

Chapter 1501:9-1 Oil Well Drilling

1501:9-1-01 General provisions.

(A) Definitions . As used in Chapters 1501:9-1 to 1501:9-12 of the Administrative Code:

(1) "Access road" means any road used as primary ingress and egress to the wellhead, tank battery, and associated equipment used in the production of a well.

(2) "Active underground mine" means an underground excavation of coal or industrial minerals in any phase of the mining operation which is required to be permitted by the division of mineral resources management, regularly and routinely examined by state-certified forepersons, and inspected quarterly by mine safety inspectors of the division of mineral resources management for compliance with mine safety laws, including the active workings of a mine, any and all sealed or unsealed boreholes, shafts, drifts, slopes or any other openings to the surface, and any and all in-seam contiguous, abandoned areas physically connected to but separated by permanently constructed seals from the current active workings where miners are able to work or travel.

(3) "API" means the American petroleum institute.

(4) "Applicant" or "person" means a natural person, corporation, association, partnership, receiver, trustee, executor, administrator, guardian, fiduciary, or other representative of any kind, and includes any government or a political subdivision or agency thereof. The masculine gender, in referring to a person, includes the feminine and the neuter genders.

(5) "Annulus" means the space between a wellbore and tubulars or between tubulars where fluid can flow.

(6) "ASTM" means ASTM international, formerly known as the American society for testing and materials.

(7) "Authorized representative of the owner" means any contractor, sub-contractor or person directed by an owner or owner holding a permit, to complete any aspect of well site construction, drilling, production, and restoration.

(8) "Best Management Practices (BMPs) For Oil and Gas Well Site Construction Manual" means practices, procedures and structures used to minimize accelerated erosion from oil and gas well site construction and well site restoration outlined in the manual, dated April 30, 2005, which can be located at http://www.dnr.state.oh.us/Portals/11/oil/pdf/BMP_OIL_GAS_WELL_SITE_CONST.pdf or by contacting the division of oil and gas resources management.

(9) " Best Management Practices (BMPs) For Pre-drilling Water Sampling Manual" means methods for ground water sampling from private or public supplies using practices, processes and procedures outlined in the manual, dated April 30, 2005, which can be located

at http://www.ohiodnr.com/Portals/11/oil/pdf/BMP_PRE-DRILLING_WATER_SAMPLING.pdf or by contacting the division of oil and gas resources management.

(10) "Cage" means a wire, wood, metal or similar material surrounding a wellhead.

(11) "Casing shoe test" means a pressure test conducted after drilling into the confining strata below a cemented casing string seat to evaluate pressure containment integrity and to determine the maximum fluid density that the strata can contain without breaking down.

(12) "Chief" means the chief of the division of oil and gas resources management.

(13) "Condensate" means liquid hydrocarbons that were originally in the gaseous phase in the reservoir.

(14) "Conductor casing" means one or more strings of casing set and cemented to provide a base for an air body for diversion of shallow naturally occurring natural gas including coalbed methane and to accomplish one or more of the following well construction objectives:

(a) Stabilize unconsolidated sediments;

(b) Isolate shallow aquifers that provide or are capable of providing groundwater for water wells and springs in the vicinity of the well; or

(c) Isolate groundwater before penetrating the workings of an active underground mine.

(15) "Contractor" means any third party engaged by an owner to conduct drilling, producing, and other operations.

(16) "Direct notification" means, person to person or phone contact between a well owner, owner holding a permit or their authorized representative and a division inspector and/or division field office staff. Voice mail messages are not considered direct notification.

(17) "Division" means the division of oil and gas resources management, department of natural resources.

(18) "Drilling unit" means the minimum acreage on which one well may be drilled, but does not apply to a well for injecting gas into or removing gas from a gas storage reservoir.

(19) "Drive pipe" means a casing string that is driven through unconsolidated sediment to stabilize the wellbore and isolate associated groundwater.

(20) "Field" means the general area underlaid by one or more pools.

(21) "Gas" means all natural gas and all other fluid hydrocarbons not defined below as oil, including condensate.

(22) "GPS" means global positioning system , which is a global satellite-based system for determining precise location on Earth.

(23) "Inhabited structure" means any inhabited private dwelling house and any public building which may be used as a place of resort, assembly, education, entertainment, lodging, trade, manufacture, repair, storage, traffic, or occupancy by the public.

(24) "Inspector" means the person who has been designated by the chief under section [1509.03](#) of the Revised Code, to administer and enforce provisions of Chapter 1509. of the Revised Code or rules thereunder.

(25) "Intermediate casing" means one or more strings of casing set after surface casing has been cemented through the base of the deepest underground source of drinking water, but before drilling into the permitted hydrocarbon reservoir(s) to isolate hydrocarbon or brine bearing flow zones, stabilize the wellbore, to isolate protected groundwater if encountered after drilling below surface casing, isolate lost circulation zones or other potential geologic hazards, or serve as a base for well control equipment.

(26) "Lead cement" means the first, typically less-dense slurry pumped during primary cementing operations to seal intervals above those sealed by the tail cement and to reduce the hydrostatic pressure of the cement slurry column at the casing seat while the slurry sets.

(27) "Liner" means a string of casing set and cemented which does not extend to surface. Liners are anchored or suspended inside the previous casing string and may serve the purpose of intermediate or production casing strings.

(28) "Manager" means the operator, whether the owner or not, of a well or wells.

(29) "Map" means a graphic representation of the location and size of the existing or proposed objects it is made to represent, accurately drawn to a scale no smaller than four hundred feet to the inch.

(30) "Mine string" means a string of casing set and cemented to isolate a mine void, rubble zone, or a mined seam.

(31) "Minimum internal yield pressure" means the minimum internal pressure at which permanent casing deformation could take place assuming no external pressure.

(32) "Oil" means crude petroleum oil and all other hydrocarbons, regardless of gravity, that are produced in liquid form by ordinary production methods, but does not include liquid hydrocarbons that were originally in a gaseous phase in the reservoir.

(33) "Oil and gas" means oil or gas or both. The use of the plural includes the singular, and the use of the singular includes the plural.

(34) "Owner" means the person who has the right to drill on a tract or drilling unit and to drill into and produce from a pool and to appropriate the oil or gas that he produces therefrom either for himself or for others.

(35) "Pool" means an underground reservoir containing a common accumulation of oil or gas, or both, but does not include a gas storage reservoir. Each zone of a geological structure and each zone of a geological feature that is completely separated from any other zone in the same structure or feature may contain a separate pool.

(36) "Potable water supply" means water that is satisfactory for drinking, culinary, and domestic purposes as defined by the Ohio department of health for private water systems in paragraph (LLL) of rule [3701-28-01](#) of the Administrative Code.

(37) "Potential flow zone" means any zone in a well where hydrocarbons or other fluids can flow when wellbore pressure is less than pore pressure and isolation of such zones is necessary to:

(a) Isolate hydrocarbons that may be present in testable or commercial quantities;

(b) Prevent over-pressurization of the surface casing annulus; or

(c) Maintain well control when drilling on fluid below the zone.

(38) "Producer" means the owner of a well capable of or producing oil or gas or both.

(39) "Production casing" means a string of casing set to isolate the permitted hydrocarbon bearing reservoir(s), and other pressurized flow or corrosive, hydrogen sulfide-bearing zones not effectively isolated by previous casing(s).

(40) "Protection of correlative rights" means administration and enforcement of these rules and regulations by the chief in such a manner as to afford reasonable opportunity to every person entitled thereto to recover and receive the oil and gas in and under his tract or tracts, or the equivalent thereof, without having to drill unnecessary wells or to incur other unnecessary expense.

(41) "Rathole" or "mousehole" means the temporary storage space that is used to store the kelly or drill pipe while adding a new section of pipe to the drill string at some rotary drilling rigs.

(42) "Rules adopted or promulgated by the chief," "rules adopted thereunder," "rules herein," "applicable rules," "these rules and regulations," or "these rules" means all rules contained in Chapters 1501:9-1 to 1501:9-12 of the Administrative Code.

(43) "Spudding" means to begin drilling, to start the hole.

(44) "Storage protective boundary" means the line denoting the outermost protected area surrounding a storage reservoir certified by the federal energy regulatory commission (FERC), or,

absent a FERC certificate, the boundary as defined by divisions (D)(2) and (E) of section [1571.01](#) of the Revised Code.

(45) "Subject tract or drilling unit" means a tract upon which a person proposes to drill, reopen, deepen, plug back, or re-work a well for producing oil and natural gas.

(46) "Surface casing" means a string of casing set and cemented to isolate and protect the deepest underground source of drinking water and to serve as a base for well control equipment.

(47) "Sustained annular pressure" means pressure in an annulus between casing strings that is measurable at the wellhead and rebuilds to at least the same shut-in pressure after pressure has been released.

(48) "Tail cement" means the last, typically higher density slurry pumped during primary cementing operations to seal the casing seat and isolate specific intervals providing faster thickening times and higher early compressive strength.

(49) "Tank battery" means any combination of oil collection tanks, brine collection tanks, and associated equipment within a containment dike.

(50) "Tract" means a single, individually taxed parcel of land appearing on the tax list.

(51) "Urbanized area" means an area where a well or production facilities of a well are located within a municipal corporation or within a township that has an unincorporated population of more than five thousand in the most recent federal decennial census prior to the issuance of the permit for the well or production facilities.

(52) "Underground source of drinking water" and "USDW" mean an aquifer or portion of an aquifer that supplies any public water system or that contains a sufficient quantity of groundwater to supply a public water system, and currently supplies drinking water for human consumption, or that contains fewer than ten thousand milligrams per liter total dissolved solids and is not an exempted aquifer.

(53) "Vault" means a structure normally made of concrete surrounding the wellhead, recessed into the ground, all or portion that is placed below ground surfaces.

(54) "Waste" means and includes:

(a) Physical waste, such as the term is understood generally in the oil and gas industry;

(b) Inefficient, excessive, or improper use, or the unnecessary dissipation of reservoir energy;

(c) Inefficient storing of oil or gas;

(d) Locating, drilling, equipping, operating, or producing an oil or gas well in a manner that reduces or tends to reduce the quantity of oil or gas ultimately recoverable under prudent and proper operation from the pool into which it is drilled, or that causes or tends to cause unnecessary or excessive surface loss or destruction of oil or gas; and

(e) Other underground or surface waste in the production, transportation, or storage of oil, gas, or condensate, however caused.

(55) "Well" means any borehole, whether drilled or bored, for stratigraphic exploration or for the production, extraction or injection of any gas or liquid mineral, excluding potable water to be used as such, but including natural or artificial brines and oil field waters, sewage, and any liquid used in or resulting from any process of industry, manufacture, trade, business, or agriculture.

(56) "Well integrity" means the quality or condition of a well being structurally sound with competent pressure seals by the application of technical and operational solutions that prevent uncontrolled fluid release or migration of annular fluids into protected groundwater throughout the well life cycle.

(57) "Well site construction" means any activity by an owner holding a permit, well owner or the owners authorized representative to build the access roads, prepare the drill site location for the drilling rig or tank battery and associated equipment and restoration of the well site.

(B) Rules for giving public notice - adoption, amendment, or rescission of rules.

(1) Public notices of hearings to adopt, amend, or rescind rules, to be conducted by the division of oil and gas resources management, department of natural resources, state of Ohio, shall be given in the register of Ohio.

(2) At least thirty days notice of the time and place of a public hearing shall be given by said notice which shall state the division's intention to consider adopting, amending, or rescinding a rule; a synopsis or the full text of the proposed rule, amendment, or rule to be rescinded or a general statement of the subject matter to which such proposed rule relates; and the date, time, and place of the hearing on said proposed action.

(C) Forms .

The division shall prescribe forms required under these rules and regulations and, upon request, furnish such forms to any interested person requiring use of same.

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1501:9-1-02 Permits.

(A) Application for permit--supplementary statutory requirements:

(1) The date of application;

(2) Designation of the well by name and number;

(3) The plan for disposal of water and other waste substances resulting from, obtained, or produced in connection with exploration, drilling, or production of oil or gas. The plan for disposal of salt water shall include identification of any disposal well or disposal wells to be used. A statement that one of the named disposal wells on the application shall be used, is sufficient. Where the applicant finds that the disposal well to be used is different from that indicated on the permit, the applicant shall so notify the division immediately in writing. The plan for disposal may include such other methods as are approved by the chief. Such plan shall include the name of the person or company disposing of the salt water and the ultimate location of its disposal. Any change in the plan for disposal shall be timely submitted to the chief.

(4) An affidavit that the applicant is the owner as defined in section 1509.01 of the Revised Code ;

(5) A map showing:

(a) The subject tract of land or drilling unit upon which the well is to be drilled and property lines with surface and mineral owner name(s) within ;

(b) The location of the proposed well on the subject tract of land or drilling unit established by a field survey showing the distances in feet from the proposed well site to the boundary lines of the subject tract or drilling unit, and to the nearest permanent geographic subdivision boundaries.

The proposed well location also shall be designated by plane coordinates as provided by Chapter 157. of the Revised Code (Ohio coordinate system. Indicate if the coordinates are NAD 27 or NAD 83.)Coordinates may be established by map scale to the nearest fifty feet or by GPS ;

(c) Location of drilling or producing wells, which are within the distances required according to depth of drilling as set forth in rule 1501:9-1-04 of the Administrative Code, and a showing of the distances between such drilling or producing wells and the proposed well;

(d) The location of all buildings, public roads, railroads and streams within two hundred feet of the proposed well site, and their distances from the proposed well site ;

(e) A title block to the map certifying the above information and including the applicants name, well name, county, civil township, permanent geographic subdivisions (section, lot and/or tract) and surface elevation for the well location, USGS quadrangle name, date map prepared, name of surveyor preparing the map and phone number, and map scale;

(f) If the proposed well is to be in an urbanized area, the map shall include the name of the urbanized area in addition to the original civil township name;

An additional color map (three copies) based on aerial photography, where available, at a scale of one inch to one hundred feet or one inch to two hundred feet showing the location of the tank battery, access road, and gas sales line and a five hundred foot radius around the well location;

As an overlay on the base aerial map, include three additional copies of the map including topographic contours (where available) ; and

(6) A casing plan and cementing plan showing how the owner proposes to drill and construct the well consistent with the best available geologic information in the vicinity of the proposed wellbore and with the requirements of rule [1501:9-1-08](#) of the Administrative Code, including at least the following:

(a) The name and anticipated depth of all zones to be tested or produced;

(b) The estimated total depth of the wellbore;

(c) The anticipated diameter of each wellbore segment;

(d) The proposed casing type, outside diameter, and setting depth for each proposed casing string;

(e) Proposed cement volumes for each casing string; and

(f) Whether the owner plans to stimulate any permitted hydrocarbon zone by hydraulic fracturing.

(B) Procedure for review of application for permit .

(1) All complete applications shall be date-stamped upon receipt by the division. Within twenty-one days of filing of the application the chief shall either issue the permit or notify the applicant of objections to the application.

(a) Notice of objections by the division to the application may be given in person, by telephone or by mail to the address on the application at the discretion of the division.

(b) Any record of telephoning or mailing the notice, made in the normal course of business by the division, shall constitute notice of objection to the applicant.

(c) Applicants will be given a reasonable opportunity to correct any objections to the application and to request an informal hearing with the chief. Except as otherwise required, amendments to applications need not be separately signed by the applicant.

(d) If an application does not contain required information, the division shall notify the applicant of the omitted data by mail or telephone. If the omissions are substantial, the division may return the application by mail with the omitted items indicated.

(2) When the chief finds that efforts to cure objections to an application will be unavailing and that the application is not in accordance with the requirements of Chapter 1509. of the Revised Code and applicable rules, or that the applicant failed to respond to objections within thirty days of notice, the chief shall issue an order denying the application for permit.

(a) The applicant has a right to an informal meeting with the chief within fifteen days after such order is issued. If, as a result of this meeting, the chief believes the application meets, or if the application is amended to meet, the requirements of Chapter 1509. of the Revised Code and applicable rules, he shall within ten days vacate or modify his order as appropriate.

(b) The applicant need not exercise his right to an informal meeting with the chief, but may treat the order issued as final and appealable pursuant to Chapter 1509. of the Revised Code.

(C) Notification .

Each drilling permit issued in an urbanized area will be conditioned on the division inspector and or the respective division regional office receiving direct notification a minimum of forty-eight hours prior to:

(1) Commencement of site construction;

(2) Pit construction and closure;

(3) Spudding of the well;

(4) Placement of the surface casing;

A twenty-four-hour (or less) direct notification may be approved if prior communications have been initiated with the division inspector and/or respective regional office.

(D) Commencement .

No well site construction shall commence in an urbanized area until a permit is issued, received by the applicant and is available on-site unless the chief waives this requirement.

(1) Site construction shall comply with the division's best management practices (BMPs) for oil and gas well site construction manual, as defined in paragraph (A) of rule [1501:9-1-01](#) of the Administrative Code. Site clearing and surface affectment shall be minimized.

(E) For wells permitted after September 15, 2004, in urbanized areas or where there is no reasonable emergency response access to the wellhead or tank battery at the ingress point to the access road, an apron of durable material shall be placed. The apron shall be sufficient in width and length to enable unobstructed access to the access road.

(1) The access road shall be constructed and maintained in a manner to permit the ingress and egress for fire and emergency response.

(2) Mud and debris deposited on public roads from the well site during drilling, production, and restoration operations shall be immediately removed by the well owner or their authorized representative.

(3) Where the well head/tank battery is in excess of one hundred fifty feet from the ingress point to the access road, the access road to the well head/tank battery shall be reasonably passable by any equipment expected to access the well head/tank battery. It is recommended that a durable surface be maintained on the lease road. The durable surface may include, gravel, crushed stone, crushed concrete, slag (when approved by the chief), crushed brick, asphalt, or concrete.

(4) Where the access road is in excess of one hundred fifty feet in length, turnaround areas shall be located as practical based on the existing site conditions (topography, land use, forest cover, and natural drainage -perennial/intermittent streams). Turnarounds located prior to any natural drainage area not having a constructed crossing sufficient to handle equipment expected to access the site may be needed.

(5) All equipment and vehicles used in the site construction, drilling, production and restoration shall not be parked on public roads without the approval of the local road authority.

(F) Water sampling.

The well owner shall sample all water wells within three hundred feet of the proposed well location in urbanized areas prior to drilling under the guidelines provided in the division's best management practices (BMPs) for pre-drilling water sampling manual, as defined in paragraph (A) of rule [1501:9-1-01](#) of the Administrative Code. The chief may require modification of this distance if determined necessary to protect water supplies or site conditions may warrant.

(G) Permit not transferable .

A permit issued pursuant to these rules and regulations shall not be transferable. It may be reissued as a new permit to a successor owner.

(H) Well deviation .

The maximum point at which a well penetrates the producing formation shall not vary unreasonably from the vertical drawn from the center of the hole at the surface, with the exception of approved directional drilling. Such approval must be in writing from the chief.

(I) Expiration of permit .

Once a permit to drill has been issued pursuant to this rule, actual drilling of the well authorized by the permit shall be commenced within twelve months of the date of issuance of such permit or the permit shall expire; if drilling is commenced but not completed within said twelve month period, drilling shall be continued with due diligence following the twelve month period or the permit shall expire.

(J) Revising subject tract or drilling unit .

A subject tract or drilling unit of a well or proposed well, previously approved by the division, may be revised by the owner with the filing of a revised map complying with this rule and section [1509.06](#) of the Revised Code and a non-refundable fifty dollar fee. One fee is required if revising a subject tract with multiple wells; however, an original revised map is required for each well within the subject tract.

(K) Revising location .

The location of a proposed well may be changed only if the owner submits an application, non-refundable two hundred fifty dollar fee and revised map complying with this rule, section [1509.06](#) and section [1509.09](#) of the Revised Code.

(L) Post drilling map .

The post drilling map required by conditions of the permit must be accompanied by a non-refundable fifty dollar fee.

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1501:9-1-03 Surety Bond.

(A) Amount:

The surety bond provided for in section [1509.07](#) of the Revised Code shall be executed by a surety company authorized to do business in the state of Ohio and shall be in the following amount:

For an individual bond covering a single well, five thousand dollars; for a blanket bond covering all such wells operated by the principal, fifteen thousand dollars;

(B) Delinquent restoration.

If the oil or gas well owner, permittee, or his agent fails to complete the initial restoration as required under division (A) of section [1509.072](#) of the Revised Code, the chief, prior to issuing a bond forfeiture order for such failure, shall issue to such person a written notice of violation. The notice of violation shall:

(1) Set forth with reasonable specificity:

(a) The nature of the failure;

(b) The remedial action required;

(c) A reasonable time for completion of the restoration; and

(d) A description of the area to be restored.

(2) State that if the notice is not complied with within the time allowed in the notice and any extensions given for good cause, the chief will forfeit the total amount of the performance bond.

(C) Forfeiture criteria and amount.

The chief shall forfeit the total amount of the performance bond when he or she finds that the oil or gas well owner or permittee has:

(1) Failed to comply with a notice of violation issued under paragraph (B) of this rule;

(2) Failed to comply with the final restoration requirements of division (B) of section [1509.072](#) of the Revised Code;

(3) Failed to comply with the plugging requirements of section [1509.12](#) of the Revised Code, the permit provisions of section [1509.13](#) of the Revised Code or rules adopted thereunder.

(D) Forfeiture procedures.

When performance bond is to be forfeited, the chief shall issue an order to the owner or permittee, which order shall be referred to in this rule as the bond forfeiture order. The bond forfeiture order shall:

- (1) Set forth the violation giving rise to the order;
 - (2) Declare that the entire amount of the bond is forfeited;
 - (3) If the performance bond filed with the division is supported by or in the form of cash or negotiable certificates of deposit, declare the cash or certificates property of the state;
 - (4) If the performance bond filed with the division is in the form of a surety bond, the chief shall also issue a bond forfeiture order to the surety involved and, in addition to the requirements of paragraphs (C)(1) and (C)(2) of this rule, the order shall also inform the surety of its rights and the extent of its obligations and liability.
- (E) Options for the surety.
- (1) Within thirty days after it receives a bond forfeiture order, each surety shall notify the chief that it will:
 - (a) Not correct the violation or violations resulting in the issuance of the bond forfeiture order and shall make payment for the full amount of the bond; or,
 - (b) Correct the violation or violations and shall submit to the chief a plan, including a time frame for performance for accomplishing the required work; or,
 - (c) Pay to the treasurer of the state that amount of money which it would cost the state of Ohio as determined by the chief to complete the required work.
 - (2) The rights of the surety to correct the violation or violations resulting in the issuance of the bond forfeiture order shall be terminated if the surety fails to:
 - (a) Notify the chief within thirty days after receipt of the bond forfeiture order that it will or will not correct the violation;
 - (b) Submit a timetable at the same time it notifies the chief that it will perform the required work; or,
 - (c) Commence, continue, or complete the required work in a manner and in accordance with its timetable and the provisions of Chapter 1509. of the Revised Code.
 - (3) When the chief determines that the rights of a surety shall be terminated, the chief shall issue an order terminating the rights of the surety and demanding payment from the surety for the entire amount of performance bond filed with the chief by the surety.
- (F) Financial statements:

Sworn financial statements may be accepted in lieu of a surety bond, certificate of deposit, or cash bond only for owners classified as exempt domestic well owners or for non-domestic well owners for whom the chief has accepted a sworn financial statement prior to January 1, 1993 and who are not in material and substantial violation of Chapter 1509. of the Revised Code. Additionally, the chief may accept new financial statements for exempt domestic well owners and non-domestic well owners if an irrevocable letter of credit on a form provided by the division for the bond amount is provided from an approved financial institution along with the financial statement required in (F)(1)(d) or (F)(2)(c) or by providing a copy of a financial statement submitted to the financial institution issuing the letter of credit. The chief will not accept new financial statements to release surety bonds, certificates of deposit or cash bonds previously filed with the division.

(1) Exempt domestic well owners:

(a) New exempt domestic well owners filing a financial statement will be limited to one well under the financial statement. New exempt domestic well owners requesting the ownership of more than one well and existing exempt domestic well owners requesting to receive additional wells must file a certificate of deposit, surety bond or cash bond in the amount required for the total number of wells to be owned.

(b) Exempt domestic well owners shall demonstrate financial responsibility at least once every two years under a schedule established by the division.

(c) To demonstrate financial responsibility, exempt domestic well owners must show sufficient assets and income to operate, maintain, and abandon the well.

(d) Exempt domestic well owners shall submit the following information to the division:

(i) Personal financial statement on a form provided by the division;

(ii) Statement of estimated well operating, maintenance, and abandonment expenses and source of funds to use in paying for these costs;

(iii) Other information required by the chief.

(iv) The exempt domestic well owner must attest to the material accuracy of the information provided. The forms shall prescribe penalties for submission of a false statement.

(2) Non-domestic well owners:

(a) Each owner with a previously approved financial statement shall demonstrate financial responsibility annually under a schedule established by the division.

(b) To demonstrate financial responsibility, and receive approval of the financial statement, each owner shall show the following:

(i) The owner must have a sufficient capital structure to show a net financial worth in Ohio of twice the required bonding amount;

(ii) The owner must not be found to be in material or substantial violation of section 1509.01, ET SEQ., of the Ohio Revised Code or section 1501:9-1-01, ET SEQ., of the Ohio Administrative Code during the preceding year;

(iii) The owner must be in compliance with sections 1509.10 and 1509.11 of the Revised Code.

(c) In order to verify the accuracy of the financial statement each owner shall submit the following information when requested by the chief of the Division of Mineral Resources Management:

(i) Income statement;

(ii) Balance sheet;

(iii) Copy of corporate franchise tax filing for previous year (if applicable);

(iv) List of fixed assets and their current market or book value;

(v) Copy of independent appraisal or copy of the county auditor's assessed value of all real estate listed if the book value exceeds twenty-thousand dollars;

(vi) Proof of payment of oil and gas severance tax for previous year;

(vii) List of all producing wells including type of equipment and percentage of equipment owned;

(viii) Other information required by the chief; other information approved by the chief may be accepted in lieu of the above listed items.

(ix) Annual reports (reviews or audits) prepared in the normal course of business for an owner by a certified public accountant in accordance with generally accepted accounting principles will be accepted in lieu of the information required in (F)(2)(c)(i) through (v) if the signature page of the division's financial statement form is submitted with the annual report and signed by the owner or authorized representative.

(d) Information preparation and standards:

(i) Financial statements submitted under (F)(2)(c) pursuant to this rule shall be compilations and prepared according to generally accepted accounting principles;

(ii) All financial statements must be sworn as to the material accuracy by the owner or authorized representative of the owner and a certified public accountant must certify that each

financial statement was prepared in accordance with generally accepted accounting principals. Forms shall prescribe penalty for submission of a false statement;

(iii) If the owner is a corporation, only assets and liabilities of the corporation may be included on the financial statements.

(e) Evaluation:

(i) The division may use accepted financial industry tools to evaluate financial information;

(ii) The division may review inspection and enforcement data to determine if the owner has acted in an environmentally responsible manner.

(f) Penalties:

(i) Failure of an owner to demonstrate financial responsibility as required under (F)(1)(b) through (d), (F)(2)(a) and (F)(2)(b) and/or failure to supply all the information listed under (F)(2)(c) of this rule will result in an order by the chief requiring a surety bond, certificate of deposit, or cash bond in the amount of bond required. If the order is not complied with, the owner will receive an order by the chief requiring the plugging of all wells of the owner.

Eff	11-1-67;	9-1-80;	11-1-84;	7-16-93;	4-15-04
Rule		promulgated		under:	RC 119.03
Rule		authorized		by:	RC 1509.03
Rule			amplifies:		RC 1509.07

RC [119.032](#) review dates: 9/16/03, 1/27/04, 4/15/09

1501:9-1-04 Spacing of wells.

(A) General spacing rules:

(1) The division of mineral resources management shall not issue a permit for the drilling of a new well, the reopening of an existing well, or the deepening or plugging back of an existing well to a different pool for the production of oil and gas unless the proposed well location and spacing substantially conform to the requirements of this rule.

(2) This rule shall not apply to any wells drilled in areas under special order from the chief for pool spacing pursuant to section [1509.25](#) of the Revised Code. The chief shall grant an exception to the requirements of any special order from the chief for pool spacing pursuant to section [1509.25](#) of the Revised Code, if an applicant can demonstrate that such exception will protect correlative rights and/or promote conservation by permitting oil and/or gas to be produced which could not otherwise be produced.

(3) Upon receipt of an application by the division, the chief shall determine if the proposed total depth is reasonable to penetrate the objective geological formation or geological zone. If the

chief determines that the proposed total depth is insufficient to penetrate the proposed geological formation or zone and that, because of the insufficient proposed total depth, the spacing and acreage requirements as per paragraph (C) of this rule are not fulfilled the permit shall be denied. In any event, no well shall be drilled deeper than the proposed total depth without prior permission from the chief.

(4) A permit shall not be issued unless the proposed well satisfies the acreage requirements for the greatest depth anticipated. If oil or gas is produced at a lesser depth than the geological formation or zone for which the permit was issued, the acreage requirements may be changed to conform with paragraph (C) of this rule by application to the chief.

(B) Scope:

Paragraph (C) of this rule, location of wells, shall apply to the drilling of a new well, the reopening of an existing well, and the deepening or plugging back of an existing well regardless of its depth or the producing geological horizon or zone except in areas under temporary minimum well spacing orders of the chief pursuant to paragraph (D) of this rule.

(C) Location of wells:

(1) No permit shall be issued to drill, deepen, reopen, or plug back a well for the production of oil and gas from pools from zero to one thousand feet in depth unless the proposed well is located:

(a) Upon a tract or drilling unit containing not less than one acre;

(b) Not less than two hundred (200) feet from any well drilling to, producing from, or capable of producing from the same pool;

(c) Not less than one hundred (100) feet from any boundary of the subject tract or drilling unit.

(2) No permit shall be issued to drill, deepen, reopen, or plug back a well for the production of oil or gas from pools from one thousand feet to two thousand feet in depth unless the proposed well is located:

(a) Upon a tract or drilling unit containing not less than ten acres;

(b) Not less than four hundred sixty (460) feet from any well drilling to, producing from, or capable of producing from the same pool;

(c) Not less than two hundred thirty (230) feet from any boundary of the subject tract or drilling unit.

(3) No permit shall be issued to drill, deepen, reopen, or plug back a well for the production of oil or gas from pools from two thousand to four thousand feet unless the proposed well is located:

- (a) Upon a tract or drilling unit containing not less than twenty (20) acres;
 - (b) Not less than six (600) hundred feet from any well drilling to, producing from, or capable of producing from the same pool;
 - (c) Not less than three hundred (300) feet from any boundary of the subject tract or drilling unit.
- (4) No permit shall be issued to drill, deepen, reopen, or plug back a well for the production of the oil or gas from pools from four thousand (4000) feet or deeper unless the proposed well is located:
- (a) Upon a tract or drilling unit containing not less than forty (40) acres;
 - (b) Not less than one thousand (1000) feet from any well drilling to, producing from, or capable of producing from the same pool;
 - (c) Not less than five hundred (500) feet from any boundary of the subject tract or drilling unit.
- (5) For new applications to drill wells in urbanized areas, the proposed wellhead location shall be no closer than seventy five (75) feet to any property not within the subject tract or drilling unit. Locating the wellhead closer than seventy five (75) feet to a property not within the subject tract or drilling unit may be approved by the chief if the owner and resident of the property in question, in writing, approves of the proposed wellhead location, or the chief waives the seventy five (75) foot requirement.
- (6) Wells drilled, deepened, reopened, reworked, or plugged back for purposes other than the production of oil and gas will be considered as special situations, and each will be evaluated in accordance with the issues of conservation of natural resources and of safety. Decisions as to spacing of such wells will be determined after evaluation of the special circumstances. Rules may be promulgated for some specific types of these wells.
- (D) Temporary minimum well spacing in the vicinity of discovery wells:
- (1) For the purpose of orderly development of a pool until such time as ultimate spacing is determined, the chief on his own motion or upon consideration of an application by an owner in an affected area, and with approval of the technical advisory council, may order temporary well spacing for wells to be drilled, deepened, reopened or plugged back to a particular pool or field in an area in the vicinity of a discovery well. Such order shall contain the following:
- (a) Description of the area covered by the order;
 - (b) Identification of the pool, field or horizons covered by the order;
 - (c) Minimum distance wells may be drilled from the tract or drilling unit boundaries;

(d) Minimum distance between wells;

(e) Minimum acreage for tracts or drilling units; and may contain other requirements deemed necessary by the chief to accomplish the purpose of paragraph (D) of this rule.

(2) An order of the chief for temporary minimum well spacing in the vicinity of a discovery well shall be effective on the date the order is made and shall continue in effect until it is either rescinded or amended by the chief or until such time as an order for special drilling unit requirements is made by the chief after hearing pursuant to section [1509.25](#) of the Revised Code.

(3) No well shall be drilled, deepened, reopened, or plugged back to or below the particular pool or field located in the area covered by an order of the chief under paragraph (D) of this rule unless the requirements of such order are met. Permits issued prior to the effective date of such order for wells to be located in the area and to or below the pool covered by such order which do not comply with the requirements of the order and where actual drilling operations have not commenced, shall be revoked.

(E) Offset wells - spacing exception:

(1) The chief shall grant an exception to the requirements of paragraph (C) of this rule to an applicant who demonstrates that the well proposed for production of oil or gas will be an offset to a well drilled or commenced before the effective date of paragraph (C) of this rule, and which is producing or may be capable of producing on an adjacent tract, and which is so located on said adjacent tract as not to comply with any one or more of the requirements of paragraph (C) of this rule.

(2) The chief shall grant an exception to the requirements of paragraph (C) of this rule if an applicant can demonstrate that such exception will protect correlative rights and/or promote conservation by permitting oil and gas to be produced which could not otherwise be produced.

(3) A well proposed to be drilled pursuant to such exceptions shall, nevertheless, be subject to the requirements of rule [1501:9-1-05](#) of the Administrative Code.

Effective: 08/11/2005
R.C. [119.032](#) review dates: 05/05/2005 and 08/11/2010
Promulgated Under: [119.03](#)
Statutory Authority: [1509.03](#), [1509.23](#), [1509.24](#)
Rule Amplifies: [1509.02](#), [1509.23](#), [1509.24](#), [1509.03](#)
Prior Effective Dates: 2/10/71, 1/31/83, 4/15/04

[1501:9-1-05 Safety.](#)

No well shall be drilled nearer than one hundred feet to any inhabited private dwelling house; nearer than one hundred feet from any public building which may be used as a place of resort,

assembly, education, entertainment, lodging, trade, manufacture, repair, storage, traffic, or occupancy by the public; nearer than fifty feet to the traveled part of any public street, road, or highway; nearer than fifty feet to a railroad track; nor nearer than one hundred feet to any other well.

Rule [1501:9-1-05](#) of the Administrative Code does not apply to a building or structure which is incident to agricultural use of the land on which it is located, unless such building is used as a private dwelling house or in the business of retail trade. The chief may grant an exception reducing the requirement in this rule that no wellhead shall be placed nearer than one hundred feet to any other wellhead where an applicant demonstrates that the requested reduction in spacing between wellheads is necessary to reduce impact to the land surface or the owners of the affected land.

R.C. [119.032](#) review dates: 12/29/2003 and 12/29/2008

Promulgated Under: [119.03](#)

Statutory Authority: [1509.23](#)

Rule Amplifies: [1509.23](#)

Prior Effective Dates: 11/1/67, 8/3/96

1501:9-1-06 Severability.

In the event any word, phrase, sentence, or other portion of these rules shall hereafter be declared invalid, such invalidity shall not affect the remaining portions and parts of the rules adopted or promulgated by the chief.

R.C. [119.032](#) review dates: 05/16/2005 and 05/16/2010

Promulgated Under: [119.03](#)

Statutory Authority: [1509.13](#)

Rule Amplifies: [1509.13](#)

Prior Effective Dates: 11/1/67, 1/31/83

1501:9-1-07 Prevention of contamination and pollution.

All persons engaged in any phase of operation of any well or wells shall conduct such operation or operations in a manner which will not contaminate or pollute the surface of the land, or water on the surface or in the subsurface.

(A) All persons engaged in any phase of operation of any well or wells shall conduct such operation or operations in a manner which will not contaminate or pollute the surface of the land, or water on the surface or in the subsurface

(B) In urbanized areas, to minimize off-site sedimentation, erosion and to control the surface flow of water, the well owner and or authorized representative must follow the best management practices (BMPs) for oil and gas well site construction manual, dated April 30, 2005 that can be located at <http://www.dnr.state.oh.us/mineral/oil/index.html> or by contacting the division of mineral resources management, as provided by the chief. BMPs and other design standards other than provided by the chief maybe used if a well owner or their authorized representative demonstrates that the alternative BMP or practices minimize erosion to the same degree as the BMP's provided by the chief.

Effective: 08/11/2005
R.C. [119.032](#) review dates: 05/05/2005 and 08/11/2010
Promulgated Under: [119.03](#)
Statutory Authority: [1509.03](#), [1509.23](#)
Rule Amplifies: [1509.02](#), [1509.03](#), [1509.06](#), [1509.072](#)
Prior Effective Dates: 11/1/67, 12/29/03

1501:9-1-08 Well construction.

(A) General. A well permitted under Chapters 1501:9-1 to 1501:9-12 of the Administrative Code shall be constructed in a manner that is approved by the chief as specified by these rules, the terms and conditions of the approved permit, plans submitted in the approved permit, and the standards established in section [1509.17](#) of the Revised Code. The casing and cementing plans in the approved permit are understood to be estimates based upon the best available geologic information prior to drilling. The division shall evaluate compliance with this rule for the as-built well. Where this rule does not detail specific methods to meet these standards, the owner shall use sound design and industry practices that effectively achieve the standards established in section [1509.17](#) of the Revised Code.

(B) Field standards. The chief may establish alternative well construction standards that are well-specific, field-specific, or play-specific by permit condition, to ensure protection of public health or safety or the environment.

(C) Drilling fluids.

(1) All intervals drilled prior to reaching the USDW protective depth shall be drilled with air, fresh water, a freshwater based drilling fluid, or a combination of the above. Only additives suitable for drilling through potable water supplies may be used while drilling these intervals.

(2) Based on regional knowledge of groundwater resources, well control, or safety factors, the chief may by permit condition require the use of a freshwater based drilling fluid and specify its

characteristics while the owner is drilling any interval prior to reaching the USDW protective depth.

(3) Below cemented surface casing, other drilling fluids may be utilized consistent with sound design and effective industry practice.

(D) Casing standards.

(1) All casing installed in a well shall be steel alloy casing that has been manufactured and tested consistent with standards established by the American petroleum institute (API) in "5 CT Specification for Casing and Tubing" or ASTM international (ASTM) in "A500/A500M Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes" and has a minimum internal yield pressure rating designed to withstand at least 1.2 times the maximum pressure to which the casing may be subjected during drilling, production or stimulation operations.

(a) The minimum internal yield pressure rating shall be based upon engineering calculations listed in API "TR 5C-3 Technical Report on Equations and Calculations for Casing, Tubing and Line Pipe used as Casing and Tubing, and Performance Properties Tables for Casing and Tubing."

(b) Reconditioned casing that is permanently set in a well shall be hydrostatically pressure tested with an applied pressure at least 1.2 times the maximum internal pressure to which the casing may be subjected, based upon known or anticipated subsurface pressure, or pressure that may be applied during stimulation, whichever is greater, and assuming no external pressure. The casing shall be marked to verify the test status. The owner shall provide a copy of the test results to the inspector before the casing is installed in the well.

(c) Where subsurface reservoir pressure is unknown and cannot be reasonably anticipated, the owner shall assume a pressure gradient of 0.45 pounds per square inch per foot in a fully evacuated hole, under shut-in conditions.

(d) All hydrostatic pressure tests shall be conducted pursuant to API "5 CT Specification for Casing and Tubing" or other method(s) approved by the chief.

(2) Reconditioned casing shall not be set in a well unless it has passed an approved hydrostatic pressure and drift test or has otherwise been approved by the inspector. The inspector shall reject casing that is excessively pitted, patched, bent, corroded, or crimped, or if threads are severely worn or damaged.

(3) In order to verify casing integrity and proper cement displacement, the owner shall pressure test each cemented casing string greater than two hundred feet long in accordance with the test method of either paragraph (D)(3)(a) or (D)(3)(b) of this rule.

(a) Immediately upon landing the latch-down plug, the owner shall increase displacement pressure by at least five hundred pounds per square inch and hold pressure for five minutes. If

pressure declines by ten per cent or more, casing integrity and cement placement shall be further evaluated and appropriate corrective action shall be taken to verify casing integrity and cement displacement. If the float apparatus does not hold, the owner shall pump the volume that flowed back, and shut in until the cement has sufficiently set.

(b) Prior to drilling the cement plug, the owner shall test any permanently cemented casing strings, at a minimum pump pressure in pounds per square inch calculated by multiplying the length of the casing string by 0.2, but not less than three hundred pounds per square inch. The test pressure may not decline by more than ten per cent during the thirty-minute test period.

(i) If, at the end of thirty minutes of such testing, the pressure shows a drop greater than ten per cent, the owner shall not resume further operations until the condition is corrected. A pressure test demonstrating a pressure drop equal to or less than ten per cent after thirty minutes is evidence that the condition has been corrected.

(ii) Casing integrity may be verified in conjunction with blowout preventer testing without a test plug using either the test pressure described in paragraph (D)(3)(b) of this rule, or the pressure required to test the blowout preventer, whichever is greater.

(E) Casing shoe tests. The chief may require the owner to conduct a casing shoe test after drilling below the surface casing and/or the intermediate casing seat if the pressure gradient of the permitted hydrocarbon reservoir exceeds 0.5 pounds per square inch per foot, or in areas where fracture gradients are unknown.

(F) Surface water infiltration. Before drilling below the first casing string, the owner shall either crown the location around the wellbore to divert fluids to a flow ditch, or construct a liquid-tight cellar at least three feet in diameter to prevent surface infiltration of fluids adjacent to the wellbore. If a reserve pit is used to contain cuttings and drilling fluids, the flow ditch from the cellar or crown to the reserve pit shall also be liquid tight.

(G) Mouse and rat holes. If a mouse and/or rat hole is used, it shall be constructed of liquid tight steel pipe with a welded basal plate or bull plug. The annulus shall be sealed with clay or cement in a manner that effectively prevents fluids from entering the annular space.

(H) Wellbore diameters.

(1) The diameter of each section of the wellbore in which casing will be set and cemented shall be at least one inch greater than the outside diameter of casing collar to be installed, unless otherwise approved by the chief.

(2) The wellbore diameter shall be consistent with manufacturer's recommendations for all float equipment, centralizers, packers, cement baskets, and all other equipment run into the wellbore on casing.

(I) Wellbore conditioning.

(1) Prior to cementing, the wellbore shall be conditioned to kill gas flow, foster adequate cement displacement, and ensure a high quality bond between cement and the wellbore. If circulation cannot be established or maintained, the inspector shall require testing to evaluate cement displacement. If tests indicate cement displacement or quality is inadequate to meet the standards, the owner shall not resume drilling activity until corrective action has achieved compliance with the standards.

(2) If oil-based drilling mud is used, the wellbore shall be conditioned with a mud flush and the spacer volume should be designed for a minimum of ten minutes of contact time prior to cementing production casing in the horizontal segment of a wellbore.

(3) Where underground mine voids, solution voids, or other geologic features render circulation infeasible, the owner shall install a cement basket or other approved device as close as possible above the top of the void or thief zone. Mine strings shall be cemented above and below the mine void in accordance with paragraph (M) of this rule.

(J) Cement standards.

(1) All cement placed into the wellbore shall be Portland cement that is manufactured to meet the standards of API "10 A Specification for Cements and Materials for Well Cementing" or ASTM "C150/C150M Standard Specification for Portland Cement."

(2) Cemented conductor, mine, and surface casing strings shall remain static until all cement has reached a compressive strength of at least five hundred pounds per square inch before drilling the plug, or initiating a test.

(3) The tail cement for all intermediate and production casings and liners shall remain static until the cement has reached a compressive strength of at least five hundred pounds per square inch before drilling out the plug or initiating a test. Tail cement shall have a seventy-two-hour compressive strength of at least one thousand two hundred pounds per square inch. Lead cements with volume extenders may be used to seal these strings, but in no case shall the cement have a compressive strength of less than one hundred pounds per square inch at the time of drill out nor less than two hundred fifty pounds per square inch twenty-four hours after being placed.

(4) The density of the cement slurry shall be based upon a laboratory free fluid separation test demonstrating an average fluid loss no more than three milliliters per two hundred fifty milliliters of cement tested in accordance with API "RP 10 B-2 Recommended Practice for Testing Well Cements." Slurry should be mixed and pumped at a rate that ensures consistent slurry density.

(5) The chief may require, by permit condition, a specific cement mixture to be used in any well or any area if evidence of local conditions indicate a specific cement is necessary.

(6) The owner shall ensure that the cement mix water quality and chemistry is proper for the cement slurry design. An authorized representative of the owner shall be on site observing the

cement mixing equipment for the entire duration of the cement mixing and placement to ensure that cement slurry design parameters are followed.

(7) Sulfate resistant cement shall be used whenever necessary to protect the casing string and prevent the migration of hydrogen sulfide. When the owner is drilling in a township where hydrogen sulfide occurs commonly in specific intervals, the chief shall require as a permit condition that the owner use sulfate resistant cement.

(8) Compressive strength test requirements.

(a) Cement mixtures for which published performance data are not available shall be tested by the owner or service company and approved by the chief prior to usage. Tests shall be made on representative samples of the basic mixture of cement and additives used, using distilled water or potable tap water for preparing the slurry. The tests shall be conducted using the equipment and procedures established in API "RP 10 B-2 Recommended Practice for Testing Well Cements." Test data showing competency of a proposed cement mixture to meet the above requirements shall be furnished to the inspector prior to the cementing operation. To determine that the minimum compressive strength has been obtained, the owner shall use the typical performance data for the particular cement mixture used in the well at the following temperatures and at atmospheric pressure:

(i) For conductor, mine string, and surface casing cement, the test temperature shall be sixty degrees Fahrenheit;

(ii) For intermediate and production casing cement, the test temperature shall be within ten degrees Fahrenheit of the formation equilibrium temperature of the cemented interval.

(K) Centralizer standards.

(1) All bowspring centralizers shall meet the standards of API "10 D, Specification for Bow-Spring Casing Centralizers."

(2) All rigid centralizers shall meet the standards of API "10 TR 4 Considerations Regarding Selection of Centralizers for Primary Cementing Operations."

(3) Casing shall be centralized in each segment of the wellbore to provide sufficient casing standoff and foster effective circulation of cement to isolate critical zones including aquifers, flow zones, voids, lost circulation zones, and hydrocarbon production zones.

(L) Notification. The owner shall notify the inspector at least twenty-four hours prior to setting any casing or liner string and before commencing any casing cementing operation pursuant to this rule to enable the inspector to participate in the pre-job safety and procedures meeting, independently test mix water, evaluate casing condition, and observe and document the execution of the cementing operation.

(M) Casing strings.

(1) Drive pipe. Drive pipe may be driven through unconsolidated materials and need not be cemented if there is no annular space.

(2) Mine string.

(a) Casing through an active underground mining operation.

(i) If a well is drilled within the geographic limits of an active underground mining operation, the owner shall construct the well in a manner that protects personnel working in the mine, and, if possible, shall locate the well so as to penetrate a pillar, a barrier, or the unmined perimeter of the seam.

(ii) If a well is drilled within the limits of an active underground mining operation that may penetrate the excavations of a mine and groundwater has been encountered below the base of the conductor casing, the hole shall be reduced fifteen feet above the roof of the mine. This string of casing shall be cemented to surface to shut off all groundwater. Drilling shall continue to a point at least thirty but no more than fifty feet below the floor of the mine and another string of casing shall be set and cemented.

(b) Casing through any underground mine void. After drilling through any underground mine void or rubble zone, casing shall be set at least thirty feet but no more than fifty feet below the base of the mine void or rubble zone and cemented at this point. The owner shall design the casing and cementing plans considering the maximum number of casing strings that may be necessary to isolate mine voids prior to setting and cementing surface casing.

(c) A mine string shall not serve as the only water protection casing. Where a mine string isolates one or more water-bearing zones, either surface or intermediate casing shall be cemented to surface inside the mine string.

(d) Each mine string shall be equipped with a guide shoe or other appropriate device to prevent deformation of the bottom of the casing.

(e) Cementing the mine string.

(i) If a mine void or rubble zone is encountered, the owner shall equip the mine string with a cement basket or other approved device as close to the top of the void as practical.

(ii) The interval from the casing seat to the base of the coal seam shall be cemented.

(iii) Cement shall be placed on top of the basket or other approved device by pour string or pumping from surface.

(3) Conductor casing.

(a) Conductor casing shall be set where necessary to:

(i) Stabilize unconsolidated sediments;

(ii) Isolate shallow aquifers that provide or are capable of providing groundwater for water wells and springs in the vicinity of the well;

(iii) Isolate groundwater before penetrating the working of an active underground mine; or

(iv) Provide a base for equipment to divert shallow, naturally occurring natural gas.

(b) Conductor casing shall be cemented to surface if there is an annular space.

(c) If circulated cement drops or fails to circulate, cement shall be emplaced from surface by a method approved by the inspector.

(4) Surface casing.

(a) An owner shall set and cement sufficient surface casing at least fifty feet below the base of the deepest USDW, or at least fifty feet into competent bedrock, whichever is deeper, and as specified by the permit, unless otherwise approved by the chief. Surface casing shall be cemented before drilling through hydrocarbon bearing flow zones or zones which contain concentrations of total dissolved solids exceeding ten thousand milligrams per liter unless otherwise approved by the chief. For the purposes of this paragraph, hydrocarbon bearing flow zones shall include all formations that have historically, are currently, or are anticipated to be commercially productive.

(b) Sufficient cement shall be used to fill the annular space outside the casing from the seat to the ground surface or to the bottom of the cellar.

(c) If cement is not circulated to the ground surface or the bottom of the cellar and the top of cement cannot be measured from surface, the owner shall perform tests as approved by the inspector. The owner shall notify the inspector prior to performing the tests. After the nature of the well construction deficiency is determined, the owner shall contact the inspector and obtain approval for the procedures to be used to perform any required additional cementing operations. Surface casing shall not be perforated for the purpose of remedial cementing unless intermediate casing is set and cemented to surface, or otherwise authorized by the chief.

(d) If remedial options fail and the chief determines that USDWs are not adequately isolated or protected, the chief may issue an administrative order suspending further drilling operations. If the chief determines additional remedial measures will not isolate and protect the USDW, the chief shall issue an administrative order requiring the well to be plugged.

(e) For surface holes drilled through glacial drift deposits that exceed one hundred feet in thickness, a guide shoe shall be run on the surface casing.

(f) In areas where bedrock USDWs cannot be mapped, except in areas subject to paragraph (M)(4)(g) of this rule, surface casing shall be set and cemented at the depth stated in paragraph (M)(4)(f)(i) or (M)(4)(f)(ii) of this rule, whichever is deeper and as determined by permit condition, or, as an alternative method for protecting groundwater resources, at the depth stated in paragraph (M)(4)(f)(iii) of this rule:

(i) At least three hundred feet deep; or

(ii) At least one hundred feet below the deepest local perennial stream base; or

(iii) At least fifty feet below the base of the lowest spring or deepest water well developed for any legitimate purpose, based upon an inventory of water supplies within a five hundred foot radius of the proposed oil and gas well. If there are no springs or water wells within the five hundred foot radius, conductor casing shall be set and cemented at a minimum depth of one hundred feet. After conductor casing is set through the deepest useable water zone and cemented to surface, the owner shall set and cement to surface a surface casing string through water zones that may include brackish or brine bearing zones. This casing string shall be set and cemented to surface before the owner drills into potential flow zones that can reasonably be expected to contain hydrocarbons in commercial quantities.

(g) In areas where bedrock USDWs cannot be mapped and where groundwater resources can be developed in valley-fill aquifers, surface casing shall be cemented at least one hundred feet below the base of the valley-fill aquifer for any well within one thousand feet of the one hundred year floodplain..

(5) Alternative surface casing requirements. An alternative method of protecting USDWs may be approved upon written application to the chief. The owner shall state the reason for the alternative USDW protection method and outline the alternative method for casing and cementing through the deepest USDW. Alternative methods for setting more than specified amounts of surface casing for well control purposes may be requested on a field-specific or area-specific basis. Alternative methods for setting less than specified amounts of surface casing shall be authorized on an individual well basis only. The chief may approve, modify, or reject the proposed alternative method. The chief shall reject the proposed method by order if the owner has not demonstrated that the alternative casing plan will meet the standards of section [1509.17](#) of the Revised Code and this rule. The owner may file an appeal with the oil and gas commission pursuant to section [1509.36](#) of the Revised Code. An owner shall obtain the chief's written approval of any alternative method before commencing operations.

(6) Intermediate casing.

(a) Intermediate casing may be set at the discretion of the owner to isolate flow zones, lost circulation zones, or other geologic hazards, unless otherwise required by this rule or the approved permit.

(b) The owner shall set and cement intermediate casing in a competent formation in the following situations:

(i) If groundwater containing total dissolved solids of less than ten thousand milligrams per liter is encountered below the base of cemented surface casing;

(ii) Through a gas storage reservoir when drilling to strata beneath a gas storage reservoir within the storage protective boundary;

(iii) When drilling to permitted hydrocarbon zones deeper than the silurian clinton sandstone east of the updip pinchout; such casing shall be set through the Mississippian berea sandstone, or one thousand feet, whichever is greater;

(iv) For wells drilled horizontally, in the Marcellus shale, or deeper, such casing shall be set through the Mississippian berea sandstone or one thousand feet, whichever is greater; or

(v) In other situations as determined by the chief.

(c) For each intermediate string of casing that is permanently set in the wellbore, tail cement shall extend from the seat to a point at least five hundred true vertical feet above the casing seat, or to a point at least two hundred feet above the seat of the next larger diameter casing string.

(d) If the intermediate wellbore penetrates one or more flow zones, cement shall be placed at least five hundred feet above the uppermost flow zone. The cement used to control annular gas migration from flow zones shall be designed consistent with recommended methods in API "65-2 Isolating Potential Flow Zones during Construction." The cement shall reach a compressive strength of five hundred pounds per square inch before drill out. Annular pressure shall be measured prior to drill out to verify isolation of the flow zone.

(e) If the cement placement indicators including fluid returns, lift pressure, or annular pressure indicate inadequate isolation of any flow zone, the owner shall obtain approval of the inspector for the proposed plan for determining top of cement and/or performing additional cementing operations.

(f) Liners may be set and cemented as intermediate casing provided that the cemented liner has a minimum of two hundred feet of cemented lap within the next larger casing, and the liner top is pressure tested to a level equal to or higher than the maximum anticipated pressure to be encountered in the interval to be drilled below the liner. The test pressure may not decline by more than ten per cent during the thirty minute test period. If at the end of a thirty minute pressure test, the pressure has dropped by more than ten per cent, the owner shall not resume operations until the condition is corrected and verified by a thirty minute pressure test.

(7) Production casing and liners.

(a) Cemented completions.

(i) The production casing shall be cemented with sufficient cement to fill the annular space to a point at least five hundred true vertical feet above the seat in an open-hole vertical completion or the uppermost perforation in a cemented vertical completion, or one thousand feet above the kickoff point of a horizontal well. If any flow zone is present, including strata that may contain hydrocarbons in commercial quantities or a hydrogen sulfide-bearing flow zone, the casing shall be cemented in a manner that effectively isolates such strata with at least five hundred feet of cement above the zone. The cement slurry shall be designed to control annular gas migration consistent with recommended methods in API "65-2 Isolating Potential Flow Zones during Construction."

(ii) When cementing the production string of a well that will be stimulated by hydraulic fracturing, and the uppermost perforation is less than five hundred feet below the base of the deepest USDW, sufficient cement shall be used to fill the annular space outside the casing from the seat to the ground surface or to the bottom of the cellar. If cement is not circulated to the ground surface or the bottom of the cellar, the owner shall notify the inspector and perform tests approved by the inspector. After the top of cement outside the casing is determined, the owner or his authorized representative shall contact the inspector and obtain approval for the procedures to be used to perform any required additional cementing operations.

(iii) Liners may be set and cemented as production casing, provided that the cemented liner has a minimum of two hundred true vertical depth feet of cemented lap within the next larger casing, and the liner top is pressure tested to a level that is at least five hundred pounds per square inch higher than the maximum anticipated pressure to be encountered by the wellbore during completion and production operations. The test pressure may not decline by more than ten per cent during the thirty minute test period. If at the end of a thirty minute pressure test, the pressure has dropped by more than ten per cent, the owner shall not resume operations until the condition is corrected and verified by a thirty minute pressure test. Liners may only be set and cemented as production casing in horizontal shale gas wells if approved by the chief.

(iv) If operations indicate inadequate cement coverage or isolation of the hydrocarbon bearing zones, the owner shall obtain approval of the inspector for procedures to determine the top of cement and/or perform corrective actions.

(b) Packer completions. Packer or other non-cemented completions may be used in place of cemented completions. If intermediate casing is run with this type of completion, cementing shall meet the requirements of paragraph (M)(7) of this rule. If intermediate casing is not run, a multi-stage cementing tool shall be run above the top external packer and cemented to fill the annular space outside the casing to the surface or to a point at least five hundred feet above the packer or casing seat. The chief may approve alternative completion proposals. Any approved alternative shall meet the well construction standards of section [1509.17](#) of the Revised Code and these rules.

(N) Annular pressure.

(1) Wellhead assemblies shall be used to maintain surface control of the well. Each component of the wellhead shall have a working pressure rating equal to or greater than the highest anticipated operating pressure to which the particular component might be exposed during the course of drilling, testing, completing, stimulating, or producing the well.

(2) The valve on the surface-production casing annulus or surface-intermediate casing annulus shall be accessible and equipped with a pressure gauge to allow continual monitoring of mechanical integrity. The valve shall also be equipped with a properly functioning pressure relief valve set at or below the hydrostatic pressure at the surface casing seat assuming a pressure gradient of 0.433 pounds per square inch times the height of the groundwater column. If the hydrostatic head at the casing seat is unknown, the surface-production casing annulus is assumed to be over-pressurized when annular pressure measured at surface exceeds 0.303 multiplied by the length of the surface casing. If the inspector approves perforation of surface casing and intermediate casing is not installed and cemented, the allowable annular pressure measured at surface in pounds per square inch will be established by multiplying the depth of the uppermost perforation by 0.303.

(3) If any time after installation of the wellhead assembly, the sustained annular pressure exceeds the prescribed pressure or releases the pressure relief valve, the owner shall immediately notify the inspector.

(4) The inspector shall approve tests or logging procedures to evaluate the cause of over-pressurized conditions and approve a plan for corrective action. If remedial cementing, replacement of defective casing, or implementation of other mechanical barriers or operational solutions cannot eliminate over-pressurized conditions, the owner shall plug the well.

(5) During stimulation or workover operations, all annuli shall be pressure-monitored. Stimulation or workover operations shall be immediately suspended for any inexplicable pressure deviation above those anticipated increases caused by pressure or thermal transfer. In the event that stimulation fluids circulate, or annular pressures deviate from anticipated, the owner shall immediately notify the inspector and acquire approval for remediation of casing or cement. If the chief determines that the stimulation of the well has resulted in irreparable damage to the well, the chief shall order that the well be plugged and abandoned within thirty days of issuance of the order.

(O) Well construction records.

(1) Within sixty days after drilling to total depth, the owner shall file a legible copy of all cement job logs with the chief furnishing complete data documenting the cementing of all cemented casing strings, on a form approved by the chief and signed by the owner of the well or his authorized agent having personal knowledge of the facts, and representatives of the cementing company performing the cementing job, attesting to compliance with the cementing requirements of this rule.

(2) Each job log shall include the following information:

- (a) Date cemented;
- (b) Name of the cementing contractor;
- (c) Mix water temperature and pH;
- (d) Whether or not the wellbore circulated prior to cementing;
- (e) Hole diameter in inches, casing outer diameter in inches, casing length in feet, float equipment depth in feet, basket depth in feet, and centralizer depth in vertical segments of the wellbore in feet;
- (f) Number of centralizers placed in the horizontal segment of a wellbore;
- (g) Cement type, additives by percent of unit volume, volume of cement in sacks, cement yield per sack, average slurry density in pounds per gallon, slurry volume in barrels, and displacement volume in barrels;
- (h) Pumping rates in barrels per minute, displacement pressure in pounds per square inch, and final circulating pressure prior to landing the plug in pounds per square inch;
- (i) The time the latch-down or wiper plug landed;
- (j) Casing test pressure in pounds per square inch and final test pressure in pounds per square inch;
- (k) Whether or not cement circulated to surface; and
- (l) Volume of cement slurry circulated to surface in barrels.

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