



**pennsylvania**  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Oil and Gas Management



# Oil & Gas Technical Advisory Committee Meeting

Discussion of concepts for a new rulemaking related to casing, cementing, and plugging of oil and gas wells  
(25 Pa. Code Chapter 78 Subchapter D)

**June 26, 2014**

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# Presentation Outline

## I. Introduction

## II. Title 25 Pa. Code Chapter 78

- Subchapter D (Subsurface Activities Section)
- Subchapter D (Plugging Section)
- Subchapter H (Underground Gas Storage)

## III. Title 25 Pa. Code Chapter 79

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# Introduction

## Purpose

- Update of oil and gas regulations mainly pertinent to subsurface operations
- Five general categories of proposed changes exist
  - Sections that were not modified substantively as part of the Feb. 5, 2011, rulemaking (e.g., well plugging)
  - Subjects that have not historically been addressed through rulemaking (e.g., coalbed methane wells)
  - Minor modification/clarification regarding sections that were changed substantively as part of the Feb. 5, 2011, rulemaking
  - Consistency between Chapters (e.g., discrepancies between Chapter 78 and Chapter 79)
  - New/substantively enhanced subjects associated with field data analysis and observation

# Subchapter D (Subsurface Activities Section)

## § 78.1. Definitions

- *Tophole materials*

Clearly define parameters related to what drilling additives, substances, and other materials may be used in conjunction with tophole operations.

- *Mine string*

Add definition for casing strings installed across mine voids or through coal pillars.

- *Oil well*

Add definition that distinguishes oil wells from combination wells at the permitting stage so provisions throughout the subchapter are applied appropriately.

- *Deepest fresh groundwater/fresh groundwater*

Refine definitions to allow for enhanced groundwater protection. This proposal is consistent with recommendations made by STRONGER.

# Subchapter D (Subsurface Activities Section)

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

- Propose Blow-out Preventer (BOP) “anchor-string” requirements.

Development of performance standards and specifications to ensure that casing string used to support BOP will provide an adequate foundation in the event of a well-control incident.

- Propose different requirements for production in depleted, i.e., low-pressure, fields.

This provision will consider less restrictive BOP requirements for infield drilling in low-pressure fields.

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# Subchapter D (Subsurface Activities Section)

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

- Propose annular space accessibility requirements for all new wells.

Intent of language is to require well surface configurations that permit at least a visual assessment of all well annular spaces.

- Propose that the production annulus pressures must be continuously (digitally) monitored during hydraulic fracturing and flowback and the monitoring results submitted to DEP electronically.

This provision is consistent with recommendations made by STRONGER and will allow for a well integrity assessment during hydraulic fracturing and flowback.

- Propose that surface pressures must be monitored continuously (digitally) during hydraulic fracturing and flowback of open-hole completions.

This provision will allow for a well integrity assessment during open-hole completions.

# Subchapter D (Subsurface Activities Section)

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

- Propose clarification that indicates that 80 percent x 0.433 psi/ft x casing seat depth criterion only applies to scenarios where gas is produced inside of a coal or surface string.

This provision is intended to prevent any confusion regarding the applicability the established standard, i.e., does not apply when gas is flowing through cement.

- Propose clarification that indicates that 80 percent x 0.433 psi/ft x casing seat depth criterion applies to a pressure estimate at the casing seat.

This provision is intended to prevent the practice of installing packers at the casing seat to lower surface measured gas pressures.

- Propose language requiring that pressure tests be conducted after all applicable well remediation measures.

This provision is intended to ensure the adequacy of well repairs.

# Subchapter D (Subsurface Activities Section)

## § 78.74. Venting of gas

- Propose development of numerical criteria to define “safe venting.”

This provision will help establish verifiable standards for ensuring safe venting practices.

## § 78.82. Use of conductor pipe

- Propose set-depth criteria for conductor pipe to prevent commingling of groundwaters of variable quality.

This provision will prevent the installation of conductor pipe to depths that penetrate multiple water-bearing zones.

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# Subchapter D (Subsurface Activities Section)

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

- Propose language requiring permanent cementing of coal casing/mine strings.

This provision will minimize the length of coal or mine casing potentially exposed to mine water.

- Propose language pertaining to cement baskets.

This provision will ensure that cement baskets are of sufficient strength to support hydrostatic pressure associated with cement slurry and also minimize the length of open annular space.

- Propose language adding further protections for surface or coal casing seats

This provision is intended to limit the potential for overpressuring of surface or coal casing seats for all new wells.

# Subchapter D (Subsurface Activities Section)

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

- Propose language related to the use of open-hole logging of tophole sections to determine the base of fresh groundwater.

This provision is intended to incorporate how open-hole logging may be applied to identify an appropriate surface casing set depth locally.

## § 78.83b. Casing and cementing – lost circulation

- Propose language to address what steps must be taken when “zone of critical cement” is not achieved.

This provision is intended to provide additional clarification regarding what options are available when the “zone of critical cement” is not met for surface or coal casing strings.

- Propose language to ensure adequate surface seal when circulation is not achieved or significant fallback is observed.

This provision is intended to prevent surface infiltration to groundwater.

# Subchapter D (Subsurface Activities Section)

## § 78.83c. Intermediate and production casing

- Propose language to address cementing of production strings for open-hole completions.

This provision will indicate the required length of cemented production casing for open-hole completions.

## § 78.84. Casing standards

- Propose language related to pressure-test thresholds for used, welded, and high-pressure BOP-support casing.

This provision will help clarify what the appropriate pressure benchmarks are when completing pressure testing.

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# Subchapter D (Subsurface Activities Section)

## § 78.85. Cement standards

- Propose revisions to compressive strength benchmarks.

This provision will consider industry standard guidance for drill-out and apply to all casing strings. Guidance is intended to limit mechanical failure and gas infiltration.

- Correct reference in Subsection (d).

This subsection should reference Subsection (c).

- Propose to broaden applicability of certain cement standards to additional casing strings.

This provision is intended to broaden the scope of key cement-standard requirements.

# Subchapter D (Subsurface Activities Section)

## § 78.85. Cement standards

- Propose to refine reference to “gas block” additives.

Existing provision will be modified to indicate performance-based requirements.

- Propose language related to the usage of mechanical barrier elements on surface and coal casing strings.

This provision will address the usage of external casing packers on surface and coal casing strings.

- Propose language to update different means available for casing support/immobilization during primary cementing and weight-on-cement (WOC) time.

Existing language will be enhanced in consideration of more recent developments for stabilizing casing during cementing and cement hydration.

# Subchapter D (Subsurface Activities Section)

## § 78.85. Cement standards

- Propose language authorizing department to require a cement bond log or equivalent.

This provision will give the department the authority to require that a cement bond log or other suitable cement evaluation log be run prior to the next stage of well construction/completion.

## § 78.88. Mechanical integrity of operating wells

- Propose language clarifying alternatives to measuring water-level.

This provision is intended to allow more flexibility in situations where measuring fluid level in a well is an indicator of casing integrity. This flexibility is currently granted by policy.

- Propose language requiring pressure or flow measurement/estimates for outer casing strings.

This provision will allow operators to measure pressure for outer casing strings if those casing strings are under the wellhead and shut-in.

# Subchapter D (Subsurface Activities Section)

## § 78.89. Gas migration response

- Propose revised language that will require closure reports for all gas migration investigations.

This provision will clarify that closure reports documenting the findings of all stray gas investigations are required.

## § 78.101 - § 78.105. Inactive status

- Propose updates to section for consistency with other mechanical integrity assessment requirements of the Subchapter and reflective of modern well construction and operational practices.

This is a broad provision intended to update the inactive status section substantively. Mechanical integrity assessments in accordance with § 78.88 are already permitted by policy.

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# Subchapter D (Subsurface Activities Section)

## § 78.122. Well record and completion report

- Propose revised language that will require well records to be updated when casing is removed from a well.

This provision will allow the department to maintain accurate well records for all operating wells in the commonwealth and allow assets to be assessed accurately prior to well transfers.

- Propose language requiring that final wellhead schematics be submitted along with the completion report.

This provision will require that operators submit wellhead schematics for completed wells.

- Propose language clarifying appropriate reference for all gas, oil, and water shows; and geologic contacts. Language will also require that geologic formation names be reported when known.

This provision will require that all reported gas, oil and water shows; and formation contacts reference the true vertical depth (TVD) or vertical depth with respect to the surface-hole location at which they are identified. The provision will also require that formation names be provided for all known geologic contacts.

# Subchapter D (Subsurface Activities Section)

## § 78.123. Logs and additional data

- Propose language requiring that microseismic data be submitted.

This provision will require that all collected microseismic data be submitted electronically. Locational and moment magnitude data will both be addressed.

- Propose language requiring that all formation integrity test (FIT) data be submitted.

This provision will require that operators submit all FIT data electronically.

## Various – Coalbed methane wells

- Propose language related to the construction, stimulation and operation of coalbed methane wells.

These updates involve the development of regulations pertaining to coalbed methane wells.

# Subchapter D (Subsurface Activities Section)

## **Various – Policy clarifications**

- Propose language to clarify intent of regulations as needed.

This provision will provide clarifications where intent of existing regulations is not well defined.

## **TBD – Simultaneous operations**

- Propose language to address simultaneous operations.

This provision will establish appropriate notifications and other provisions during simultaneous operations, i.e., when activities at one well location on a pad coincide with the operation of wells on that same pad.

## **TBD – Intermediate casing strings**

- Propose language to specify when intermediate casing strings are required.

This provision will address certain situations when intermediate casing strings are required to construct the well.

# Subchapter D (Subsurface Activities Section)

## **TBD – Deviation survey accuracy**

- Propose language specifying accuracy statements for all deviation surveys.

This provision will allow for deviated wellbore locational uncertainty to be assessed.

## **TBD – Broaden welding certification**

- Propose language to expand welder's certification applicability.

This provision will broaden the applicability of the welder's certification to all components of a well intended to contain pressure or fluids and to those that may otherwise affect well integrity.

## **TBD – Addressing cement fallback**

- Propose language to identify appropriate course of action when cement fallback is noted.

This provision will ensure that groundwater resources are protected from surface infiltration and that casing protection via a sufficient cement sheath is established in the event of cement fallback.

# Subchapter D (Subsurface Activities Section)

## **TBD – Permitting wells in coal areas**

- Propose language to resolve current inconsistencies related to permitting wells in coal areas.

This provision will clarify terms and practices for wells in coal areas to provide consistency and adequate environmental protection.

## **TBD – Microseismic wells, seismic wells and shotholes**

- Propose language addressing the proper construction and abandonment of microseismic monitoring wells, seismic monitoring wells, and shotholes for seismic surveys.

This provision will provide construction requirements for microseismic monitoring wells, which may be shallower than the surface casing seat or designed to intercept the target formation; in addition to wellbores for geophone placement and shotholes, which are designed to monitor for returns and house charges used, respectively; when completing seismic surveys. Some of these matters are currently addressed by policy.

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# Subchapter D (Subsurface Activities Section)

## **TBD – Well adoption**

- Propose language that will allow abandoned wells to be “adopted.”

This provision will provide a mechanism for operators to acquire assets that have been abandoned.

## **TBD – Induced seismicity**

- Propose language that will establish requirements in “seismic hazard areas.”

This provision will address risks associated with well stimulation in areas that may be susceptible to enhanced “induced seismicity” related to well stimulation.

## **TBD – Line and tank integrity**

- Propose language that will establish integrity testing requirements for subsurface lines and tanks containing hydrocarbons or other produced fluids.

This provision will outline recurring integrity testing requirements for any equipment designed to provide subsurface containment in order to prevent releases.

# Subchapter D (Plugging Section)

## § 78.1. Definitions

- *Drilling mud*

Develop definition pertinent to use as spacer between plugs.

- *Nonporous material* update

Expand definition to include drilling mud.

- *Noncementing material* update

Clarify definition as needed

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# Subchapter D (Plugging Section)

## § 78.91. General provisions

- Propose language that will specify additional measures needed to ensure no gases are present prior to installing cement plugs.

This provision will outline additional steps to prevent gas channeling during cementing.

- Propose language that will establish standards/department approval for mechanical plugs.

This provision will reference standards for mechanical plugs or require DEP approval prior to use of operator-fabricated mechanical plugs to ensure permanent closure.

- Propose language authorizing DEP to require tagging of cement plugs.

This provision will ensure proper placement of cement plugs in order to isolate wellbore fluids to the respective intervals at which they occur and prevent gas, oil and brackish water/brine from entering the fresh groundwater interval.

# Subchapter D (Plugging Section)

## § 78.91. General provisions

- Propose language authorizing the department to require pressure testing of cement plugs and respotting.

This provision will ensure sufficient integrity of placed cement plugs and provide a mechanism for addressing plugs that fail to meet requirements.

- Propose language to ensure that plugging solid option is applied consistently and does not contradict other sections of the regulations.

This provision will specify when plugging solid is appropriate in order to ensure permanent closure.

## Subchapter D (Plugging Section)

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

- Propose language to further address placement of permanent markers.

This provision will introduce language modifications to minimize the potential for marker disturbance.

### § 78.97. Plugging a well stimulated with explosives

- Propose language to ensure adequacy of plugging above voids.

This provision will ensure that cement slurry is set across the appropriate depth interval and not lost to subsurface voids in wells stimulated with explosives by requiring installation of a mechanical plug prior to slurry placement.

# Subchapter D (Plugging Section)

## § 78.98. Restricting surface water from the well bore

- Propose language to prevent surface water infiltration while allowing for gas to vent should a plug fail.

This provision will allow gas to vent while preventing surface water infiltration that could affect local groundwater supplies.

## Various – Substantive section reorganization

- Propose language in multiple sections and overall reorganization to streamline regulations, lessen ambiguity, and limit or remove redundancy.

This provision will simplify the plugging section language, which is currently characterized by significant redundancy and overlap. The reorganization will make interpretation simpler and eliminate the improper application of various regulatory provisions.

# Subchapter D (Plugging Section)

## Various – Coal area vents

- Propose language to comprehensively address venting in coal areas.

This provision will address the installation of proper vents in coal areas in consideration of modern well designs. Proper venting is intended to encapsulate gas at the source in order to prevent subsurface hazards proximal to underground mining operations.

## Subchapter D (Plugging Section)

### **Various – Retrievable production casing; non-retrievable production casing; and surface, coal protective, and production casing cemented to surface**

- Refine language addressing retrievable production casing; non-retrievable production casing; and surface casing, coal protective casing, and production casing cemented to surface.

This provision enhances language intended to address known variability associated with different casing strings in different settings, i.e., coal areas and noncoal areas. Most changes are not substantive, although specific language pertaining to the installation of functioning vents, where needed, is being proposed. In addition, for certain situations, the department will be granted the authority to determine if a second attempt is necessary to remove uncemented lengths of casing. Activities aimed at removing uncemented casing in ecologically/environmentally sensitive areas will also be addressed. Finally, language modifications to ensure that fluid-bearing zones are properly isolated during plugging will be suggested.

# Subchapter D (Plugging Section)

## **Various – Cement plug consistency**

- Propose language to make cement plug lengths consistent where technically warranted. Plugging length specifications will also be addressed in other scenarios.

This provision will standardize cement plug lengths to avoid confusion and also account for situations where a standard-length bottom plug can't be placed. Plugging across multiple horizons will also be addressed.

## **Various – Reaching attainable bottom**

- Propose language to address wellbore clean-out prior to plugging in situations where total depth is not reached.

This provision will introduce acceptable measures for verifying that attainable bottom has been reached to ensure that well-plug placement prevents any vertical migration of gas or other fluids within the wellbore.

# Subchapter D (Plugging Section)

## **TBD – Unconventional well production-hole section**

- Propose language to address plugging of unconventional wells.

This provision introduces language intended to address plugging of the production-hole section in horizontal/intentionally deviated wells in different settings, i.e., coal areas and noncoal areas.

## **TBD – Intermediate casing**

- Propose language to address plugging of the intermediate-hole section.

This provision introduces language intended to address plugging of the intermediate casing string section in wells in different settings, i.e., coal areas and noncoal areas.

# Subchapter D (Plugging Section)

## TBD – Coalbed methane wells

- Propose language to address plugging of coalbed methane wells.

This provision introduces language intended to address plugging of horizontal/intentionally deviated and vertical coalbed methane wells.

## TBD – Microseismic wells, seismic wells and shotholes

- Propose language addressing the proper plugging of microseismic monitoring wells, seismic monitoring wells, and shotholes for seismic surveys.

This provision will provide requirements for the proper plugging and abandonment of microseismic monitoring wells, which may be shallower than the surface casing seat or designed to intercept the target formation. In addition, the plugging of wellbores for geophone placement in association with seismic surveys and shotholes, which are designed to house charges used when completing seismic surveys will also be addressed. Some of these matters are currently addressed by policy.

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# Subchapter D (Plugging Section)

## **TBD – Conductor pipe**

- Propose language to address plugging of conductor pipe holes.

This provision introduces language intended to address plugging of conductor holes when no other section of the well has yet been drilled in order to eliminate a potential conduit for surface fluid infiltration.

## **TBD – Cement standards**

- Propose language that will establish minimum standards for cement used in plugging operations.

This provision will reference standard benchmarks for ensuring cement quality.

## Subchapter D (Plugging Section)

### TBD – Plugging certificate

- Propose language that will cross-reference when plugging certificate is due as described in §78.124.

This provision will clarify when the operator must submit the plugging certificate to the department.

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# Subchapter H (Underground Gas Storage)

## § 78.402. Inspections by the gas storage operator

- Propose updates to section for consistency with other mechanical integrity assessment requirements of Subchapter D.

This provision is intended to allow for the recording of mechanical integrity assessment data on the same form available for operating wells regulated under §78.88.

## Various – Language modifications

- Propose several minor language modifications/updates for the Subchapter.

These updates will be consistent with appropriate industry standard practices associated with well construction, operation, integrity assessment and repair.

# Title 25 Pa. Code Chapter 79

## TBD – Tagging Onondaga

- Propose updates to address different scenarios where wells targeting a producing formation shallower than the Onondaga penetrate the Onondaga.

This provision is intended to address the requirements in scenarios where the Onondaga is penetrated due to a geologic condition, drilling error or for some other reason. The provision will preserve the original intent of the Conservation Law in consideration of recognized, more recent drilling incidents/practices.

## Various – Consistency between Chapters 78 and 79

- Propose language to resolve all discrepancies between Chapters 78 and 79.

This provision will ensure consistency between the conservation regulations and regulations pertaining to all other oil and gas wells. Currently, the more protective regulation applies per policy.



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# Questions?

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