test for blind rams is sufficient. Testing shall be conducted in accordance with American Petroleum Institute publication API RP53, "API Recommended Practice for Blowout Prevention Equipment Systems for Drilling Wells." The operator shall record the results of the inspection and closure test in the drillers log before the end of the tour. **Blow-out prevention equipment that is not in good working order shall be repaired or replaced immediately and re-tested prior to the resumption of drilling.**

**(g) All lines, valves and fittings between the closing unit and the blow-out preventer stack shall be flame resistant and have a rated working pressure that meets or exceeds the requirements of the blow-out preventer system.**

[(f)] (h) During drilling when conditions are such that the use of a blowout preventer can be anticipated, there shall be present on the [rig floor a certified] **well site an individual [responsible to] who the operator has determined is trained and competent in the use of the blow-out prevention equipment.** Satisfactory completion of [a United States Geologic Survey (U.S.G.S.)] a[n approved] well control course **by the [American Petroleum Institute,] Independent Association of Drilling Contractors** or equivalent study shall be deemed adequate [certification] for purposes of this subsection.

[(g)] (i) \* \* \* \* \*

[(h)] (j) \* \* \* \* \*

**§ 78.73. General provision for well construction and operation.**

**(a) The operator shall construct and operate the well in accordance with this chapter and ensure that the integrity of the well is maintained and health, safety, environment and property are protected.**

**[(a)] (b)** The operator shall prevent gas **[and other fluids from lower formations from entering fresh groundwater.]**, **oil, brine, completion and servicing fluids, and any other fluids from below the casing seat from entering fresh groundwater and prevent pollution or diminution of fresh groundwater.**

**[(b)] (c)** After a well has been completed, recompleted, reconditioned or altered the operator shall prevent shut-in pressure **[or] and** producing back pressure at the surface casing seat, **[or] coal protective casing seat or intermediate casing seat when the intermediate casing is used in conjunction with the surface casing to isolate fresh groundwater** from exceeding **80 percent (80%) of** the hydrostatic pressure of the surrounding fresh groundwater system in accordance with the following formula. The maximum allowable shut-in pressure **[or] and** producing back pressure to be exerted at the **[surface casing seat, or coal protective]** casing seat may not exceed the **[hydrostatic]** pressure calculated as follows: Maximum pressure = **(0.8 x 0.433 psi/foot)** multiplied by (casing length in feet).

**[(c)] (d)** After a well has been completed, recompleted, reconditioned or altered, if the shut-in pressure or producing back pressure exceeds the **[hydrostatic]** pressure at the surface casing seat, coal protective casing as calculated in subsection **[(b)] (c)**, the operator shall take action to prevent the migration of gas and other fluids from lower formations into fresh groundwater. To meet this standard the operator may cement or install on a packer sufficient intermediate or production casing or take other actions approved by the Department. This section does not apply during testing for mechanical integrity in accordance with State or Federal requirements.

**(e) Excess gas encountered during drilling, completion or stimulation shall be flared, captured or diverted away from the drilling rig in a manner that does not create a hazard to the public health or safety.**

**(f) Except for gas storage wells, the well must be equipped with a check valve to prevent backflow from the pipelines into the well.**

\* \* \* \* \*

**§ 78.75a. Area of alternative methods.**

**(a) The Department may designate an area of alternative methods if the Department determines that well drilling requirements beyond those provided in this chapter are necessary to drill, operate or plug a well in a safe and environmentally protective manner.**

**(b) To establish an area of alternative methods, the Department shall publish a notice in the *Pennsylvania Bulletin* of the proposed area of alternative methods and provide the public with an opportunity to comment on the proposal. After reviewing any comments received on the proposal, the Department shall publish a**

final designation of the area and required alternative methods in the *Pennsylvania Bulletin*.

(c) Wells drilled within an area of alternative methods established pursuant to subsection (b) must meet the requirements specified by the Department unless the operator obtains approval from the Department to drill, operate or plug the well in a different manner that is at least as safe and protective of the environment as the requirements of the area of alternative methods.

§ 78.76. Drilling within a gas storage reservoir area.

(a) An operator proposing to drill a well within a gas storage reservoir area or a reservoir protective area to produce gas or oil shall forward by certified mail a copy of the well location plat, the drilling, casing and cementing plan and the anticipated date drilling will commence to the gas storage reservoir operator **and to the Department for approval by the Department** and shall submit proof of notification to the Department with the well permit application.

\* \* \* \* \*

#### CASING AND CEMENTING

\* \* \* \* \*

[(c) Casing and cementing standards in § § 78.83—78.85 (relating to surface and coal protective casing and cementing procedures; casing standards; and cement standards) apply to surface casing and coal protective casing but do not apply to production casing.]

§ 78.82 Use of conductor pipe.

If the operator installs conductor pipe in the well, the [operator may not remove the pipe] **following provisions shall apply:**

- (i) **The operator may not remove the pipe;**
- (ii) **Conductor pipe shall be installed in a manner that prevents infiltration of surface water or fluids from the operation into groundwater;**
- (iii) **Conductor pipe must be made of steel unless a different material is approved for use by the Department.**

§ 78.83. Surface and coal protective casing and cementing procedures.

**(a) For wells drilled, altered, reconditioned or recompleted after [effective date], surface casing or any casing functioning as a water protection casing must not be utilized as production casing unless one of the following applies:**

- (1) In oil wells where the operator does not produce any gas generated by the well and the annulus between the surface casing and the production pipe is left open;
- (2) The operator demonstrates that the pressure in the well bore at the casing seat is no greater than the pressure permitted by § 78.73(c) and demonstrates through a pressure test or other method approved by the Department that all gas and fluids will be contained within the well.

[(a)] (b) If the well is to be equipped with threaded and coupled casing, the operator shall drill a hole so that the diameter is at least 1 inch greater than the outside diameter of the casing collar to be installed. If the well is to be equipped with plain-end welded casing, the operator shall drill a hole so that the diameter is at least 1 inch greater than the outside diameter of the [casing tube] centralizer band.

[(b)] (c) [Except as provided in subsection (c), t]The operator shall drill to approximately 50 feet below the deepest fresh groundwater or at least 50 feet into consolidated rock, whichever is deeper, and immediately set and permanently cement a string of surface casing to that depth. The surface hole shall be drilled using air, freshwater, or freshwater based drilling fluid. The surface casing seat shall be set in consolidated rock. When drilling a new well or redrilling an existing well, the operator shall install at least one centralizer within 50 feet of the casing seat and then install a centralizer in intervals no greater than every 150 feet above the first centralizer.

[(c) If no fresh groundwater is being utilized as a source of drinking water within a 1,000-foot radius of the well, the operator may set and permanently cement a single string of surface casing through all water zones, including fresh, brackish and salt water zones. Prior to penetrating zones known to contain, or likely containing, oil or gas, the operator shall install and permanently cement the string of casing in a manner that segregates the various waters.]

\* \* \* \* \*

(f) If additional fresh groundwater is encountered in drilling below the permanently cemented surface casing, the operator shall protect the additional fresh groundwater by installing and cementing a subsequent string of casing or other procedures approved by the Department to completely isolate and protect fresh groundwater. The string of casing may also penetrate zones bearing salty or brackish water with cement in the annular space being used to segregate the various zones. Sufficient cement shall be used to cement the casing at least 20 feet into the permanently cemented surface casing.

(g) The operator shall set and cement a coal protective string of casing through workable coal seams. The base of the coal protective casing shall be at least 30 feet below the lowest workable coal seam. The operator shall install at least two centralizers. One

**centralizer shall be within 50 feet of the casing seat and the second centralizer shall be within 100 feet of the surface.**

(h) **Unless an alternative method has been approved by the Department in accordance with § 78.75 (relating to Alternative methods), [W]when a well is drilled through a coal seam at a location where the coal has been removed or when a well is drilled through a coal pillar,** the operator shall drill to a depth of at least 30 feet but no more than 50 feet deeper than the bottom of the coal seam. The operator shall set and cement a coal protection string of casing to this depth. The operator shall equip the casing with a cement basket or other similar device above and as close to the top of the coal seam as practical. The bottom of the casing shall be equipped with an appropriate device designed to prevent deformation of the bottom of the casing. The interval from the bottom of the casing to the bottom of the coal seam shall be filled with cement either by the balance method or by the displacement method. Cement shall be placed on top of the basket between the wall of the hole and the outside of the casing by pumping from the surface. If the operator penetrates more than one coal seam from which the coal has been removed, the operator shall protect each seam with a separate string of casing that is set and cemented or with a single string of casing which is stage cemented so that each coal seam is protected as described in this subsection. The operator shall cement the well to isolate workable coal seams from each other.

\* \* \* \* \*

(j) If it is anticipated that cement used to permanently cement the surface casing can not be circulated to the surface a cement basket may be installed immediately above the depth of the **anticipated [last] lost** circulation zone. The casing shall be permanently cemented by the displacement method. Additional cement may be added above the cement basket, if necessary, by pumping through a pour string from the surface to fill the annular space.

**§ 78.83a. Casing and cementing plan.**

**(a) The operator shall prepare and maintain a casing and cementing plan showing how the well will be drilled and completed. The plan must demonstrate compliance with this subchapter and include the following information:**

**(1) The anticipated depth and thickness of any producing formation, expected pressures, and anticipated fresh groundwater zones;**

**(2) Diameter of the well bore;**

**(3) Casing type, whether the casing is new or used, depth, diameter, wall thickness and burst pressure rating;**

**(4) Cement type, yield, additives, and estimated amount;**

(5) Estimated location of centralizers;

(6) Alternative methods or materials as required by the Department as a condition of the well permit.

(b) The plan must be available at the well site for review by the Department.

(c) Upon request, the operator shall provide a copy of the well specific casing and cementing plan to the Department for review and approval.

(d) Any revisions to the plan made as a result of on-site modification shall be documented in the plan by the operator and be available for review by the Department.

§ 78.83b. Casing and cementing – lost circulation.

(a) If cement used to permanently cement the surface or coal protective casing is not circulated to the surface despite pumping a volume of cement equal to or greater than 120% of the calculated annular space, the operator shall notify the Department and meet one of the following requirements:

(1) Run an additional string of casing at least 50 feet deeper than the surface casing and cement the second string of casing back to the seat of the surface or coal protective casing and vent the annulus of the additional casing string to the atmosphere at all times unless closed for well testing or maintenance. Shut-in pressure on the casing seat of the second string of casing must not exceed the requirements of section 78.73(c).

(2) If the additional string of casing is the production casing, the operator shall set the production casing on a packer in a competent formation below the surface casing seat, and vent the annulus of the production casing to the atmosphere at all times unless closed for well testing or maintenance.

(3) Run production casing at least to the top of the formation that is being produced and cement the production casing to the surface.

(4) Produce oil but not gas and leave the annulus between the surface casing and the production pipe open.

(b) If cement used to permanently cement the surface or coal protective casing is not circulated to the surface, the Department may require the operator to determine the amount of casing that was cemented by logging or other suitable method.

§ 78.83c. Intermediate and production casing.

(a) Except as provided in § 78.72 (relating to Use of safety devices – blow-out prevention equipment), intermediate and production casing must be cemented according to this section.

(b) If the well is to be equipped with an intermediate casing, the casing must be cemented from the casing seat to a point at least 500 feet above the seat. If any producing horizon is open to the well bore above the casing seat, the casing must be cemented from the casing seat up to a point at least 500 feet above the top of the shallowest productive horizon, or to a point at least 200 feet above the shoe of the next shallower casing string that was set and cemented in the well. The intermediate casing may be perforated to produce gas or oil if a shoe test demonstrates a pressure gradient greater than 0.465 psi/ft multiplied by casing length in feet.

(c) Except as provided for in § 78.83 (relating to surface and coal protective casing and cementing procedures), each well must be equipped with production casing. The production string may be set on a packer or cemented in place. If the production casing is cemented in place, cement must be placed by the displacement method with sufficient cement to fill the annular space to the surface or to a point at least 500 feet above the production casing seat.

§ 78.84. Casing standards.

(a) The operator shall install casing that can withstand the effects of tension, and prevent leaks, burst and collapse during its installation, cementing and subsequent drilling and producing operations.

(b) Surface casing must be a string of new pipe with a pressure rating that is at least 20 percent greater than the anticipated maximum pressure to which the surface casing will be exposed.

(c) Used casing may be approved for use as surface, intermediate or production casing but must be pressure tested after cementing and before continuation of drilling. A passing pressure test is holding the anticipated maximum pressure to which it will be exposed for 30 minutes with not more than a 10 percent decrease in pressure.

(d) New or used plain end casing, except when being used as drive pipe, conductor, or as a casing string prior to setting and cementing surface casing, that is welded together for use must meet the following requirements:

- (1) It must pass a pressure test by holding the anticipated maximum pressure to which the casing will be exposed for 30 minutes with not more than a 10 percent decrease in pressure. The operator shall notify the Department at least 24 hours before conducting the test. The test results shall be entered on the drilling log.
- (2) It shall be welded using at least three passes with the joint cleaned between each pass.
- (3) It shall be welded by a person trained and certified in the applicable American Petroleum Institute's standard for welding casing and pipe or an equivalent training and certification program as approved by the Department. A person with 10 or more years of experience welding casing as of [effective date] who registers with the Department within nine months of the effective date of this subsection is deemed to be certified.

[(b) The operator shall equip the casing string with appropriate equipment to center the casing through the hole in fresh groundwater zones. This equipment is not required when existing hole conditions such as caving or crookedness might cause loss of the well or result in a defective cement job.]

[(c)] (e) When casing through a workable coal seam, the operator shall install coal protective casing that has a minimum wall thickness of 0.23 inches.

(f) Casing which is attached to a blow-out preventer with a pressure rating of greater than 3,000 psi shall be pressure tested. A passing pressure test must be holding 120 percent of the highest expected working pressure of the casing string being tested, for 30 minutes with not more than a 10 percent decrease. Certification of the pressure test shall be confirmed by entry and signature of the person performing the test on the driller's log.

§ 78.85. Cement standards.

(a) When cementing surface casing, coal protective casing and intermediate casing when the intermediate casing is used in conjunction with the surface casing to isolate fresh groundwater, [T]the operator shall use cement that [will resist degradation by chemical and physical conditions in the well.] meets or exceeds the ASTM International C 150, Type I, II or III Standard or API Specification 10. The cement must also:

- (1) Secure the casing in the well bore;
- (2) Isolate the well bore from fresh groundwater;
- (3) Contain any pressure from drilling, completion and production;

(4) Protect the casing from corrosion;

(5) Resist degradation by the chemical and physical conditions in the well;

(6) Prevent gas flow in the annulus.

(b) [The operator shall permit the cement to set to a minimum compressive strength of 350 pounds per square inch (psi) in accordance with the American Petroleum Institute's API Specification 10. The operator shall permit the cement to set for a minimum period of 8 hours prior to the resumption of actual drilling.] After the casing cement is placed behind surface casing and intermediate casing when the intermediate casing is used in conjunction with the surface casing to isolate fresh groundwater, the operator shall permit the cement to set to a minimum designed compressive strength of 350 pounds per square inch (psi) at the casing seat.

(c) After the casing cement is placed and cementing operations are complete, the casing may not be disturbed for a minimum of eight (8) hours by:

(1) Releasing pressure on the cement head, if float equipment check valves did not hold or float equipment was not equipped with check valves;

(2) Nippling up on or in conjunction to the casing;

(3) Slacking off by the rig supporting the casing in the cement sheath; or

(4) Running drill pipe, wireline, or other mechanical devices into or out of the wellbore.

[(c)] (d) Where special cement or additives are used, the operator may request approval from the Department to reduce the cement setting time specified in subsection [(b)] (d).

(e) The operator shall notify the Department a minimum of one day before cementing of the surface casing begins, unless the cementing operation begins within 72 hours of commencement of drilling.

(f) A copy of the cement job log must be available at the well site for inspection by the Department during drilling operations. The cement job log shall be maintained by the operator after drilling operations for at least five years and be made available to the Department upon request.

\* \* \* \* \*

## OPERATING WELLS

§ 78.88. Mechanical integrity of operating wells.

(a) Except for wells regulated under Subchapter H (relating to Underground gas storage), the operator shall inspect each operating well at least quarterly to ensure it is in compliance with the well construction and operating requirements of this chapter and the Act. The results of the inspections shall be recorded and retained by the operator for at least five years and shall be available for review by the Department and the coal owner or operator.

(b) At a minimum, inspections must determine:

(1) The well-head pressure or water level measurement;

(2) The open flow on the annulus of the production casing or the annulus pressure when the annulus is shut in;

(3) If there is evidence of gas escaping from the well and the amount escaping, using measurement or best estimate of quantity;

(4) If there is evidence of progressive corrosion, rusting or other signs of equipment deterioration.

(c) For structurally sound wells in compliance with §78.73(c), the operator shall follow the reporting schedule outlined in subsection (e).

(d) For wells exhibiting progressive corrosion, rusting or other signs of equipment deterioration that compromise the integrity of the well, or the well is not in compliance with §78.73(c), the operator shall immediately notify the Department and take corrective actions to repair or replace defective equipment or casing or mitigate the excess pressure on the surface casing seat, coal protective casing seat or intermediate casing seat when the intermediate casing is used in conjunction with the surface casing to isolate fresh groundwater according to the following hierarchy:

(1) The operator shall reduce the shut-in or producing back pressure on the casing seat to achieve compliance with § 78.73(c).

(2) The operator shall retrofit the well by installing production casing to reduce the pressure on the casing seat to achieve compliance with § 78.73(c). The annular space surrounding the production casing must be open to the atmosphere. The production casing shall be either cemented to the surface or installed on a permanent packer. The operator shall notify the Department at least seven days prior to initiating the corrective measure.

(3) Additional mechanical integrity tests, including but not limited to pressure tests, may be required by the Department to demonstrate the integrity of the well.

(e) The operator shall submit an annual report to the Department identifying the compliance status of each well with the mechanical integrity requirements of this section. The report shall be submitted on forms prescribed by, and available from, the Department or in a similar manner approved by the Department.

§ 78.89. Gas migration response.

(a) When an operator or owner is notified of or otherwise made aware of a natural gas migration incident, the operator shall immediately notify the Department and, if so directed by the Department, conduct an investigation of the incident. The purpose of the investigation is to determine the nature of the incident, assess the potential for hazards to public health and safety, and mitigate any hazard posed by the levels of natural gas. The operator, in conjunction with the Department and local emergency response agencies, shall take measures necessary to ensure public health and safety.

(b) The investigation undertaken pursuant to subsection (a) shall include, but not be limited to:

(1) An interview with the complainant to obtain information about the complaint and to assess the reported problem.

(2) A field survey to assess the presence and concentrations of natural gas and aerial extent of the stray natural gas.

(3) Establishment of monitoring locations at potential sources, in potentially impacted structures, and the subsurface.

(c) If the level of natural gas is greater than 10 percent of the lower explosive limit of natural gas, the operator shall:

(1) Immediately notify the local emergency response agency, police and fire departments and the Department;

(2) Conduct an immediate field survey of the operator's adjacent oil or gas wells to assess the wells for mechanical integrity, defective casing or cementing, and excess pressures within any part of the well. The initial area of assessment shall include wells within 2,500 feet and expanded to a greater distance if necessary as determined by the Department;

(3) Initiate mitigation controls, which may include remedial measures, access control, advisories, evacuation, signs and other actions;

(d) The operator shall take action to correct any defect in the oil and gas wells to mitigate the stray gas incident.

**(e) The operator and owner shall report to the Department by phone within 12 hours after the interview with the complainant and field survey of the natural gas levels. A follow-up report shall be filed in writing with the Department within three days of the complaint. This follow-up report must include the results of the investigation, monitoring results and measures taken by the operator to repair any defects at any of the adjacent oil and gas wells.**

## PLUGGING

§ 78.92. Wells in coal areas—surface or coal protective casing is cemented.

(a) In a well underlain by a workable coal seam, where the surface casing or coal protective casing is cemented and the production casing is not cemented or the production casing is not present, the owner or operator shall plug the well as follows:

(1) The retrievable production casing shall be removed **by applying a pulling force at least equal to the casing weight plus 5000 pounds or 120% whichever is greater. If this fails, an attempt shall be made to separate the casing by cutting, ripping, shooting or other method approved by the Department, and making a second attempt to remove the casing by exerting a pulling force equal to the casing weight plus 5,000 pounds or 120 percent of the casing weight, whichever is greater. [and the]** The well shall be filled with nonporous material from the total depth or attainable bottom of the well, to a point **50 feet** below [**20 feet above the top of**] the lowest stratum bearing or having borne oil, gas or water. At this point there shall be placed a plug of cement, which shall extend for at least 50 feet above **this stratum [that point]. Each overlying formation bearing or having borne oil, gas or water shall be plugged with cement a minimum of 50 feet below this formation to a point 50 feet above this formation. The zone between cement plugs shall be filled with nonporous material.** [Between this sealing plug and a point 20 feet above the next higher stratum bearing or having borne oil, gas or water, the hole shall be filled with nonporous material and at that point there shall be placed another 50-foot plug of cement which] **The cement plugs shall be placed in a manner that** will completely seal the hole. [In like manner, the hole shall be filled and plugged, with reference to each of the strata bearing or having borne oil, gas or water.] The operator may treat multiple strata as one stratum and plug as described in this subsection with a single column of cement or other materials approved by the Department. Where the production casing is not retrievable, the operator shall plug that portion of the well under § 78.91(d) (relating to general provisions).

\* \* \* \* \*

(b) The owner or operator shall plug a well, where the surface casing, coal protective casing and production casing are cemented, as follows:

\* \* \* \* \*

(3) Following the plugging of the cemented portion of the production casing, the uncemented portion of the production casing shall be separated from the cemented portion and retrieved **by applying a pulling force at least equal to the casing weight plus 5000 pounds or 120% whichever is greater. If this fails, an attempt shall be made to separate the casing by cutting, ripping, shooting or other method approved by the Department, and making a second attempt to remove the casing by exerting a pulling force equal to the casing weight plus 5,000 pounds or 120 percent of the casing weight, whichever is greater**. The maximum distance the stub of the uncemented portion of the production casing may extend is 100 feet below the surface or coal protective casing whichever is lower. In no case may the uncemented portion of the casing left in the well extend through a formation bearing or having borne oil, gas or water. Other stratum above the cemented portion of the production casing bearing or having borne oil, gas or water shall be plugged by filling the hole with nonporous material to 20 feet above the stratum and setting a 50-foot plug of cement. The operator may treat multiple strata as one stratum and plug as described in this subsection with a single column of cement or other material as approved by the Department. When the uncemented portion of the production casing is not retrievable, the operator shall plug that portion of the well under § 78.91(d).

§ 78.93. Wells in coal areas—surface or coal protective casing anchored with a packer or cement.

(a) In a well where the surface casing or coal protective casing and production casing are anchored with a packer or cement, the owner or operator shall plug the well as follows:

(1) The retrievable production casing shall be removed **by applying a pulling force at least equal to the casing weight plus 5000 pounds or 120% whichever is greater. If this fails, an attempt shall be made to separate the casing by cutting, ripping, shooting or other method approved by the Department, and making a second attempt to remove the casing by exerting a pulling force equal to the casing weight plus 5,000 pounds or 120 percent of the casing weight, whichever is greater.**

~~[and the]~~ **The** well shall be filled with nonporous material from the total depth or attainable bottom of the well, to a point **50 feet below [20 feet above the top of]** the lowest stratum bearing or having borne oil, gas or water. At this point there shall be placed a plug of cement, which shall extend for at least 50 feet above **this stratum [that point]. Each overlying formation bearing or having borne oil, gas or water shall be plugged with cement a minimum of 50 feet below this formation to a point 50 feet above this formation. The zone between cement plugs shall be filled with nonporous material.** ~~[Between this sealing plug and a point 20 feet above the next higher stratum bearing or having borne oil, gas or water, the hole shall be filled with nonporous material and at that point there shall be placed another 50-foot plug of cement which]~~ **The cement plugs shall be placed in a manner that** will completely seal the hole. ~~[In this manner, the hole shall be filled and plugged, with reference to each of the strata bearing or having borne oil, gas or water.]~~ The operator may treat

multiple strata as one stratum and plug as described in this subsection with a single column of cement or other material as approved by the Department. When the production casing is not retrievable, the operator shall plug this portion of the well under § 78.91(d) (relating to general provisions).

(2) The well shall then be filled with nonporous material to a point approximately 200 feet below the lowest workable coal seam, or surface or coal protective casing seat, whichever is deeper. Beginning at this point a 100-foot plug of cement shall be installed.

(3) After it has been established that the surface casing or coal protective casing is free and can be retrieved, the surface or coal protective casing shall be retrieved **by applying a pulling force at least equal to the casing weight plus 5000 pounds or 120% whichever is greater. If this fails, an attempt shall be made to separate the casing by cutting, ripping, shooting or other method approved by the Department, and making a second attempt to remove the casing by exerting a pulling force equal to the casing weight plus 5,000 pounds or 120 percent of the casing weight, whichever is greater.** [and a] A string of casing with an outside diameter of not less than 4 1/2 inches for gas wells, or not less than 2 inches for oil wells, shall be run to the top of the 100-foot plug described in paragraph (2) and cemented to the surface.

\* \* \* \* \*

§ 78.94. Wells in noncoal areas—surface casing is not cemented or not present.

(a) The owner or operator shall plug a noncoal well, where the surface casing and production casing are not cemented, or is not present as follows:

(1) The retrievable production casing shall be removed **by applying a pulling force at least equal to the casing weight plus 5000 pounds or 120% whichever is greater. If this fails, an attempt shall be made to separate the casing by cutting, ripping, shooting or other method approved by the Department, and making a second attempt to remove the casing by exerting a pulling force equal to the casing weight plus 5,000 pounds or 120 percent of the casing weight, whichever is greater.** The well shall be filled with nonporous material from the total depth or attainable bottom of the well, to a point **50 feet below [20 feet above the top of]** the lowest stratum bearing or having borne oil, gas or water. At this point there shall be placed a plug of cement, which shall extend for at least 50 feet above **this stratum [that point].** **Each overlying formation bearing or having borne oil, gas or water shall be plugged with cement a minimum of 50 feet below this formation to a point 50 feet above this formation. The zone between cement plugs shall be filled with nonporous material. [Between this sealing plug and a point 20 feet above the next higher stratum bearing or having borne oil, gas or water, the hole shall be filled with nonporous material and at that point there shall be placed another 50-foot plug of cement which] The cement plugs shall be placed in a manner that** will completely seal the hole. [The hole shall be filled and plugged, with reference to each of the strata bearing or having borne oil, gas or water.] The operator may treat multiple strata as one stratum and plug as described in

this paragraph with a single column of cement or other materials as approved by the Department. When the production casing is not retrievable, the operator shall plug this portion of the well under § 78.91(d) (relating to general provisions).

(2) After plugging strata bearing or having borne oil, gas or water, the well shall be filled with nonporous material to approximately 100 feet below the surface casing seat and there shall be placed another plug of cement or other equally nonporous material approved by the Department extending at least 50 feet above that point.

(3) After setting the uppermost 50-foot plug, the retrievable surface casing shall be removed **by applying a pulling force at least equal to the casing weight plus 5000 pounds or 120% whichever is greater. If this fails, an attempt shall be made to separate the casing by cutting, ripping, shooting or other method approved by the Department, and making a second attempt to remove the casing by exerting a pulling force equal to the casing weight plus 5,000 pounds or 120 percent of the casing weight, whichever is greater.** [and the] The hole shall be filled from the top of the 50-foot plug to the surface with nonporous material other than gel. If the surface casing is not retrievable, the hole shall be filled from the top of the 50-foot plug to the surface with a noncementing material.

\* \* \* \* \*

§ 78.95. Wells in noncoal areas—surface casing is cemented.

(a) The owner or operator shall plug a well, where the surface casing is cemented and the production casing is not cemented or not present, as follows:

(1) The retrievable production casing shall be removed **by applying a pulling force at least equal to the casing weight plus 5000 pounds or 120% whichever is greater. If this fails, an attempt shall be made to separate the casing by cutting, ripping, shooting or other method approved by the Department, and making a second attempt to remove the casing by exerting a pulling force equal to the casing weight plus 5,000 pounds or 120 percent of the casing weight, whichever is greater.** [and] T[t]he well shall be filled with nonporous material from the total depth or attainable bottom of the well, to a point **50 feet below [20 feet above the top of]** the lowest stratum bearing or having borne oil, gas or water. At this point there shall be placed a plug of cement, which shall extend for at least 50 feet above **this stratum [that point]. Each overlying formation bearing or having borne oil, gas or water shall be plugged with cement a minimum of 50 feet below this formation to a point 50 feet above this formation. The zone between cement plugs shall be filled with nonporous material.** [Between this sealing plug and a point 20 feet above the next higher stratum bearing or having borne oil, gas or water, the hole shall be filled with nonporous material and at that point there shall be placed another 50-foot plug of cement] **The cement plugs shall be placed in a manner that will completely seal the hole.** [The hole shall be filled and plugged, with reference to each of the strata bearing or having borne oil, gas or water.] The operator may treat multiple strata as one stratum and plug as described in this subsection with a single column of cement or other materials as

approved by the Department. When the production casing is not retrievable, the operator shall plug this portion of the well under § 78.91(d) (relating to general provisions).

\* \* \* \* \*

§ 78.96. Marking the location of a plugged well.

(a) Upon the completion of plugging or replugging a well, the operator shall erect over the plugged well a permanent marker of concrete, metal, plastic or equally durable material [or metal and concrete]. The marker shall extend at least 4 feet above the ground surface and enough below the surface to make the marker permanent. Cement may be used to hold the marker in place provided the cement does not prevent inspection of the adequacy of the well plugging. The permit or registration number shall be stamped or cast or otherwise permanently affixed to the marker. In lieu of placing the marker above the ground surface, the marker may be buried below plow depth and shall contain enough metal to be detected at the surface by conventional metal detectors

\* \* \* \* \*

## SUBCHAPTER E. WELL REPORTING

- 78.121. [Annual] P[p]roduction reporting.
- 78.122. Well record and completion report.
- 78.123. Logs and additional data.
- 78.124. Certificate of plugging.
- 78.125. Disposal and enhanced recovery well reports.

§ 78.121. [Annual] P[p]roduction reporting.

(a) The well operator shall submit an annual production and status report for each well on an individual basis, on or before ~~[March 31]~~ February 15 of each year. The operator of a well which produces gas from the Marcellus shale formation shall submit a production and status report for each well on an individual basis, on or before February 15 and August 15 of each year. Production shall be reported for the preceding calendar year or in the case of a Marcellus shale well, for the preceding six months. When the production data is not available to the operator on a well basis, the operator shall report production on the most well-specific basis available. The annual production report shall include information on the amount and type of waste produced and the method of waste disposal or reuse. Waste information submitted to the

Department in accordance with this subsection shall satisfy the residual waste biennial reporting requirements of § 287.52 (relating to biennial report).

(b) The [~~annual~~] production report shall be submitted **ELECTRONICALLY TO THE DEPARTMENT THROUGH ITS WEBSITE.** [on forms prescribed by, and available from, the Department or in a similar manner approved by the Department.]

§ 78.122. Well record and completion report.

(a) For each well that is drilled or altered, the operator shall keep a detailed drillers log at the well site available for inspection until drilling is completed. Within 30 calendar days of cessation of drilling or altering a well, the well operator shall submit a well record to the Department on a form provided by the Department that includes the following information:

\* \* \* \* \*

(9) **A certification by the operator that the well has been constructed in accordance with this chapter and any permit conditions imposed by the Department.**

**[(10)] 11** Other information required by the Department.

(b) Within 30 calendar days after completion of the well, the well operator shall submit a completion report to the Department on a form provided by the Department that includes the following information:

(1) Name, address and telephone number of the permittee.

(2) Name, address and telephone number of the service companies.

(3) Permit number and farm name and number.

(4) Township and county.

(5) Perforation record.

(6) Stimulation record, **including pump rates, pressure, total volume and list of hydraulic fracturing chemicals used, the volume of water used and identification of water sources used pursuant to an approved water management plan.**

(7) Actual open flow production and **[rock] reservoir** pressure.

(8) Open flow production and **[rock] reservoir** pressure, measured 24 hours after **[treatment] completion**.

(c) No information described in subsection (b)(5)—(8) will be required as part of the report unless the operator has had the information compiled in the ordinary course of business. No interpretation of the data is to be filed.

\* \* \* \* \*



# pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

POLICY OFFICE

June 25, 2010

Mr. Kim Kaufman, Executive Director  
Independent Regulatory Review Commission  
14th Floor  
333 Market Street  
Harrisburg, PA 17120

Re: Proposed Rulemaking – Oil and Gas Well Casing and Cementing (#7-459)

Dear Mr. Kaufman:

Pursuant to Section 5(a) of the Regulatory Review Act, please find enclosed a copy of a proposed regulation for review and comment by the Independent Regulatory Review Commission. The proposal is scheduled for publication in the *Pennsylvania Bulletin* on July 10, 2010, with a 30-day public comment period and four public hearings. The Environmental Quality Board (EQB) adopted this proposal on May 17, 2010.

To protect water supplies and the public health and safety of the Commonwealth's citizens from improperly constructed or old, deteriorated wells, this proposed rulemaking updates existing requirements in 25 *Pa Code*, Chapter 78 regarding the drilling, casing, cementing, testing, monitoring and plugging of oil and gas wells. The proposed modifications include updated material specifications and performance testing and revised design, construction, operational, monitoring, plugging, water supply replacement, and gas migration reporting requirements. The additional requirements included in the proposed rulemaking will minimize gas migration and provide an increased degree of protection for both public and private water supplies.

The proposed rulemaking was presented to the Oil and Gas Technical Advisory Board (TAB) for its consideration on September 17, 2009. Because of the scope of the changes, TAB requested additional time to review and provide comment on the proposal. As part of its review, TAB formed a technical committee with representatives from various companies, trade groups and consultants. Since the initial meeting in September, the Department has met with TAB and its subcommittee on October 28, 2009, January 14, 2010, January 21, 2010 and March 25, 2010. At its March 25, 2010, meeting, TAB voted unanimously to recommend the EQB consider the proposed rulemaking.

In addition to TAB's input, the Department received input from industry representatives, consultants and environmental groups. On January 30, 2010, the Department published an Advanced Notice of Proposed Rulemaking (ANPR) for a 30-day comment period. The Department received comments from 87 individuals representing industry, consultants and



environmental groups. The current proposed rulemaking is based on the comments received during the ANPR public comment period and comments submitted by TAB members.

The Department will provide the Commission with the assistance required to facilitate a thorough review of this proposal. Section 5(d) of the Regulatory Review Act provides that the Commission may, within 30 days of the close of the comment period, convey its comments, recommendations and objections to the proposed regulation. The Department will consider any comments, recommendations or suggestions made by the Commission, as well as the Committees and public commentators, prior to final adoption of these rulemakings.

Please contact me at the number above if you have any questions or need additional information.

Sincerely,

A handwritten signature in cursive script that reads "Michele L. Tate".

Michele L. Tate  
Regulatory Coordinator

Enclosures

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes the need for transparency and accountability in financial reporting.

2. The second part of the document outlines the various methods and techniques used to collect and analyze data. It includes a detailed description of the experimental procedures and the statistical tools employed.

3. The third part of the document presents the results of the study, showing the relationship between the variables under investigation. It includes several tables and graphs to illustrate the findings.

4. The final part of the document discusses the implications of the study and offers suggestions for further research. It concludes by highlighting the significance of the work and its contribution to the field.



COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OFFICE OF POLICY

TRANSMITTAL SHEET FOR REGULATIONS SUBJECT TO  
THE REGULATORY REVIEW ACT

I.D. NUMBER: 7- 459

SUBJECT: Oil and Gas well casing and cementing

AGENCY: DEPARTMENT OF ENVIRONMENTAL PROTECTION

TYPE OF REGULATION

- Proposed Regulation
- Final Regulation
- Final Regulation with Notice of Proposed Rulemaking Omitted
- 120-day Emergency Certification of the Attorney General
- 120-day Emergency Certification of the Governor
- Delivery of Tolled Regulation
- a.  With Revisions                      b.  Without Revisions

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INDEPENDENT REGULATORY  
REVIEW COMMISSION

FILING OF REGULATION

DATE	SIGNATURE	DESIGNATION
6/25/10	Rhonda Campbell	Majority Chair, HOUSE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY Rep. Camille George
6/25/10	R. Watts	Minority Chair, HOUSE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY
6-25-10	D. Castello	Majority Chair, SENATE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY Senator Mary Jo White
6-25-10	A. Reparczyk	Minority Chair, SENATE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY
6/25/10	K. Cooper	INDEPENDENT REGULATORY REVIEW COMMISSION
		ATTORNEY GENERAL (for Final Omitted only)
6-25-10	Mayer Garcia	LEGISLATIVE REFERENCE BUREAU (for Proposed only)

