

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 Drilling Practices* – An area where components of the production from a well geology, formation, seismic or other mechanical failures have been identified by the department which require additional procedures or equipment for an operator to safely drill or operate well.**

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

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***Intermediate casing* – Casing used in the well bore to isolate, stabilize or provide well control beyond that provided by the fresh water or coal protection casing.**

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***Mechanical Integrity Test (MIT)* - 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 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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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 permanently restored or replaced water supply.* A permanently 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 an increased cost to operate and maintain. if the operating and maintenance costs of the restored or replaced water supply are increased, the

operator shall provide for the permanent payment of the increased operating and maintenance costs of the restored or replaced water supply.

(2) *Quality.* A restored or replaced water supply will be deemed adequate if it meets the Pennsylvania safe drinking water act (35 p. s. § § 750.1—750.20), 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.* A replacement of a water supply shall include the installation of any piping, pumping equipment and treatment equipment necessary to put the replaced water source into service.

(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 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.

(b) The operator shall determine the amount and type of casing to be run and the amount and type of cement to be used in accordance with current prudent industry practices and engineering. In making the determinations, the operator shall consider the following:

- (1) Successful local practices for similar wells.
- (2) Maximum anticipated surface pressure.
- (3) Collapse resistance.
- (4) Tensile strength.

- (5) Chemical environment.
- (6) Potential mechanical damage.
- (7) Manufacturing standards and American Petroleum Institute specifications 5 CT/ISO 11960 or equivalent specifications for used pipe that may be used in wells.**

§ 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.
- (b) Blow-out prevention equipment used shall be in good working condition at all times.
- (c) An alternate set of blow-out prevention controls must be located a safe distance away from the drilling rig to allow actuation of the blow-out preventer in an emergency.**

[(c)] **(d)** The operator shall use pipe fittings, valves and unions placed on or connected to the blow-out prevention systems that have a working pressure capability that exceeds the anticipated pressures.

[(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.

(f) All lines, valves and fittings between the closing unit and the blow-out preventer stack shall be made of steel with a rated working pressure at least equal to the working pressure rating of the stack.

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

[(f)] **(h)** During drilling when conditions are such that the use of a blowout preventer can be anticipated, that there shall be present on the rig floor **[a certified] 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.) approved well control course or equivalent study shall be deemed adequate certification for purposes of this subsection.]**

[(g)] **(i)** The minimum amount of cemented casing to which blow-out prevention equipment may be attached, shall be in accordance with the following:

<i>Proposed Total Depth (in feet)</i>	<i>Minimum Cemented Casing Required (in feet of casing cemented)</i>
Up to 5,000	400
5,001 to 5,500	500
5,501 to 6,000	600
6,001 to 6,500	700
6,501 to 7,000	800
7,001 to 8,000	1,000
8,001 to 9,000	1,200
9,001 to 10,000	1,400
Deeper than 10,000	1,800

[(h)] **(j)** Upon completion of the drilling operations at a well, the operator shall install and utilize equipment, such as a shut-off valve of sufficient rating to contain anticipated pressure, lubricator or similar device, as may be necessary to enable the well to be effectively shut-in while logging and servicing the well and after completion of the well.

§ 78.73. General provision for well construction and operation.

(a) The operator shall prevent gas and other fluids from lower formations from entering fresh groundwater.

(b) 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 any intermediate casing seat** from exceeding 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 or any intermediate casing seat** may not exceed the hydrostatic pressure calculated as follows: Maximum pressure = (0.433 psi) multiplied by (casing length in feet).

(c) 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, [or] coal protective casing **or any intermediate casing seat** as calculated in subsection (b), 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) Surface casing or any casing function as a water protection casing shall not be utilized as production casing for the extraction of any produced oil and gas.

(e) Natural gas encountered during drilling shall be safely flared away from the drilling rig or captured.

(f) The surface, coal and intermediate casing must be pressure tested. They may be tested separately or in combination. A passing pressure test shall be holding 120 percent of the expected highest working pressure of the well for 30 minutes with not more than a 5 percent change. Certification of the pressure test shall be conformed by entry and signature of the person performing the test on the well record.

(g) The annular space between casing(s) of the well shall be open to atmosphere unless closed for well testing, maintenance, or is produced at less than half the pressure the casing seat is capable of containing.

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 groundwaters.

(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.

(a) If the operator installs conductor pipe in the well, the operator may not remove the pipe.

(b) Conductor pipe must be installed in a manner that prevents surficial sediments from entering the wellbore. Sealing or cementing, or both, on the outside of the conductor casing shall be performed as necessary.

(c) Conductor pipe must be made of non-flammable materials.

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

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(h) 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.

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(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 **[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 §78.81 (relating to general provisions) , §78.73 (relating to general provisions for well construction and operation) and include the following information

- (1) Any producing formation, expected pressures, fresh groundwater zones**
- (2) Diameter of the well bore**
- (3) Casing type, depth, specifications, diameter, wall thickness and mill test pressure. If used casing, the pressure test report.**
- (4) Cement type, additives and amount, including calculations.**
- (5) Location of centralizers.**
- (6) Other requirements as required by the Department.**

(b) The plan must 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 include areas of alternative drilling practices, areas where unknown or elevated pressures are anticipated, public water supply well protection areas, and areas of unique or different geology.

(d) Any changes in the plan made as a result of on-site modification will require notice to the Department and approval of the modification prior to implementation.

§ 78.83c Casing and cementing – lost circulation

(a) If cement used to permanently cement the surface or coal protective casing cannot be circulated to the surface, due to a lost circulation zone or zones, the operator shall notify the Department. A cement bond log shall be run to ascertain the amount of casing that was cemented before resuming any drilling.

(b)The operator will prepare and submit a proposal to the Department to employ an alternate method to ensure adequate cement will be placed in the annular space if

the evaluation in (a) determines inadequate cement exists to adequately contain all known and anticipated pressure at the surface casing seat and protect fresh groundwater. Upon approval of an alternate method by the Department, the operator shall implement such measures to ensure the effective and proper placement of the cement for each string of casing in the approved plan.

§ 78.83d. Intermediate and production casing.

(a) 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) Each well shall be equipped with production casing. The production string shall be cemented by the 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. 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 as described in subsection (a).

§ 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) All surface casing shall be a string of new pipe with a mill test of at least 1,100 pounds per square inch. Used casing may be approved for use but must be pressure tested after cementing and before continuation of drilling. If new or used plain end pipe is welded together for use, 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 anticipated maximum 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.

[(b)] (c) 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.

(e) Plain end casing shall be welded by a person trained and experienced in oil and gas well applications.

§ 78.85. Cement standards.

(a) The operator shall use cement that **meets the API class of cement for its intended use and placement in the wellbore and** will resist degradation by chemical and physical conditions in the well. **The type and amount of cement and placement in the well bore shall be recorded on the well record or plugging certificate.**

(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 10A. The operator shall permit the cement to set for a minimum period of 8 hours 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 24 hours before commencing cementing of the surface casing.

(e) Additives shall be used and noted on the well record or plugging certificate which inhibit changes to the cement properties by fluids in the wellbore.

§ 78.86. Defective casing or cementing.

In a well that has defective, insufficient or improperly cemented casing, the operator shall report the defect to the Department within 24 hours of discovery by the operator and shall correct the defect. The operator shall correct the defect or submit a plan to correct the defect for approval by the Department within 30 days. If the defect cannot be corrected or an alternate method is not approved by the Department, the well shall be plugged under §§ 78.91—78.98 (relating to plugging).

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OPERATING WELLS

78.88 Mechanical Integrity of Operating Wells

a) The operator shall conduct routine inspections of each operating well to ensure it is 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 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, as appropriate.

(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 a well 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(b), the operator shall follow the reporting schedule outlined in subsection (e).

(d) For wells not in compliance with §78.73(b), the operator shall take corrective actions to mitigate the excess pressure on the surface casing seat or coal protective casing seat. The operator shall conduct the corrective measure plan 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 surface casing seat or coal protective casing seat.

(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. 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 the Department with 7 day notice prior to initiating the corrective measure.

(3) The operator shall conduct mechanical integrity testing on the well to demonstrate compliance with §78.73(a). If mechanical integrity cannot be demonstrated, the operator shall plug the well. The operator shall provide the Department with 7 day notice prior to initiating the testing or corrective measure.

(d) 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) 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.

b) The investigation shall include, but not 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.

c) If the level of natural gas is greater than 10 percent of the LEL, the operator shall:

(1) 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.

d) If the stray natural gas is present, the operator shall install the necessary controls 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

NOTE – The first proposal is to revise sections 78.92 to 78.94 to require the cement plug to extend from 50 feet below any producing formation to 100 feet above the formation rather than locating the cement plug above the formations: **A cement plug shall be placed at either the attainable bottom or 50 feet below the lowest formation bearing or having borne oil, gas or water, and shall extend a minimum of 50 feet above the lowest formation bearing or having borne oil, gas or water. Overlying formations 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 second issue for discussion and consideration is a proposal to redraft the plugging sections (78.92 to 78.95) to another format so that it is more user friendly and easier to follow.

§ 78.91. General provisions.

(a) Upon abandoning a well, the owner or operator shall plug the well under § § 78.92—78.98 or an approved alternate method under section 211 of the act (58 P. S. § 601.211) to stop the vertical flow of fluids or gas within the well bore unless one of the following applies:

(1) The Department has granted inactive status under § § 78.101—78.105 (relating to inactive status).

(2) The well is part of a plugging schedule that has been approved by the Department and the operator is complying with that schedule, and the schedule takes into account potential harm that the well poses to the environment or public health and safety.

(3) The Department has approved the identification of the well as an orphan well under section 203 of the act (58 P. S. § 601.203), and the Department has not determined a prior owner or operator received economic benefit after April 18, 1979, from this well other than economic benefit derived only as a landowner or from a royalty interest.

(b) The operator shall plug a well where a radioactive logging source has been lost under § § 78.92—78.98 and 78.111.

(c) When a well is being plugged from the attainable bottom, the operator shall install a 50-foot plug of cement at the attainable bottom and plug the remainder of the well under § § 78.92—78.98.

(d) If the production casing cannot be retrieved, the operator shall plug strata bearing or having borne oil, gas or water by perforating the casing and squeezing cement into the annulus or other method approved by the Department. The maximum distance the stub of the uncemented production casing may extend is 100 feet below the surface casing seat or coal protective casing seat, whichever is deeper. The uncemented portion of the casing left in the well above the total depth or attainable bottom may not extend through a formation bearing or having borne oil, gas or water or extend to a point where it interferes with subsequent plugging requirements of §§ 78.92(a)(2) and 78.93(a)(2) and (b)(4) (relating to wells in coal areas—surface or coal protective casing is cemented; and wells in coal areas—surface or coal protective casing anchored with a packer or cement). The remainder of the well shall be plugged under §§ 78.92—78.98.

(e) When plugging a well, an operator shall insure that no gases are present in the well in an amount that could interfere with cementing the well.

(f) When plugging a well with a casing string cemented through a gas storage reservoir or reservoir protective area, an operator shall use bridge plugs immediately above and below the gas storage reservoir unless an alternate plugging plan has been approved by the Department.

(g) When a well located in a coal area is plugged to allow mining through it, the person authorized by the Department to plug the well under the act or section 13 of the Coal and Gas Resource Coordination Act (58 P. S. § 513) shall clean out the gas well to a depth of at least 200 feet below the coal seam which will be mined and, unless impracticable, to a point 200 feet below the deepest minable coal seam the well penetrates.

(h) In lieu of the plugging requirements of §§ 78.92—78.95 and 78.97, an operator may cement a well from the total depth or attainable bottom to the surface. Wells in coal areas still shall meet the venting requirements of § 78.92 or § 78.93 (relating to wells in coal areas—surface or coal protective casing is cemented; and wells in coal areas—surface or coal protective casing anchored with a packer or cement).

78.91(b) Plugging wells with horizontal boreholes.

(a) The operator shall plug a well with a horizontal borehole by setting a mechanical packer a minimum of 50 feet below the top of the producing formation or to the extent that the well construction will allow. From this point, a cement plug shall be placed, and shall extend 200 feet above the top of the producing formation. The operator shall confirm the location of the cement plug by tagging.

(b) The operator shall plug the lateral borehole of a well drilled in a coal seam that may be mined by deep mining methods as follows:

(1) The well shall be completely filled with cement, including the laterals. Casing shall be removed if possible.

(2) The vertical portion can be vented from the coal to the surface and filled with cement.

(c) The operator shall plug the lateral borehole of a well drilled in a coal seam that will not be mined by deep mining methods as follows: all casing shall be removed, if possible, and the lateral and vertical components of the wellbore shall be filled with cement.

§ 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 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 that point. 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 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).

(2) After plugging strata bearing or having borne oil, gas or water, the well shall be filled with nonporous material to a point approximately 100 feet below the surface or coal protective casing seat, whichever is deeper. At this point, a 100-foot plug of cement shall be installed.

(3) After the plug has been installed below the casing seat, the inner casing shall be emptied of liquid from the surface to the plug of cement. A vent or other device approved by the Department shall then be installed on top of the inner string of casing to prevent liquids and solids from entering the well but permit access to the full internal diameter of the inner casing when required. The vent or other device approved by the Department shall extend, when finally in place, a distance of no less than 72 inches above ground level and the permit or registration number shall be permanently affixed.

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

(1) If the total depth or attainable bottom is deeper than the cemented production casing seat, the operator shall plug that portion of the well under subsection (a)(1).

(2) Cement plugs shall be set in the cemented portion of the production casing so that the plugs will extend from at least 50 feet below each stratum bearing or having borne oil, gas or water, to a point at least 100 feet above each stratum bearing or having borne oil, gas or water. A Department approved mechanical plug may be set 20 feet above each stratum bearing or having borne oil, gas or water as a substitute for the plug of cement. Nonporous material shall separate each cement plug or mechanical plug. 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.

(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. 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).

(4) After plugging all strata bearing or having borne oil, gas or water, the well shall be filled with nonporous material to a point approximately 100 feet below the surface or coal protective casing seat, whichever is deeper. At this point a 200-foot cement plug shall be placed so that the plug extends from 100 feet below the casing seat to a point at least 100 feet above the casing seat.

(5) After the 200-foot plug has been installed, the remainder of the well shall be plugged and vented as described in subsection (a)(3).

(c) A person authorized by the Department under the act or section 13 of the Coal and Gas Resource Coordination Act (58 P. S. § 513) to plug a gas well that penetrates a workable coal seam that was drilled prior to November 30, 1955, or which was permitted after that date but not plugged in accordance with the act, shall plug the well to mine through it in the following manner:

(1) The gas well shall be cleaned out to a depth of at least 200 feet below the coal seam which is proposed to be mined and, unless impracticable, to a point 200 feet below the deepest mineable coal seam that the well penetrates.

(2) The gas well shall be plugged in accordance with section 13(a)(1), (2), (3) or (4) of the Coal and Gas Resource Coordination Act.

§ 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 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 that point. 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 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 and 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.

(4) If the surface or coal protective string is not free and cannot be retrieved, it shall be perforated or cut below the lowest workable coal to allow the cement used to cement the 4 1/2-inch or 2-inch casing to communicate between the surface casing or coal protective casing, or both, and the well bore. A string of casing 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.

(5) The inner casing shall then be emptied of liquid and cement from the base of the casing to the surface and a vent or other device approved by the Department shall be installed on the top of the casing to prevent liquids and solids from entering the well, but permit ready access to the full internal diameter of the inner casing. The inner string of casing and the vent or other device approved by the Department shall extend, when

finally in place, a distance of no less than 72 inches above ground level and the permit or registration number shall be permanently affixed to the vent.

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

(1) If the total depth or attainable bottom is deeper than the cemented production casing seat, the operator shall plug that portion of the well under subsection (a)(1).

(2) A cement plug shall be set in the cemented portion of the production casing so that the plugs extend from at least 50 feet below each stratum bearing or having borne oil, gas or water, to a point at least 100 feet above each stratum bearing or having borne, oil, gas or water. A Department approved mechanical plug may be set 20 feet above the stratum bearing or having borne oil, gas or water as a substitute for the plug of cement. Nonporous material shall separate each cement plug or mechanical plug. 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.

(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. 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 paragraph with a single column of cement or other material 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).

(4) The well shall be filled with nonporous material to a point approximately 300 feet below the bottom of the surface casing or coal protective casing, whichever is deeper. In this case, a 100-foot plug of cement shall then be placed in the well beginning at that point and extending to a point approximately 200 feet below the bottom of the casing seat.

(5) 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 and 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 (4) and cemented to the surface.

(6) If the surface or coal protective string is not free and cannot be retrieved, it shall be perforated or cut below the lowest workable coal seam to allow the cement used to cement the 4 1/2-inch or 2-inch casing to communicate between the surface casing or coal protective casing, or both, and the well bore. A string of casing 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 (4) and cemented to the surface.

(7) The inner casing shall then be emptied of liquid and cement from the base of the casing to the surface and a vent or other device approved by the Department shall be installed on the top of the casing to prevent liquids and solids from entering the well, but permit ready access to the full internal diameter of the inner casing. The inner string of casing and the vent or other device approved by the Department shall extend, when finally in place, a distance of not less than 72 inches above ground level and the permit or registration number shall be permanently affixed to the vent.

(c) A person authorized by the Department under the act or section 13 of the Coal and Gas Resource Coordination Act (58 P. S. § 513) to plug a gas well that penetrates a workable coal seam which was drilled prior to November 30, 1955, or which was permitted after that date but not plugged in accordance with the act shall plug the well to mine through it in the following manner:

(1) The gas well shall be cleaned out to a depth of at least 200 feet below the coal seam which is proposed to be mined and, unless impracticable, to a point 200 feet below the deepest minable coal seam which the well penetrates.

(2) The well shall be plugged in accordance with section 13(a)(2) or (4) of the Coal and Gas Resource Coordination Act.

§ 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 20 feet above the top of the lowest stratum bearing or having borne oil, gas or water. At that point there shall be placed a plug of cement, which shall extend at least 50 feet above that point. 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 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 and 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.

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

(1) If the total depth or attainable bottom is deeper than the cemented production casing seat, the operator shall plug that portion of the well under subsection (a)(1).

(2) Cement plugs shall be set in the cemented portion of the production casing so that each plug extends from at least 50 feet below each stratum bearing or having borne oil, gas or water, to a point at least 100 feet above each stratum. A Department approved mechanical plug may be used as a substitute for the plug of cement. The mechanical plug shall be set 20 feet above each stratum 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 approved by the Department.

(3) Following the plugging of the cemented portion of the production casing, the uncemented portion of the production string shall be separated from the cemented portion and retrieved. The maximum distance the stub of the uncemented portion of the production casing may extend is 100 feet below the surface casing. In no case may the uncemented portion of the production casing left in the hole extend through stratum bearing or having borne oil, gas or water. Other stratum 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. When the uncemented portion of the production casing is not retrievable, the operator shall plug that portion of the well under § 78.91(d).

(4) The remainder of the well shall be plugged under subsection (a)(2) and (3).

§ 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 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 at least 50 feet above that

point. 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 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).

(2) After plugging all 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. Another plug of cement, or other equally nonporous material approved by the Department, shall be placed extending at least 50 feet above that point.

(3) After setting the 50-foot plug, the hole shall be filled from the top of the 50-foot plug to the surface with a noncementing material or the operator shall set a 100-foot cement plug which extends 50-feet into the surface casing and fill the hole to the surface with noncementing material.

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

(1) If the total depth or attainable bottom is deeper than the cemented production casing seat, the operator shall plug that portion of the well under subsection (a)(1).

(2) Cement plugs shall be set in the cemented portion of the production casing so that each plug extends from at least 50 feet below each stratum bearing or having borne oil, gas or water, to a point at least 100 feet above the stratum. A Department approved mechanical plug may be used as a substitute for the plug of cement. The mechanical plug shall be set 20 feet above each stratum 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.

(3) Following the plugging of the cemented portion of the production casing, the uncemented portion of the production string shall be separated from the cemented portion and retrieved. The maximum distance the stub of the uncemented portion of the production casing may extend is 100 feet below the surface casing. In no case may the uncemented portion of the production casing left in the hole extend through stratum bearing or having borne oil, gas or water. Other stratum 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. When the uncemented portion of the production casing is not retrievable, the operator shall plug that portion of the well under § 78.91(d).

(4) The remainder of the well shall be plugged under subsection (a)(2) and (3).

§ 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**. 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

(b) **When a well through a workable coal seam is plugged and equipped with a vent, a sign or means of providing notice to the public shall indicate “Do Not Disturb – Contact DEP”.**

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§ 78.98. Restricting surface water from the well bore.

When casing, including conductor pipe, is left in the well at the surface, the area between the casings or the casing and the well bore shall be permanently filled to the surface with a nonporous material to restrict surface water from the well bore.

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