

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.

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

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~~*Area of Alternate Methods*—An area where an alternate methods or materials may be required to safely drill, case, cement, operate or plug a well. Alternate practice areas may include step-out or wildcat areas or areas where known geologic features have been identified that may affect the conventional development of a well.~~

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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 casing seat shall be equal to the depth of casing which is normal for PROPERLY CONSTRUCTED wells in the area.

CEMENT TICKET – DEFINITION TO BE DEVELOPED

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Intermediate casing – ~~Casing~~ A STRING OF CASING OTHER THAN PRODUCTION CASING THAT IS used in the well bore to isolate, stabilize or provide well control to a greater depth than that provided by the fresh-water SURFACE CASING or coal protection casing.

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~~**Mechanical Integrity Test—Specific testing or series of measurements capable of demonstrating the integrity of the well to maintain fluids without escaping the well bore to freshwater zones, coal formations, or the atmosphere.**~~

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Retrievable—When used in conjunction with **UNCEMENTED** 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. **If this fails, an attempt shall be made to separate the casing by cutting, ripping 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.**

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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 well bore 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.**

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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.

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(e) Adequacy of restored or replaced water supply. A restored or replaced water supply shall include any well, spring, municipal water supply 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, shall:

- (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:

- (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.

(f) [(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) 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).

(i) 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.

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(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.**

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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 prevent blowouts, explosions, fires and casing failures during installation, completion and operation.

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

(a) The operator shall use blow-out prevention equipment **IN THE FOLLOWING CIRCUMSTANCES:**

- 1) WHEN DRILLING A WELL THAT IS INTENDED TO PRODUCE NATURAL GAS FROM A SHALE FORMATION.**
- 2) When well head pressures or natural open flows are anticipated at the well site that may result in a blow-out.
- 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.**

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

(c) The controls for the blow-out preventer shall be accessible to ~~safely~~ allow actuation of the equipment in the event of an emergency. ~~This may be achieved by locating an alternate set of controls a safe distance from the well site~~ **CONTROLS FOR A BLOW-OUT PREVENTER WITH A PRESSURE RATING OF GREATER THAN 3,000 PSI SHOULD BE LOCATED A SAFE DISTANCE FROM THE DRILL RIG.**

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

[(d)] **(e)** * * * * *

(f) All lines, valves and fittings between the closing unit and the blow-out preventer stack shall be ~~made of steel with~~ **FLAME RESISTANT AND HAVE** a rated working pressure ~~at least equal to the working pressure rating of the stack~~ **SUFFICIENT TO SAFELY OPERATE THE BLOW-OUT PREVENTER.**

[(e)] **(g)** * * * * *

[(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~~ **WELL SITE AN** [a certified] 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.)] an 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 USE BEST ENGINEERING PRACTICES TO ENSURE THAT THE INTEGRITY OF THE WELL IS MAINTAINED AND THE HEALTH, SAFETY, ENVIRONMENT AND PROPERTY OF THE CITIZENS OF THE COMMONWEALTH 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 OTHER FLUIDS FROM LOWER FORMATIONS 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 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 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) 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.**

~~(d) If an intermediate casing is used in conjunction with the surface casing to isolate the fresh groundwater, the pressure in the annulus of the intermediate casing may not exceed the maximum pressure determined in paragraph (b)~~

~~(d) Surface casing or any casing function as a water protection casing shall not be utilized as production casing for the extraction of oil and gas.~~

(e) Excess gas encountered during drilling 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) The surface, coal and intermediate casing must be pressure tested. They may be tested separately or in combination.~~ CASING ATTACHED TO A BLOW-OUT PREVENTER WITH A PRESSURE RATING OF GREATER THAN 3,000 PSI AND THE PRODUCTION CASING OF A WELL THAT IS INTENDED TO PRODUCE GAS FROM A SHALE FORMATION SHALL BE PRESSURE TESTED. A passing pressure test shall be holding 120 percent of the HIGHEST expected ~~highest~~ working pressure of the CASING STRING BEING TESTED well for 30 minutes with not more than a ~~5~~ 10 percent change. Certification of the pressure test shall be confirmed by entry and signature of the person performing the test on the DRILLER'S LOG ~~well-record~~.

~~(h) The casing annulus shall be open to atmosphere to vent any gas pressure unless closed for well testing or maintenance.~~

(g) The well shall be equipped with a check valve to prevent backflow from the pipeline.

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§ 78.75a. AREA OF ALTERNATIVE METHODS

(A) THE DEPARTMENT MAY DESIGNATE AN AREA OF ALTERNATIVE METHODS IF THE DEPARTMENT DETERMINES THAT WELL DRILLING REQUIRMENTS BEYOND THOSE PROVIDED IN THIS CHAPTER ARE NECESSARY TO DRILL, OPERATE OR PLUG A WELL IN A SAFE AND ENVORNMENTALLY 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 DESIGANATION 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) SHALL 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 Department** and shall submit proof of notification to the Department with the well permit application.

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CASING AND CEMENTING

§ 78.81. General provisions.

(a) The operator shall conduct casing and cementing activities under this section and § § 78.82—78.87 or an approved alternate method under § 78.75 (relating to alternative methods). The operator shall case and cement a well to accomplish the following:

- (1) Allow effective control of the well at all times.
- (2) Prevent the migration of gas or other fluids into sources of fresh groundwater.
- (3) Prevent pollution or diminution of fresh groundwater.
- (4) Prevent the migration of gas or other fluids into coal seams.

(b) The operator shall drill through fresh groundwater zones with diligence and as efficiently as practical to minimize drilling disturbance and commingling of groundwater.

(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 AND INTERMEDIATE CASING WHEN THE INTERMEDIATE CASING IS USED IN CONJUNCTION WITH THE SURFACE CASING TO ISOLATE FRESH GROUNDWATER**, but do not apply to production casing.

§ 78.82 Use of conductor pipe.

If the operator installs conductor pipe in the well, the **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 shall be made of steel.**

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

(a) FOR WELLS DRILLED, ALTERED, RECONDITIONED OR RECOMPLETED AFTER [DATE], SURFACE CASING OR ANY CASING FUNCTIONING AS A WATER PROTECTION CASING SHALL NOT BE UTILIZED AS PRODUCTION CASING EXCEPT IF 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 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 ~~1.5 inches~~ **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 ~~1.5 inches~~ **1 INCH** greater than the outside diameter of the casing tube.

[(b)] (c) Except as provided in subsection **[(c)] (d)**, 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 COMPETENT BEDROCK. THE OPERATOR SHALL INSTALL AT LEAST ONE CENTRALIZER 50 FEET ABOVE THE CASING SEAT AND THEN INSTALL A CENTRALIZER IN INTERVALS NO GREATER THAN EVERY 150 FEET ABOVE THE FIRST CENTRALIZER.**

[(c)] (d) 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.

[(d)] (e) The operator shall permanently cement the surface casing by placing the cement in the casing and displacing it into the annular space between the wall of the hole and the outside of the casing.

[(e)] (f) Where potential oil or gas zones are anticipated to be found at depths within 50 feet below the deepest fresh groundwater, the operator shall set and permanently cement

surface casing prior to drilling into a stratum known to contain, or likely containing, oil or gas.

[(f)] (g) 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 casing.

[(g)] (h) 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)] (i) UNLESS AN ALTERNATIVE METHOD HAS BEEN APPROVED BY THE DEPARTMENT IN ACCORDANCE WITH § 78.75 (RELATING TO ALTERNATIVE MEHTODS), [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.

[(i)] (j) If the operator sets and cements casing under subsection (g) or (h) and subsequently encounters additional fresh groundwater zones below the deepest cemented casing string installed, the operator shall protect the fresh groundwater by installing and cementing another string of casing or other method approved by the Department. Sufficient cement shall be used to cement the casing at least 20 feet into the surface or coal protective casing. The additional casing string may also penetrate zones bearing brackish or salt water, but shall be run and cemented prior to penetrating a zone known to or likely to contain oil or gas.

~~[(j)]~~ **(k)** 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 ~~[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.

§ 78.83b Casing and Cementing Plan

(a) The operator shall prepare and maintain a casing and cementing plan showing how the well be drilled and completed. The plan shall demonstrated 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, depth, **specifications**, diameter, wall thickness and **mill-test BURST pressure RATING**. ~~If used casing, the pressure test report.~~**
- (4) Cement type, additives and **ESTIMATED** amount.,~~including calculations.~~**
- (5) **ESTIMATED** location of centralizers.**
- (6) Alternate methods or materials as required by the Department **AS A CONDITION OF THE WELL PERMIT**.**

(b) The plan shall be available at the well site for inspection 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. ~~The request may involve areas of alternative methods, areas where unknown or elevated pressures are anticipated, public water supply well protection areas, and areas of problematic or complex geology.~~

(d) Any revisions to the plan made as a result of on-site modification must be ~~incorporated into the plan and made available onsite~~ **DOCUMENTED BY THE OPERATOR AND BE AVAILABLE for review by the Department.**

§ 78.83c Casing and cementing – lost circulation

If cement used to permanently cement the surface or coal protective casing cannot be circulated to the surface due to lost circulation, the operator shall determine the amount of casing that was cemented by logging or other suitable method **AND DO ONE OF THE FOLLOWING:**

(1) CEMENT AN ADDITIONAL 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.

(2) IF THE ADDITIONAL STRING OF CASING IS THE PRODUCTION CASING, THE OPERATOR SHALL SET THE PRODUCTION CASING ON A PACKER AND VENT THE ANNULUS OF THE PRODUCTION CASING TO THE ATMOSPHERE AT ALL TIMES UNLESS CLOSED FOR WELL TESTING OR MAINTENANCE.

~~(b) If inadequate cement exists to contain all the anticipated and actual pressure in the well and prevent the migration of gas, oil or other fluids into fresh groundwater, the operator shall prepare and submit a request to the Department to employ an alternate method to ensure adequate cement will be placed in the annular space. Upon approval of the alternate method by the Department, the operator shall implement such measures to ensure proper placement of the cement for each string of casing in the approved plan.~~

§ 78.83d. Intermediate and production casing.

(A) EXCEPT AS PROVIDED IN § 78.72 (I), INTERMEDIATE AND PRODUCTION CASING SHALL BE CEMENTED ACCORDING TO THIS SECTION.

(b) If the well is to be equipped with an intermediate casing, the casing shall be cemented from the casing seat to a point at least 600 feet above the seat. If any producing horizon is open to the well bore above the casing seat, the casing shall be cemented from the casing seat up to a point at least 600 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.

(b) EXCEPT AS PROVIDED FOR IN § 78.83 (RELATING TO SURFACE AND COAL PROTECTIVE CASING AND CEMENTING PROCEDURES), each well shall 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 shall be placed by the DISPLACEMENT ~~pump and plug~~ method with sufficient cement to fill the annular space to the surface or to a point at least 600 feet above the production casing seat OR 600 FEET ABOVE THE ABOVE THE PRODUCING FORMATION, WHICHEVER IS GREATER. ~~If any producing horizon is open to the well bore above the casing shoe, the casing shall be cemented in a manner that effectively seals off the productive horizons.~~

§ 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 shall be a string of new pipe with a ~~mill test of at least 1,100 pounds per square inch.~~ **PRESSURE RATING THAT IS AT LEAST 20 PERCENT GREATER THAN THE ANTICIPATED MAXIMUM PRESSURE.** Used casing may be approved for use but must be pressure tested after cementing and before continuation of drilling. **A PASSING PRESSURE TEST IS HOLDING THE ANTICIPATED MAXIMUM PRESSURE FOR 30 MINUTES WITH NOT MORE THAN A 10 PERCENT CHANGE IN PRESSURE**

(C) New or used plain end **CASING pipe** THAT is welded together for use **SHALL MEET THE FOLLOWING REQUIREMENTS:**

- (1) ~~It must be pressure tested. The minimum pressure for testing used casing or casing joined together by welding, shall be at least equal to the~~ **IT MUST PASS A PRESSURE TEST BY HOLDING THE anticipated maximum pressure FOR 30 MINUTES WITH NOT MORE THAN A 10 PERCENT CHANGE 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. A PERSON WITH 10 OR MORE YEARS OF EXPERIENCE WELDING CASING AS OF [DATE] DOES NOT NEED 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)] (d) When casing through a workable coal seam, the operator shall install coal protective casing that has a minimum wall thickness of 0.23 inches.

~~(d) Plain end casing shall be welded by a person trained and certified in the applicable American Petroleum Institute's standard for welding casing and pipe.~~

§ 78.85. Cement standards.

(a) The operator shall use cement that [will resist degradation by chemical and physical conditions in the well.] meets **OR EXCEEDS** the ~~American Petroleum Institute's Specification 10A for its intended use and placement in the well bore~~ **ASTM INTERNATIONAL C 150, TYPE I, II OR III STANDARD. THE CEMENT SHALL 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, AND**
- (5) RESIST DEGRADATION BY THE CHEMICAL AND PHYSICAL CONDITIONS IN THE WELL.**

~~Upon approval of the Department, the operator may use ordinary Portland cement or other types of cement if the operator demonstrates that the material will ensure the integrity of the well.~~

(b) The operator shall permit the cement to set to a minimum compressive strength of **350 500** pounds per square inch (psi) [in accordance with the American Petroleum Institute's API Specification 10]. **After the cement is placed and the cementing equipment is disconnected, [T]the operator shall permit the cement to set for a minimum period of 8 hours before disturbing the casing in any way, INCLUDING BUT NOT LIMITED TO RELEASING PRESSURE ON THE CEMENT HEAD, SLACKING OFF BY THE RIG SUPPORTING THE CASING IN THE CEMENT SHEATH, NIPPLING UP OR RUNNING DRILL PIPE INTO THE WELL BORE, prior to the resumption of actual drilling.**

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

(e) A copy of the ~~cement test results and~~ cement ticket shall be available at the well site for inspection by the Department **DURING DRILLING OPERATIONS. THE CEMENT TICKET SHALL BE MAINTAINED BY THE OPERATOR AFTER DRILLING OPERATIONS FOR AT LEAST 5 YEARS AND BE MADE AVAILABEL TO THE DEPARTMENT UPON REQUEST.**

~~(f) Cement used for cementing the surface casing shall contain no more than 3 percent calcium chloride.~~

~~(g) The type and amount of additives and cement, cement set time and placement in the well bore shall be recorded on the well record or plugging certificate.~~

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OPERATING WELLS

78.88 Mechanical Integrity of Operating Wells

(a) The operator shall ~~conduct routine inspections of~~ **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 5 YEARS** and shall be available for review by the Department and the coal owner or operator.

(b) At a minimum, inspections shall 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 if 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 wells in compliance with §78.73(c), the operator shall follow the reporting schedule outlined in subsection (e).

(d) For wells not in compliance with §78.73(c), the operator shall **IMMEDIATELY NOTIFY THE DEPARTMENT AND** take corrective actions to 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 ~~surface casing seat or coal protective casing seat by venting the annular space of the casing~~ **TO ACHIEVE COMPLIANCE WITH § 78.73 (C)**.
- (2) The operator shall retrofit the well by installing production casing to reduce the pressure on the ~~surface casing seat or coal protective 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 ~~provide~~ **NOTIFY** the Department ~~with~~ 7 days ~~notice~~ 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 with the mechanical integrity requirement of each well. 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 Stray Gas Mitigation Response

- (a) The oil or gas well operator or owner shall take necessary measures to prevent the oil, gas or other fluids from directly or indirectly escaping from the well into water of the commonwealth or resulting in a threat to the public health and safety.
- (b) When an operator or owner becomes aware of a stray natural gas incident, ~~or receives notice of such incident from the Department, local emergency response agency, water purveyor or surface landowner,~~ the operator shall immediately notify the Department and 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.**
- ~~(c) When an operator becomes aware of a stray natural gas incident or upon receipt of notice from a landowner or water purveyor, local emergency response agency or Department, the operator shall immediately conduct an investigation of the incident and notify the Department. 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.~~

(c) The investigation **UNDERTAKEN PURSUANT TO SUBSECTION B** 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 levels of natural gas and aerial extent of the stray natural gas.
- (3) Establish monitoring locations.

(d) 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 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 1,500 feet and expanded to a greater distance if necessary.

(3) INITIATE MITIGATION CONTROLS, WHICH MAY INCLUDE ACCESS CONTROL, ADVISORIES, EVACUATION, SIGNS AND OTHER ACTIONS.

~~(f) If the stray natural gas is present, the operator shall take the necessary measures to ensure public health and safety. The mitigation controls may include, access control, advisories, evacuation, signs and other necessary controls.~~

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

(f) The operator and owner shall file a report with the Department by phone within 12 hours ~~receipt~~ after the interview with the complainant and field survey of the natural gas levels. ~~If the natural gas level is greater than 10 percent of LEL, the notice shall occur immediately.~~ A follow-up report shall be filed in writing with the Department within three days of the complaint. This follow-up report shall 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 and 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).

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§ 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 and 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 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).

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§ 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. 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 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).

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§ 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 and 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 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).

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§ 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 shall not be used to hold the marker in place.** 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

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§ 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:

- (1) Name, address and telephone number of the permittee.
- (2) Permit number, and farm name and number.
- (3) Township and county.
- (4) Date drilling started and completed.
- (5) Method of drilling.
- (6) Size and depth of conductor pipe, surface casing, coal protective casing, production casing and borehole.
- (7) Type and amount of cement and results of cementing procedures.
- (8) Elevation and total depth.
- (9) Drillers log that includes the name and depth of formations from the surface to total depth, depth of oil and gas producing zone, depth of fresh water and brines and source of information.

(10) 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, AND VOLUME OF FLUID USED.**
 - (7) Actual open flow production and rock pressure.
 - (8) Open flow production and rock pressure, measured 24 hours after treatment.
- (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.