DEFINITIONS (100 Series)

ANNULAR OVER-PRESSURIZATION means a wellbore condition that occurs when fluids in the annulus between the surface casing and the intermediate or production casings are pressurized to a degree that may cause migration of confined fluids or gases out of the annular space.

ANNULUS means the space between the borehole and a casing string or between two casing strings in a well.

PROTECTED WATER means groundwater that the Director has designated as protected water pursuant to Rule 209 or groundwater that contains less than 10,000 milligrams per liter total dissolved solids, contains a sufficient quantity to supply a public water system, is not a hydrocarbon formation, and is situated at a depth of less than 3,000 feet.

POTENTIAL FLOW ZONES means formations or zones which have the potential to flow or are geotechnically unstable to stand under pressure.

STIMULATION means a treatment performed on a well to restore or enhance the productivity of the well and includes hydraulic fracture treatments and low pressure matrix treatments such as acidizing.

GENERAL RULES (200 Series)

201. EFFECTIVE SCOPE OF RULES AND REGULATIONS

All rules and regulations of a general nature herein promulgated to prevent waste and to conserve oil and gas in the State of Colorado while protecting public health, safety, and welfare, including the environment and wildlife resources, shall be effective throughout the State of Colorado and be in force in all pools and fields except as may be amended, modified, altered or enlarged generally or in specific individual pools or fields by orders heretofore or hereafter issued by the Commission, and except where special field rules apply, in which case the special field rules shall govern to the extent of any conflict. Operators will ensure compliance with all applicable rules and regulations.

[no changes proposed to other subparts]

207. TESTS AND SURVEYS

207.a. **Tests and surveys.** When deemed necessary or advisable, the Commission is authorized to require that tests or surveys be made to determine the presence of waste or occurrence of pollution. The Commission, in calling for reports under Rule 206 and tests or surveys to be made as provided in this rule, shall designate the time allowed to the operator for compliance, which provisions as to time shall prevail over any other time provisions in these rules.

207.b. **Bradenhead ~~monitoring~~test areas.**

(1) The ~~Director shall have authority to designate~~ Commission may approve specific fields or portions of fields as bradenhead test areas. ~~At all wells within the~~

A. The Director may propose specific fields or portions of fields as bradenhead test ~~area, the bradenhead access to the annulus between the production and surface casing, as well as any intermediate casing, shall be equipped with fittings to allow safe and convenient determinations of pressure and fluid flow. All valves used for annular pressure monitoring~~

~~shall remain exposed and not buried to allow for COGCC visual inspection at all times. A rigid housing may be used to protect the valves, provided that the housing can be easily opened or removed by the operator upon request of COGCC staff. Any such proposed bradenhead test area shall be designated~~areas by notice to all operators on record within the area and by publication.

B. The proposed designation, if no protests are timely filed, ~~shall~~will be placed upon the Commission consent agenda for the next regular ~~monthly~~ meeting of the Commission following the month in which such notice ~~is~~was given~~, and shall be approved or heard by~~. The Commission will hear the proposed designation in accordance with Rule 531. ~~Such designation shall be~~

C. If a protest is timely filed, the Commission will hear the proposed designation in accordance with the 500 Series Rules.

(2) The Commission order will describe the bradenhead testing or monitoring required and become effective ~~immediately,~~ upon approval by the Commission~~.~~ unless the Commission orders otherwise.

~~(2)~~ **~~All operators within any bradenhead test area shall have thirty (30) days after the effective date of the designation to commence the taking of bradenhead pressure readings in all wells located therein which are equipped for such readings. The operator shall equip any well which is not so equipped within ninety (90) days of the effective date, and within thirty (30) days thereafter the operator shall take the required reading. Such readings shall include the date, time and pressure of each reading, and the type of fluid reported. Such readings shall be taken in bradenhead test areas annually, maintained at the operator's office for a period of five (5) years, and shall be reported to the Director upon written request.~~**

209. ~~PROTECTION~~ISOLATION OF COAL SEAMS AND PROTECTED WATER~~-BEARING FORMATIONS~~

In the conduct of oil and gas operations each owner ~~shall~~will exercise due care in the ~~protection~~isolation of coal seams and protected water. The Director may consult with the Colorado Geologic Survey, the Colorado Division of Water Resources, or the Colorado Water Quality Control Commission, in order to designate a water-bearing ~~formations as required by the applicable statutes of the State of Colorado~~formation as a protected water.

Special precautions ~~shall~~will be taken in drilling and abandoning wells to guard against any loss of artesian water from the stratum in which it occurs and the contamination of ~~fresh~~protected water(s) by ~~objectionable~~produced water, ~~oil~~liquid hydrocarbons, or natural gas. Before any oil or gas well is completed ~~as a producer~~, all oil, gas, and protected water ~~strata~~bearing formations above and below the producing ~~horizon shall~~formation(s) will be ~~sealed or separated in order~~isolated to prevent the intermingling of ~~their contents~~formation fluids and gases between formations.

DRILLING, DEVELOPMENT, PRODUCTION AND ABANDONMENT (300 Series)

301. RECORDS, REPORTS, NOTICES-GENERAL

Any written notice of intention to do work or to change plans previously approved must be filed with the Director, and must reach the Director and receive approval before the work is begun, or such approval may be given orally and, if so given, shall thereafter be confirmed to the Director in writing.

In case of emergency, or any situation where operations might be unduly delayed, any notice or information required by these rules and regulations to be given to the Director may be given orally or by wire, and if approval is obtained the transaction shall be promptly confirmed in writing to the Director, as a matter of record.

Immediate notice shall be given to the Director when public health or safety is in jeopardy. Notice shall also be given to the Director of any other significant downhole problem or mechanical failure in any well within ten (10) days.

The owner shall keep on the leased premises, or at the owner's headquarters in the field, or otherwise conveniently available to the Director, accurate and complete records of the drilling, redrilling, deepening, repairing, plugging or abandoning of all wells, and of all other well operations, and of all alterations to casing. These records shall show all the formations penetrated, the content and quality of oil, gas or water in each formation tested, and the grade, weight and size, and landed depth of casing used in drilling each well on the leased premises, and any other information obtained in the course of well operation. Such records on each well shall be transferred to and maintained by any subsequent owner.

Whenever a person has been designated as an operator by an owner or owners of the lease or well, such an operator may submit the reports as herein required by the Commission.

303. REQUIREMENTS FOR FORM 2, APPLICATION FOR PERMIT-TO-DRILL, DEEPEN, RE-ENTER, OR RECOMPLETE, AND OPERATE; FORM 2A, OIL AND GAS LOCATION ASSESSMENT.

303.a. **FORM 2. APPLICATION FOR PERMIT-TO-DRILL, DEEPEN, RE-ENTER, OR RECOMPLETE, AND OPERATE.**

[no changes proposed to previous subparts]

(5) **Information Requirements.**

The Form 2 requires the following information:

A. Every Form 2, Application for Permit-to-Drill, shall specify the distance between the well and wall or corner of the nearest building, Building Unit, High Occupancy Building Unit, Designated Outside Activity Area, public road, above ground utility, railroad, and property line.

B. **Wellbore Diagram.** A Form 2 to deepen, to re-enter, to recomplete to a different reservoir, or to drill a sidetrack of an existing well shall have a wellbore diagram attached.

C. A Form 2 to deepen, to re-enter, to recomplete to a different reservoir, or to drill a sidetrack of an existing well shall include the details of the proposed work.

D. **Well Location Plat.** A Form 2 to drill a new well or a new wellbore shall have a well location plat attached. The plat shall be a current scaled drawing(s) of the entire section(s) penetrated by the proposed well with the following minimum information:

i. Dimensions on adjacent exterior section lines sufficient to completely describe the quarter section(s) containing the proposed well surface location, top of productive zone, wellbore, and bottom hole location shall be indicated. If dimensions are not field measured, state how the dimensions were determined.

ii. For irregular, partial or truncated sections, dimensions will be furnished to completely describe the entire section(s) containing the proposed well.

iii. The field-measured distances from the nearer north/south and nearer east/west section lines shall be measured at 90 degrees from said section lines to the well surface location and referenced on the plat. For unsurveyed land grants and other areas where an official public land survey system does not exist, the well locations shall be spotted as footages on a protracted section plat using Global Positioning System (GPS) technology and reported as latitude and longitude in accordance with Rule 215.

iv. The latitude and longitude of the proposed surface location shall be provided on the drawing with a minimum of five (5) decimal places of accuracy and precision using the North American Datum (NAD) of 1983 (e.g.; latitude 37.12345 N, longitude 104.45632 W). ~~ ~~If GPS technology is utilized to determine the latitude and longitude, all GPS data shall meet the requirements set forth in Rule 215~~. a. through h~~.

v. The well location plat ~~for deviated~~must include the proposed top of the productive zone and the bottom hole location. If the wellbore ~~(directional, highly deviated, or horizontal) to be drilled utilizing controlled directional drilling methods shall meet the requirements set forth in Rule 321.~~penetrates multiple sections, the well location plat will depict every section penetrated by the wellbore.

vi. A map legend.

vii. A north arrow.

viii. A scale expressed as an equivalent (e.g. - 1~~" = 1000'~~ inch = 1000 feet).

ix. A bar scale.

x. The ground elevation.

xi. The basis of the elevation (how it was calculated or its source).

xii. The basis of bearing or interior angles used.

xiii. Complete description of monuments and/or collateral evidence found; all aliquot corners used shall be described.

xiv. The legal land description by section, township, range, principal meridian, baseline and county.

xv. Operator name.

xvi. Well name and well number.

xvii. Date of completion of scaled drawing.

E. **Deviated Drilling Plan.** A Form 2 to drill a deviated ~~wellbore~~ (directional, highly deviated, or horizontal) wellbore utilizing controlled directional drilling methods ~~shall~~will have the deviated drilling plan attached. The deviated drilling plan ~~shall~~will meet the requirements set forth in Rule 321.

F. **Casing and Cementing Plan.** A Form 2 to drill a well will include a casing and cementing plan that addresses anticipated protected water, potential flow and hydrocarbon bearing zones, and subsurface hazards.

G. **Statewide Offset Well Evaluation.**

i. The Form 2 will include an offset well evaluation. The operator will evaluate the construction and integrity of all offset wells within 1,500 feet of the proposed wellbore. The operator will provide a plan to address all offset wells within 1,500 feet that do not meet isolation and integrity requirements.

ii. The operator will attach any consents obtained pursuant to Rule 317.y. to the Form 2.

iii. The operator will provide notice as required by Rule 317.z.

H. **Stimulation at Depths 2,000 Feet or Less.** If an operator proposes to stimulate a well at a depth less than 2,000 feet true vertical depth (TVD) below the ground surface, the following requirements apply:

i. **Geology and Hydrogeology Assessment.** The operator will characterize and assess the local geology and groundwater resources within 2 miles of the proposed oil and gas well.

ii. **Engineering Assessment.** The operator will describe the proposed drilling process, well design, completion process, stimulation process, production methods, and facilities. The assessment will identify any risks to geology and hydrogeology and explain how the operator will prevent, minimize, or mitigate any identified risk.

[no changes proposed to further subparts]

308A. COGCC Form 5. DRILLING COMPLETION REPORT

308A.a. **Preliminary Drilling Completion Report, Form 5**

(1) If drilling is suspended prior to reaching total depth and does not recommence within 90 days, an operator ~~shall~~will submit a "Preliminary" Drilling Completion Report, Form 5 within the next 10 days.

(2) **Information Requirements.** The "Preliminary" Drilling Completion Report, Form 5 ~~shall~~will include the following information:

A. The date drilling activity was suspended;

B. The reason for the suspension;

C. The anticipated date and method of resumption of drilling; and

D. The details of all work performed to date, including all the information required in Rule 308A.b.(2) that has been obtained.

(3) A “Final” Form 5 ~~shall~~will be submitted after reaching total depth as required by Rule 308A.b.

308A.b. **Final Drilling Completion Report, Form 5**

(1) A “Final” Drilling Completion Report, Form 5, ~~shall~~will be submitted within 60 days of rig release after drilling, sidetracking, or deepening a well to total depth. In the case of continuous, sequential drilling of multiple wells on a pad, the Final Form 5 ~~shall~~will be submitted for all the wells within 60 days of rig release for the last well drilled on the pad.

(2) **Information Requirements.** The “Final” Drilling Completion Report, Form 5 ~~shall~~will include the following information:

A. A cement job summary for every casing string set~~, except for those with verification by a cement bond log as~~ or required by ~~Rule 317.p. or by~~ permit conditions, ~~shall~~will be attached to the form. The summary report will include all cement reports and charts related to cement placement.

B. All logs run, open-hole and cased-hole, electric, mechanical, mud, or other, ~~shall~~will be reported and ~~copies~~ submitted as specified here:

i. A digital image file (PDF, TIFF, PDS, or other format approved by the Director) of every log run ~~shall~~will be attached to the form. ~~A paper copy may be submitted in lieu of the~~. The digital image file ~~and shall be so noted on the form~~of the cement bond log will include a variable density display.

ii. A digital data file (LAS, DLIS, or other format approved by the Director) of every log run, with the exception of mud logs and cement bond logs, ~~shall~~will be attached to the form.

C. All drill stem tests ~~shall~~will be reported and test results ~~shall~~will be attached to the form.

D. All cores ~~shall~~will be reported and the core analyses attached to the form. If core analyses are not yet available, the Operator ~~shall~~will note this on the Form 5 and provide a copy of the analyses as soon as it is available, via a Sundry Notice, Form 4.

E. Any directional survey ~~shall~~will be attached to the form and ~~shall~~will meet the requirements set forth in Rule 321.

F. The latitude and longitude coordinates of the “as drilled” well location ~~shall~~will be reported on the form. The latitude and longitude coordinates ~~shall~~will be in decimal degrees to an accuracy and precision of five decimals of a degree using the North American Datum (NAD) of 1983 (e.g.; latitude 37.12345, longitude -104.45632). If GPS technology is utilized to determine the latitude and longitude, all GPS data ~~shall~~will meet the requirements set forth in Rule 215 ~~and~~. The operator will report the ~~Position Dilution of Precision (PDOP) reading, the GPS instrument operator’s name~~accuracy value expressed in meters and the date of the GPS measurement ~~shall also be reported~~ on the Form 5.

G. The bradenhead threshold monitoring value calculated as 30% of the true vertical depth (TVD) in feet of the surface casing shoe and expressed in psig.

(3) The operator will submit a Drilling Completion Report, Form 5, ~~shall be submitted~~ within 30 days of the completion of well operations in which the casing or cement in the wellbore is

changed. Changes to the wellbore casing or cement configuration include, but ~~shall~~are not be limited to, the operations listed in Rule 317.e.(~~1~~5). The form ~~shall~~will include the following attachments:

A. Daily operations summary;

B. Cement verification reports from the contractor; and

C. Cement bond log(s) if run by rule, choice or as a required condition of the repair approval, submitted per Rule 308A.b.(2).B.

308B. COGCC Form 5A. COMPLETED INTERVAL REPORT

308B.a. The operator will submit the Completed Interval Report, Form 5A,~~ shall be submitted~~ within 30 days after a formation is completed (successful or not); after a formation is temporarily abandoned or permanently abandoned; after a formation is recompleted, reperforated or restimulated; and after a formation is commingled. The operator will report the details of hydraulic fracturing, acidizing, or other ~~similar treatment~~stimulation method, including the volumes of all fluids involved,~~ shall be reported~~ on the Form 5A.

308B.b. The operator will report the parameters as required by the Completed Interval Report, Form 5A.

308B.c. In order to resolve completed interval information uncertainties, the Director may require an operator to submit further information in an additional Completed Interval Report, Form 5A.

311. COGCC Form 6. WELL ABANDONMENT REPORT

311.a. **Notice of Intent to Abandon, Form 6.** Prior to the abandonment of a well, a Well Abandonment Report, Form 6 – Notice of Intent to Abandon, ~~shall~~will be submitted to, and approved by, the Director. The Form 6 - Notice of Intent to Abandon ~~shall~~will be completed and attachments included to fully describe the proposed abandonment operations. This includes the proposed depths of mechanical plugs and casing cuts; the proposed depths and volumes of all cement plugs; the amount, size and depth of casing and junk to be left in the well; the volume, weight, and type of fluid to be left in the wellbore between cement or mechanical plugs; and the nature and quantities of any other materials to be used in the plugging. The operator ~~shall~~will provide a current wellbore diagram and a wellbore diagram showing the proposed plugging procedure with the Form 6. If the well is not plugged within six months of approval, the operator will file a new Form 6 – Notice of Intent to Abandon~~ shall be filed~~.

311.b. **Subsequent Report of Abandonment, Form, 6.**

(1) Within 30 days after abandonment, the Well Abandonment Report, Form 6 - Subsequent Report of Abandonment, ~~shall~~will be filed with the Director. The abandonment details ~~shall~~will include an account of the manner in which the abandonment or plugging work was performed. Copies of any casing pressure test results and downhole logs run during plugging and abandonment ~~shall~~will be submitted with Form 6. Additionally, plugging verification reports detailing all procedures are required. A Plugging Verification Report ~~shall~~will be submitted for each person or contractor actually setting the plugs. The Form 6 - Subsequent Report of Abandonment, and the Plugging Verification Reports ~~shall~~will detail the depths of mechanical plugs and casing cuts, the depths and volumes of all cement plugs, the amount, size and depth of casing and junk left in the well, the volume and weight of fluid left in the wellbore and the

nature and quantities of any other materials used in the plugging. Plugging Verification Reports ~~shall~~will conform with the operator's report and both ~~shall~~will show that plugging procedures are at least as extensive as those approved by the Director.

(2) The Director will review an operator's Well Abandonment Report, Form 6 - Subsequent Report of Abandonment, plugging records, and the well file to evaluate the abandonment or plugging work performed. The Director will approve the form or identify deficiencies for the operator to correct and may require one of the following:

i. Surface or subsurface monitoring programs after the well has been plugged and abandoned, if a subsurface or surface releases occurred or may occur;

ii. Re-entering the well to complete additional remediation or plugging and abandonment work; or

iii. Any other actions necessary to ensure proper plugging and abandonment of the well.

(3) If the operator does not take actions necessary to correct deficiencies, the Director may issue a corrective action pursuant to Rule 208.

311.c. **Re-Plugging.** A Well Abandonment Report, Form 6 – Notice of Intent to Abandon, ~~shall~~will be submitted to, and approved by, the Director prior to the re-entry of a plugged and abandoned well for the purpose of re-plugging the well. A Well Abandonment Report, Form 6 - Subsequent Report of Abandonment ~~shall~~will be filed with the Director within 30 days of the completion of the re-plugging operations. These forms ~~shall~~will be submitted with all the information required above and any additional information required by current policy.

311.d. **As-Drilled Location.** For all wells being plugged, the operator will report the latitude and longitude coordinates of the "as drilled" well location ~~shall be reported~~ on the Form 6. When plugging a well for which this data has been obtained and submitted to the Commission previously, the operator ~~shall~~will submit this data on the Form 6 – Notice of Intent to Abandon. When plugging a well for which this data has not yet been obtained and submitted to the Commission, the operator ~~shall~~will determine the "as drilled" location prior to plugging and submit the location on the Form 6 – Subsequent Report of Abandonment. The latitude and longitude coordinates ~~shall~~will be in decimal degrees to an accuracy and precision of five decimals of a degree using the North American Datum (NAD) of 1983 (e.g.; latitude 37.12345, longitude -104.45632). If the operator uses GPS technology ~~is utilized~~ to determine the latitude and longitude, all GPS data ~~shall~~will meet the requirements set forth in Rule 215 ~~and the Position Dilution of Precision (PDOP) reading,~~. The operator will report the ~~GPS instrument operator's name~~accuracy value expressed in meters and the date of the GPS measurement ~~shall also be reported~~ on the Form 6.

314. COGCC Form 17. BRADENHEAD TEST REPORT

The operator will submit results of bradenhead tests~~, as required by Rule 207.b., shall be submitted~~ to the Director within ~~ten (~~10~~)~~ days of ~~completion~~completing the test either by filing a Form 17~~.~~ or by another method approved by the Director or Commission. The operator will include a wellbore diagram ~~shall be submitted~~ if not previously submitted or if the wellbore configuration has changed. ~~If sampled, then the~~ If the operator conducted sampling, the operator will include results of any gas and liquid analysis ~~shall be submitted.~~.

316C. COGCC Form 42. FIELD OPERATIONS NOTICE

Operators shall submit a Form 42, Field Operations Notice, as designated below and in accordance with a Condition of Approval on any Form 2, Application for Permit to Drill; Form 2A, Oil and Gas Location Assessment; Form 4, Sundry Notice; Form 6, Well Abandonment Report; or any other approved form.

316C.a. **Notice of Intent to Conduct Hydraulic Fracturing Treatment.** Operators shall give at least 48 hours advance written notice of intent to the Commission of a hydraulic fracturing treatment at any well. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice of Hydraulic Fracturing Treatment. The Commission shall provide prompt electronic notice of such intention to the relevant local governmental designee (LGD).

316C.b. **Notice of Spud.** Operators shall give at least 48 hours advance written notice of intent to the Commission of a surface hole spud on any well. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice of Spud. The Commission shall provide prompt electronic notice of such intention to the relevant local governmental designee (LGD).

316C.c. **Notice of Construction or Major Change.** Operators shall give at least 48 hours advance written notice of intent to the Commission of a construction or major change at any Well, Oil and Gas Locations, or Oil and Gas Facility. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice of Construction or Major Change.

316C.d. **Notice to Run and Cement Casing.** If required by policy or condition of approval, Operators shall give at least 24 hours advance written notice of intent to the Commission to run and cement casing on any well. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice to Run and Cement Casing.

316C.e. **Notice of Formation Integrity Test.** If required by policy or condition of approval, Operators shall give at least 24 hours advance written notice intent to the Commission of a formation integrity test on any well. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice of Formation Integrity Test.

316C.f. **Notice of Mechanical Integrity Test.**~~-~~ Operators shall give at least 10 day advance written notice of intent to the Commission of a mechanical integrity test on any well. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice of Mechanical Integrity Test.

316C.g. **Notice of ~~Bradenhead Test.~~Start of Plugging Operations.** Operators ~~shall~~will give at least 48 hours advance written notice to the Commission ~~of a bradenhead test at~~prior to mobilizing for plugging any well. Such notice ~~shall~~will be provided on a Field Operations Notice, Form 42 - ~~Notice~~Start of ~~Bradenhead Test~~Plugging Operations.

316C.h. **Notice of Blow Out Preventer Test.** If required by policy or condition of approval, Operators shall give at least 24 hours advance written notice of intent to the Commission of a blow out preventer test at any well. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice of Blow Out Preventer Test.

316C.i. **Notice of Site Ready for Reclamation Inspection.** Operators shall give written notice to the Commission of a site ready for reclamation inspection at any well, well pad or production facility. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice of Site Ready for Reclamation Inspection.

316C.j. **Notice of Pit Liner Installation.** Operators shall give at least 48 hours advance written notice of intent to the Commission of a pit liner installation at any facility. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice of Pit Liner Installation.

316C.k. **Notice of Significant Lost Circulation.** Operators shall give written notice to the Commission of significant lost circulation at any well within 24 hours. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice of Significant Lost Circulation.

316C.l. **Notice of High Bradenhead Pressure During Stimulation.** Operators ~~shall~~will give~~ at least 24 hours advance~~ written notice to the Commission of high bradenhead pressure during stimulation at any well~~.~~ within 24 hours of measuring the high pressure. Such notice ~~shall~~will be provided on a Field Operations Notice, Form 42 - Notice of High Bradenhead Pressure During Stimulation.

316C.m. **Notice of Completion of Form 2/2A Permit Conditions.** If required by policy or condition of approval, Operators shall give written notice to the Commission of completion of Form 2 or 2A permit conditions at any well, Oil and Gas Location, or Oil and Gas facility. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice of Completion of Form 2/2A Permit Conditions.

316C.n. **Notice of Inspection Corrective Actions Performed.** Operators shall give written notice to the Commission of inspection corrective actions performed at any well, Oil and Gas Location, or Oil and Gas facility. Such notice shall be provided on a Field Operations Notice, Form 42 - Notice of Inspection Corrective Actions Performed.

316C.o. **Notice of Return to Service.** Operators must provide at least 48 hours advance written notice to the Director as required by the 1100-Series Rules and Rule 326.

316C.p. **Abandonment of Flowline.** Operators must provide written notice to the Commission before undertaking or after completing abandonment of flowlines in accordance with Rule 1105.

317. GENERAL DRILLING AND COMPLETION RULES

Unless altered, modified, or changed for a particular field or formation upon hearing before the Commission the following shall apply to the drilling or deepening of all wells.

317.a. **Blowout prevention equipment ("BOPE").** The operator ~~shall~~will take all necessary precautions for keeping a well under control ~~while being drilled~~during drilling, deepening, re-entering, recompleting, workovers or ~~deepened.~~plugging. The operator will indicate the BOPE, if any,~~ shall be indicated~~ on the Application for Permit to Drill, Deepen, Re-enter, or Recomplete and Operate (Form 2), as well as any known subsurface conditions (e.g. under or over-pressured formations). The operator will ensure the working pressure of any BOPE ~~shall exceed~~exceeds the anticipated surface pressure to which it may be subjected, assuming a partially evacuated hole with a pressure gradient of 0.22 psi/ft. ~~[~~For BOPE requirements in Designated Setback Locations see Rule 604.c.(2). For statewide BOPE specification, inspection, operation and testing requirements see Rule 603.e.

(1) The ~~Director shall have the authority to~~Commission may designate specific areas, fields or formations as requiring certain BOPE. Any such proposed designation ~~shall~~will occur by notice describing the area, field or formation in question and ~~shall~~will be given to all operators of record within such area or field and by publication. The proposed designation, if no protest is timely filed, ~~shall~~will be placed on the Commission consent agenda for its next regularly scheduled meeting following the month in which such notice was given. The matter ~~shall~~will be approved or heard by the Commission in accordance with Rule 531. Such designation ~~shall~~will be effective immediately upon approval by the Commission, except as to any previously-approved Form 2. If a protest is timely filed, the designation will be heard by the Commission in accordance with the 500 Series Rules.

(2) ~~The Director shall have the authority, outside areas designated~~ Pursuant to Rule 317.a.(1), ~~to~~the Director may condition approval of any application for permit to drill by requiring BOPE which the Director determines to be necessary for keeping the well under control. Should the operator object to such condition of approval, the Commission will hear the matter ~~shall be heard~~ at the next regularly scheduled meeting of the Commission, subject to the notice requirements of Rule 507.

317.b. **Bottom hole location.** Unless authorized by the provisions of Rule 321~~.~~, operators will drill all wells ~~shall be~~ so ~~drilled~~ that the horizontal distance between the bottom of the hole and the location at the top of the hole ~~shall~~will be at all times a practical minimum.

317.c. **Requirement to post permit at the rig~~.~~.** The operator will post a copy of the approved Application for Permit-to-Drill, Form 2, ~~shall be posted~~ in a conspicuous place on the drilling rig or workover rig.

317.d. **Requirement to provide spud notice.** An operator will provide advance notice ~~shall be provided~~ to the Director on a Field Operations Notice, Form 42, no less than 48 hours prior to spudding a well.

317.e. **~~Casing~~Drilling fluid, casing, and cement program to ~~protect~~isolate hydrocarbon formations and ~~ground~~protected water.**

(1) The casing and cement program for each well ~~must~~will prevent migration of oil, gas, and water ~~from migrating~~ within potential flow zones from one formation to another behind the casing. ~~Ground~~Protected water ~~bearing zones~~ penetrated during drilling ~~must~~will be ~~protected~~isolated from the infiltration of hydrocarbons or water from other formations penetrated by the well.

ABC~~Prior~~(2) All hole intervals drilled prior to reaching the base of protected water will be drilled with air, fresh water, or a fresh water-based bentonitic drilling mud. Any other additives will be reviewed and approved by the Director prior to use.

(3) All casing cemented in a well will be steel casing.

(4) Prior to placing casing in the hole, the operator will test the casing to verify integrity. An operator may:

A. Hydrostatically pressure test the casing with an applied pressure at least equal to the maximum pressure to which the pipe will be subjected in the well;

B. Use a casing evaluation tool; or

C. For new pipe only, use the mill test pressure.

(5) Prior written approval from the Director on a Form 4, Sundry Notice, is required before commencing any of the following operations:

A. Pumping cement down the bradenhead access to the annulus between the production casing (or intermediate casing, if present) and surface casing;

B. All routine or planned casing repair operations; or

C. Any other changes to the casing or cement in the wellbore.

(6) In the case of unforeseen casing repairs during well operations, ~~verbal~~the operator will obtain oral approval ~~shall be obtained~~from the Director, and ~~shall be followed~~will immediately ~~by~~submit a Form 4, Sundry Notice, confirming the repairs and approval.

(7) An operator will submit a Drilling Completion Report, Form 5 ~~shall be submitted,~~ within 30 days of the completion of the operations listed above, per Rule 308A.b.(3).

(8) Prior written approval from the Director on a Form 4, Sundry Notice, is required before changing the gross interval of perforations in a completed formation, including into a formation designated as a common source of supply. A Completed Interval Report, Form 5A ~~shall~~will be submitted within 30 days of the Gross Interval Change, per Rule 308B.

317.f. **~~Surface~~Cementing.**

(1) Operators will use the pump and plug method. An operator will use a top plug to reduce contamination of cement from the displacement of fluid. An operator will use a bottom plug or other Director-approved isolation technique or equipment to reduce contamination from drilling mud within the casing.

(2) Unless the Director approves otherwise, the diameter of the drilled hole in which surface casing will be set and cemented must be at least 1.5 inches greater than the nominal outside diameter of the casing the operator will install. All other casing will have a minimum annular space of 0.42 inches.

(3) The operator will design and place cement in a manner that inhibits channeling of the cement in the annular space outside of the casing being cemented. During placement of cement, the operator will monitor pump rates to verify the rates remain within design parameters and ensure displacement meets the design. The operator will monitor the cementing process to ensure proper cement densities are maintained.

(4) The operator will use a cement slurry that isolates all protected water, hydrocarbon, corrosive, potential flow, or hydrogen sulfide zones.

(5) The operator will prepare cement slurry to:

A. The designed density;

B. Minimize free fluid content, to the extent practicable;

C. Ensure cement slurry free water separation will not exceed 3 milliliters per 250 milliliters of cement; and

D. Ensure the cement mix water chemistry is appropriate for the cement slurry design.

(6) The operator or cement services provider will test a cement mixture at a rate that is the most frequent of every six months or when there is a change in operating conditions, cement type, or cement vendor.

A. The test will be on representative samples of the cement and additives.

B. The operator will make cement test data available to the Director upon request.

317.g. **Casing Centralization.**

(1) Surface casing. At a minimum, the operator will centralize casing within 120 feet of the top of the casing, at the shoe, above and below a stage collar or diverting tool, if run, every fourth joint, and through all protected water. The operator may implement an alternative centralization plan for surface casing if approved by the Director.

(2) Production and intermediate casing. The operator will provide adequate centralization or other methods to achieve cementing objectives in accordance with the permitted well design.

317.h. **Wellbore circulation.** Prior to cementing, the operator will clean and condition the wellbore to control gas flow, foster adequate cement displacement, and ensure a bond between cement, casing, and the wellbore.

317.i. **Surface casing where subsurface conditions are unknown.** In areas where pressure and formations are unknown, ~~sufficient~~ surface casing ~~shall~~will be run to reach a depth approved by the Director that is below all known or reasonably estimated ~~utilizable domestic fresh~~protected water ~~levels and~~, to prevent blowouts or uncontrolled flows, ~~and shall~~at a minimum depth of 10% of true vertical depth (TVD) of the deepest point of the planned well (or as required by Commission order) and will be of sufficient size to permit the use of an intermediate string or strings of casings. Surface casing ~~shall~~will be set in or through an impervious formation and ~~shall~~will be cemented by pump and plug or displacement or other approved method with sufficient cement to fill the annulus to the top of the hole, all in accordance with reasonable requirements of the Director. In the D–J Basin Fox Hills Protection Area surface casing will be set in accordance with Rule 317A. (See also ~~subparagraph g~~subpart k.).

~~g~~317.j. **Surface casing where subsurface conditions are known.** For wells drilled in areas where subsurface conditions have been established by drilling experience, surface casing, size at the ~~owner's~~operator's option, ~~shall~~will be set and cemented to the surface by the pump and plug or displacement or other approved method at a depth approved by the Director and in a manner sufficient to ~~protect~~isolate all ~~fresh~~protected water and to ensure against blowouts or uncontrolled flows. In the D–J Basin Fox Hills Protection Area surface casing ~~shall~~will be set in accordance with Rule 317A. (See also ~~subparagraph g~~subpart k.).

~~h~~317.k. **Alternate ~~aquifer protection~~protected water isolation by stage cementing.**

(1) In areas where ~~fresh~~protected water ~~aquifers~~ are of such depth as to make it impractical ~~or uneconomical~~ to set the full amount of surface casing necessary to comply fully with the requirement to cover or isolate all ~~fresh~~protected water ~~aquifers~~ as required in ~~subparagraph e. and f.,~~Rule 317, the ~~owner~~operator may, at its option, comply with this requirement by stage cementing the intermediate and/or production string so as to accomplish the required result.

(2) If unanticipated ~~fresh~~protected water ~~aquifers are~~is encountered after setting the surface pipe ~~they shall be protected or isolated~~the operator will isolate it by stage cementing the intermediate and/or production string with a solid cement plug extending from ~~fifty (~~50~~)~~ feet below ~~each fresh~~the protected water ~~aquifer~~ to ~~fifty (~~50~~)~~ feet above ~~said fresh water aquifer~~it or by other methods approved by the Director in each case. ~~In the D–J Basin Fox Hills Protection Area any stage cementing shall occur only in accordance with Rule 317A. If the stage cement is not circulated to surface, a temperature log or cement bond log shall be run to determine the top of the stage cement to ensure aquifers are protected.~~

~~i~~(3) In the D–J Basin Fox Hills Protection Area any stage cementing will occur only in accordance with Rule 317A. If the stage cement is not circulated to surface, a cement bond log will be run to determine the top of the stage cement to ensure aquifers are protected.

317.l. **Surface and intermediate casing cementing.**

(1) The operator ~~shall~~will ensure that all surface and intermediate casing cement required under this rule ~~shall be of adequate quality to achieve~~achieves a minimum compressive strength of ~~three hundred (~~300~~)~~ psi after ~~twenty-four (~~24~~)~~ hours and ~~eight hundred (~~800~~)~~ psi after ~~seventy-two (~~72~~)~~ hours measured at ~~ninety-five degrees Fahrenheit (95 °F) and at eight hundred (~~800~~)~~ psi confining pressure~~.~~ and 95º Fahrenheit or at the minimum expected downhole temperature.

(2) The operator will cement all surface casing ~~shall be cemented~~ with a continuous column from the bottom of the casing to the surface.

(3) After thorough circulation of the wellbore~~,~~ as required by Rule 317.h., the operator will pump cement ~~shall be pumped~~ behind the intermediate casing to at least ~~two hundred (200)~~500 feet above the top of the shallowest known production horizon and as required in Rule 317.~~g.~~ The operator will allow cement placed behind the surface and intermediate casing ~~shall be allowed~~ to set a minimum of ~~eight (~~8~~)~~ hours~~,~~ or until ~~three hundred (~~300~~)~~ psi calculated compressive strength is developed, whichever occurs first, prior to commencing drilling operations. If the surface casing cement level falls below the surface~~, to the extent safety or aquifer protection is compromised, remedial cementing operations shall be performed.~~ or if there is evidence of inadequate cement coverage, the operator will consult with the Director and, upon request, provide and implement a corrective action plan prior to drilling ahead

~~j~~317.m. **Production casing cementing.**

(1) The operator ~~shall~~will ensure that all cement required under this Rule 317 placed behind production casing ~~shall be of adequate quality to achieve~~achieves a minimum compressive strength of at least ~~three hundred (~~300~~)~~ psi after ~~twenty-four (~~24~~)~~ hours and of at least ~~eight hundred (~~800~~)~~ psi after ~~seventy-two (~~72~~)~~ hours both measured at ~~eight hundred (~~800~~)~~ psi at either ~~ninety-five degrees~~95° Fahrenheit ~~(95 °F)~~ or at the minimum expected downhole temperature.

(2) After thorough circulation of a wellbore~~,~~ as required by Rule 317.h., the operator will pump cement ~~shall be pumped~~ behind the production casing ~~(200)~~to the shallower of: 500 feet above the top of the shallowest uncovered known producing horizon~~. All fresh~~, isolation of specific geologic internals specified in the permit, or isolation of any other zone as required by Rule 317.e.

(3) The operator will cement behind the production casing all protected water ~~aquifers which are~~ that is exposed below the surface casing ~~shall be cemented behind the production casing. All such cementing around an aquifer shall consist of a continuous cement column extending~~in accordance with 317.k.

317.n. **Surface casing pressure testing.**

(1) Prior to drilling out below the surface casing shoe, the operator will successfully pressure test the surface casing for a minimum 30-minute duration and to a minimum of 1,500 psi or to a pressure that will determine if the casing has adequate mechanical integrity to meet the well design and construction objectives.

(2) If the surface casing is exposed to more than 360 rotating hours after reaching total depth or the depth of the next casing string, the operator will verify the integrity of the surface casing before running the next casing string by using a casing evaluation tool, conducting a mechanical integrity test, or using an equivalent casing evaluation method submitted to and approved by the Director through a Sundry Notice, Form 4.

317.o. **Intermediate casing pressure testing.**

(1) Prior to drilling out below the intermediate casing shoe, the operator will successfully pressure test the intermediate casing to ensure integrity is adequate to meet well design and construction objectives. The operator will perform the pressure test for a minimum 30-minute duration and to a minimum of 1,500 psi unless otherwise approved by the Director.

(2) The operator will monitor the well's bradenhead pressure during any pressure test conducted pursuant to Rule 317.o.

317.p. **Production casing and stimulation string pressure testing.**

(1) Prior to stimulation, the operator will successfully pressure test the production casing or stimulation string, if used. The operator will pressure test from ~~at least fifty (50) feet below the bottom of the fresh water aquifer which is being protected to at least fifty (50)~~the wellhead to a minimum depth of 200 feet above the ~~top of said fresh water aquifer. Cement placed behind the production casing shall be allowed to set seventy-two (72) hours, or until eight hundred (800) psi calculated compressive strength is developed, whichever occurs first, prior to the undertaking of any completion operation.~~true vertical depth (TVD) of the top perforations.

~~k. **Production and intermediate casing pressure testing.** The installed~~(2) For production casing ~~or, in the case of a production liner, the intermediate casing, shall be adequately pressure tested for the conditions~~that will be exposed to stimulation and the stimulation string, the operator will perform the pressure test for a minimum of 30 minutes and to a minimum of 500 psi greater than the maximum surface pressure anticipated to be ~~encountered~~imposed during ~~completion~~the stimulation.

(3) For wells that are not stimulated and production casing that will not be exposed to the stimulation, the operator will perform the pressure test for a minimum of 30 minutes and to a minimum of 500 psi greater than the maximum anticipated surface pressure.

(4) The operator will monitor the well's bradenhead pressure during any pressure test conducted pursuant to Rule 317.p.

317.q. **Casing pressure test monitoring and success criteria for all casing strings.**

(1) An operator has successfully conducted a pressure test when:

A. The surface pressure does not change more than 5 percent from the initial test pressure;

B. The pressure does not change more than 1% during the last 5 minutes of the test; and

C. The bradenhead pressure does not change more than 5% during the test when testing the intermediate or production ~~operations~~casings.

~~l. **Protection**~~(2) In the event of an indication that a well no longer has mechanical integrity, the operator may not conduct stimulation on any well on the oil and gas location until the operator has determined the well has mechanical integrity or the reason for the loss of mechanical integrity. If a well intervention is necessary, the operator will obtain verbal approval from the Director for the intervention and authorization to proceed with the stimulation.

317.r. **Isolation of aquifers and production stratum and suspension of drilling operations before running production casing.** In the event drilling operations are suspended before production string is run, the operator will notify the Director ~~shall be notified~~ immediately and ~~the operator shall~~will take adequate and proper precautions to assure that no alien water enters oil or gas strata, nor ~~potential fresh~~protected water ~~aquifers~~ during such suspension period or periods. If alien water is found to be entering the production stratum or to be causing significant adverse environmental impact to ~~fresh~~protected water aquifers during completion testing or after the well has been put on production, the ~~condition shall be~~operator will promptly ~~remedied~~remedy the condition.

~~m~~317.s. **Flaring of gas during drilling and notice to local emergency dispatch.** Any gas escaping from the well during drilling operations shall be, so far as practicable, conducted to a safe distance from the well site and burned. The operator shall notify the local emergency dispatch as provided by the local governmental designee of any such flaring. Such notice shall be given prior to the flaring if the flaring can be reasonably anticipated, and in all other cases as soon as possible but in no event more than two (2) hours after the flaring occurs.

~~n~~317.t. **Protection of productive strata during deepening operations.** If a well is deepened for the purpose of producing oil and gas from a lower stratum, such deepening to and completion in the lower stratum shall be conducted in such a manner as to protect all upper productive strata.

~~o~~317.u. **Requirement to evaluate disposal zones for hydrocarbon potential.** If a well is drilled as a disposal well then the disposal zone shall be evaluated for hydrocarbon potential. The proposed hydrocarbon evaluation method shall be submitted in writing and approved by the Director prior to implementation. The productivity results shall be submitted to the Director upon completion of the well.

~~p~~317.v. **Requirement to log well.** For all new drilling operations, the operator ~~shall be required to~~will run a minimum of a resistivity log with gamma-ray or other petrophysical log(s) approved by the Director that adequately describe the stratigraphy of the wellbore. A cement bond log~~ shall~~, capable of generating a variable density display, will be run on all production casing or, in the case of a production liner, the intermediate casing, when these casing strings are run. The operator will submit these logs and all other logs run ~~shall be submitted~~ with the Drilling Completion Report, Form 5. The operator will run open-hole logs or equivalent cased-hole logs~~ shall be run~~ at depths that adequately verify the setting depth of surface casing and any aquifer coverage. These requirements ~~shall~~will not apply to unlogged open-hole completion intervals.

~~q~~317.w. **Remedial cementing~~ during recompletion.~~ .** If cement coverage in any casing string does not satisfy the requirements of Rule 317.e., the Director may apply a condition of approval for Application for Permit-to-Drill, Form 2, to require remedial cementing ~~during~~and a cement bond log or other cement evaluation tool before recompletion, reentering or deepening operations consistent with the provisions for ~~protecting aquifers~~isolating protected water and hydrocarbon bearing zones in this Rule 317.

~~r~~317.x. **Statewide Wellbore Collision Prevention.** An operator will perform an anti-collision evaluation of all active (producing, shut in, or temporarily abandoned) offset wellbores that have the potential of being within 150 feet of a proposed well prior to drilling operations for the proposed well. ~~Notice shall be given~~The operator will give notice to all offset operators prior to drilling.

~~s~~317.y. **Statewide ~~Fracture Stimulation~~ Setback for Hydraulic Fracturing Treatment.**

(1) No portion of a proposed ~~wellbore's~~wellbore that will be treated ~~interval shall~~by hydraulic fracture may be located within 150 feet of an existing (producing, shut-in, or temporarily abandoned) or permitted interval of an oil and gas ~~wellbore's~~wellbore that has been or will be treated ~~interval~~by hydraulic fracture belonging to another operator without the signed written consent of the operator of the encroached upon wellbore. The operator will attach any signed written ~~consent shall be attached~~consents to the Application for Permit-to-Drill, Form 2 for the proposed wellbore.

(2) The operator will measure the distance between the proposed and offset wellbores ~~measurement shall be based upon~~using the directional survey for drilled wellbores and the deviated drilling plan for permitted wellbores, or as otherwise reflected in the COGCC well records. The operator will measure the distance~~ shall be measured~~ from the perforation or mechanical isolation device.

317.z. **Notice prior to stimulation.** At least 90 days prior to the anticipated commencement of stimulation, the operator of the wellbore that will be stimulated will provide notice of stimulation commencement to all operators of offset wells that were identified pursuant Rule 303.a.(5)G.i.

317.aa. **Offset wellheads and surface equipment.** Prior to hydraulic fracture treatments, the operator will ensure offset existing wells within 1,500 feet of the wellbore to be hydraulically fractured that are producing, shut-in, or temporarily abandoned have surface equipment (wellhead and master valve) rated to a pressure adequate to contain anticipated surface pressures that could occur from the proposed hydraulic fracture treatment. For offset wells that do not have adequately rated surface equipment, the operator may instead use downhole mechanical isolation above perforations in the objective formation to prevent unanticipated migration of pressure.

317.bb. **Consent to Offset Well Mitigation.** When an offset well and a proposed well are under different operatorship, the operator of the offset well will not refuse to have the offset well appropriately mitigated to meet the requirements of these Rules necessary to ensure protection of public health, safety, welfare, the environment, and wildlife resources.

317.cc. **Communication Prevention.** An operator will take all prudent measures to prevent communication along any known conduits between a stimulated interval and a protected water source.

317.dd. **Surface equipment used in hydraulic fracturing treatment.** Prior to beginning a hydraulic fracturing treatment, the operator will rig up and pressure test any surface equipment exposed to hydraulic fracturing treatment pressure. The operator will test for the proposed hydraulic fracture treatment design and, at a minimum, to 110% of the maximum anticipated surface hydraulic fracturing treating pressure. The test will ensure an appropriate safety factor and prevent fluid losses.

317.ee. **Hydraulic fracture treatment monitoring:** The operator will monitor and record hydraulic fracturing treatment parameters including but not limited to:

(1) surface injection pressure (psig);

(2) slurry rate (bpm);

(3) proppant concentration (ppg);

(4) fluid rate (bpm);

(5) identities, rates, and concentrations of additives used; and

(6) all other annuli pressures or volumes measured at the surface.

319. ABANDONMENT

The requirements for abandoning a well ~~shall be~~are as follows:

319.a. **Plugging**

(1) ~~A~~An operator will plug dry or abandoned well, seismic, core, or other exploratory hole, ~~must be plugged~~ in such a manner that oil, gas, water, or other substance ~~shall~~will be confined to the reservoir in which it originally occurred, isolating all zones specified in Rule 317.e., and zones identified and approved on the Notice of Intent to Abandon, Form 6. If the wellbore is not static

before setting a plug in an open hole or after casing is removed from the wellbore, then the operator will circulate any produced fluids ~~must be circulated~~ from the wellbore and will fill the wellbore ~~shall be filled~~ with wellbore fluids sufficient to maintain a balance or overbalance of the producing formation. Wellbore fluids ~~shall~~will be in a static state prior to pumping balanced cement plugs, unless the operator is placing the cement plug ~~is being placed~~ as a preliminary step to counteract a high pressure or a lost circulation zone before establishing a static state. The operator will fill intervals between plugs ~~shall be filled~~ with wellbore fluids of sufficient density to exert hydrostatic pressure exceeding the greatest formation pressure encountered while drilling such interval. If mud is necessary to maintain wellbore fluids in a static state prior to setting plugs, the operator will use a minimum mud weight of 9 pounds per gallon ~~shall be used.~~ . The operator will use water spacers ~~shall be used~~ both ahead of and behind balanced plug cement slurry to minimize cement contamination by any wellbore fluids that are incompatible with the cement slurry. Any cement plug ~~shall~~will be a minimum of 100 feet in length and ~~shall~~will extend a minimum of 100 feet above each zone to be ~~protected~~isolated. The material ~~used~~an operator uses in plugging, whether cement, mechanical plug, or some other equivalent method approved in writing by the Director, ~~must~~will be placed in the well in a manner to permanently prevent migration of oil, gas, water, or other substance from the formation or horizon in which it originally occurred. ~~The preferred plugging cement slurry is that recommended by the American Petroleum Institute (API) Environmental Guidance Document: Well Abandonment and Inactive Well Practices for U.S. Exploration and Production Operations, i.e., a neat cement slurry mixed~~Cement will conform to ~~API standards. However, pozzolan, salt-compatible cements, gel, high-temperature additives, extenders, accelerators, retarders, dispersants, water loss control additives, lost circulation material, and other additives may be used, as appropriate for the well being plugged, if~~the requirements in Rule 317.f. The operator ~~can document to the Director's satisfaction that~~will ensure the slurry design ~~will achieve~~achieves a minimum compressive strength of 300 psi after 24 hours and 800 psi after 72 hours measured at 95 ~~degrees~~° Fahrenheit ~~(95 °F)~~, or at the minimum expected downhole temperature, and at 800 psi confining pressure.

(~~2~~3)The operator ~~shall~~will have the option as to the method of placing cement in the hole by (a) dump bailer, (b) pumping a balanced cement plug through tubing or drill pipe, (c) pump and plug, or (d) equivalent method approved by the Director prior to plugging. Unless prior approval is given, all wellbores ~~shall~~will have water, mud or other approved fluid between all plugs.

(~~3) No substance~~4) An operator will not place substances of any nature or description other than that normally used in plugging operations ~~shall be placed~~ in any well at any time during plugging operations. An operator will submit all final reports of plugging and abandonment ~~shall be submitted~~ on a Well Abandonment Report, Form 6, and ~~accompanied by~~include a job log or cement verification report from the plugging contractor specifying the type of fluid used to fill the wellbore, type and slurry volume of API Class cement used, date of work, and depth the plugs were placed.

(~~4~~5)In order to ~~protect~~isolate the ~~fresh~~protected water strata, ~~no~~an operator may not pull surface casing ~~shall be pulled~~ from any well unless authorized by the Director.

(~~5~~6)All abandoned wells ~~shall~~will have a plug or seal placed in the casing and all open annuli from a depth of 50 feet to the surface of the ground or the bottom of the cellar in the hole in such manner as not to interfere with soil cultivation or other surface use. For below-grade markers, the operator will fit the top of the casing ~~must be fitted~~ with a screw cap or a steel plate welded in place with a weep hole. For above-grade markers, the operator will fit the top of the casing ~~must be fitted~~ with a screw cap or a steel plate welded in place with a weep hole, and a permanent monument ~~shall~~that will be a pipe not less than four inches in diameter and not less than 10 feet in length, of which four feet ~~shall~~will be above ground level and the remainder embedded in cement or welded to the surface casing. Whether a below-grade or an above-grade marker is used, the operator will inscribe the marker ~~shall be inscribed~~ with the well's legal location, well name and number, and API Number. The operator will not cap or seal the well until 5 days after placing the last plug to allow monitoring for successful plugging and will cap or seal the well within 90 days after placing the last plug.

(~~6~~7)The operator ~~must~~will obtain approval from the Director of the plugging method prior to plugging, and ~~shall~~will notify the Director of the estimated time and date the plugging operation of any well is to commence, and identify the depth and thickness of all known sources of groundwater. The operator will verify the placement of the plug required at the base of the deepest protected water stratum and the placement of any other plug specified by the Director by tagging or by an alternative method approved by the Director. For good cause shown, the Director may require that a cement plug be tagged if a cement retainer or bridge plug is not used. If requested by the operator, the Director ~~shall~~will furnish written follow-up documentation for a requirement to tag cement plugs.

(~~7~~8)**Wells Used for Fresh Water.** When the well, seismic, core, or other exploratory hole to be plugged may safely be used as a fresh water well, and such utilization is desired by the landowner, the well need not be filled above the required sealing plug set below fresh water; provided that written authority for such use is secured from the landowner and, in such written authority, the landowner assumes the responsibility to plug the well upon its abandonment as a water well in accordance with these rules. Such written authority and assumption of responsibility shall be filed with the Commission, provided further that the landowner furnish a copy of the permit for a water well approved by the Division of Water Resources.

319.b. **Temporary Abandonment.**

(1) A well may be temporarily abandoned after passing a successful mechanical integrity test per Rule ~~326upon~~326 upon approval of the Director, for a period not to exceed six months provided the hole is cased or left in such a manner as to prevent migration of oil, gas, water or other substance from the formation or horizon in which it originally occurred. All temporarily abandoned wells shall be closed to the atmosphere with a swedge and valve or packer, or other approved method. The well sign shall remain in place. If an operator requests temporary abandonment status in excess of six months the operator shall state the reason for requesting such extension and state plans for future operation. A Sundry Notice, Form 4, or other form approved by the Director, shall be submitted annually stating the method the well is closed to the atmosphere and plans for future operation. Subsequent mechanical integrity tests will be required at the frequency specified in Rule 326.

(2) The manner in which the well is to be maintained should be reported to the Commission, and bonding requirements, as provided for in Rule 304, kept in force until such time as the well is permanently abandoned.

(3) ~~A~~An operator will abandon any well which has ceased production or injection and is incapable of production or injection ~~shall~~and any hole determined to be ~~abandoned~~dry within six months thereafter unless the well passes a successful mechanical integrity test per Rule 326, and the time is extended by the Director upon application by the owner. The application ~~shall~~will indicate why the well is temporarily abandoned and future plans for utilization. In the event the well is covered by a blanket bond, the Director may require an individual plugging bond on the temporarily abandoned well. Subsequent mechanical integrity tests will be required at the frequency specified in Rule 326. Gas storage wells are to be considered active at all times unless physically plugged.

321. ~~-~~DIRECTIONAL DRILLING WELLBORE PLAN AND SURVEY

321.a. **Deviated Drilling Plan.**

(1) If an operator intends to drill a deviated ~~wellbore~~ (directional, highly deviated, or horizontal) wellbore utilizing controlled directional drilling methods, the operator will prepare a deviated drilling plan ~~shall be attached to the Application for Permit-to-Drill, Form 2. The deviated drilling plan shall include a listing of coordinate data~~ that includes sufficient data to describe the location of the wellbore in three dimensions from ~~the base of~~not greater than 500 feet below the surface ~~casing to the kick off point and from that point~~of the ground to total depth. ~~The plan shall also include two wellbore deviation plots, one depicting the map view and one depicting the side view.~~

(2) ~~**Well Location Plat**. If an~~The operator ~~intends to drill a~~ will file the deviated ~~wellbore (directional, highly deviated, or horizontal) utilizing controlled directional~~ drilling ~~methods, the well location plat attached to~~plan with the Application for Permit-to-Drill, Form 2 ~~shall include (~~in ~~addition to the information required in Rule 303.a) the proposed top of the productive zone and the bottom hole location. If the wellbore penetrates multiple sections, the well location plat shall depict every section penetrated~~a format approved by the ~~wellbore.~~ Director.

321.b. **Directional Survey**~~. If an operator has drilled~~ **for** **a Deviated Wellbore**~~, either~~**.**

(1) For an intentionally ~~or unintentionally, the directional survey shall be attached to the Drilling Completion Report, Form 5. The directional survey shall include~~drilled deviated wellbore the operator will perform a ~~listing of coordinate data~~ directional survey of the wellbore in a manner to gather sufficient data to describe the location of the wellbore ~~from the base of~~in three dimensions and from not greater than 500 feet below the surface ~~casing to the kick off point and from that point~~of the ground to total depth. ~~The~~

(2) The directional survey will be included with the Drilling Completion Report, Form 5, and in a format approved by the Director.

321.c. **Inclination Survey for a Non-deviated Wellbore.**

(1) For a newly drilled non-deviated wellbore or for the re-entry, recompletion or deepening of an existing wellbore, the operator will perform an inclination survey ~~shall also include two~~of the wellbore and file the inclination survey with the Drilling and Completion Report, Form 5.

(2) The first shot point of such inclination survey must be made at a depth not greater than 500 feet below the ground surface, and succeeding shot points will be made either at 500-foot intervals or at the nearest drill bit change thereto, but will not exceed 1,000 feet apart. The inclination survey may be made either during the normal course of drilling or after the well has reached total depth. A directional survey meeting the requirements of Rule 321.b. may be filed in lieu of an inclination survey.

~~(1)~~(3) In the event a Form 5 is not required for re-entry, recompletion or deepening of an existing wellbore ~~deviation plots, one depicting the map view and one depicting the side view.~~ , the operator will file the inclination survey with a Sundry Notice, Form 4.

(4) The survey will be provided in a format approved by the Director.

321.d. **Wellbore Setback Compliance.** ~~It shall be the operator's responsibility to~~The operator will ensure that the wellbore complies with the setback requirements in Commission orders or rules prior to producing the well.

341. . BRADENHEAD MONITORING ~~DURING WELL STIMULATION OPERATIONS~~, TESTING, AND REPORTING

341.a. **Equipment requirements.**

(1) The operator will equip bradenhead access on all wells to the annulus between the production and surface casing as well as any intermediate casing with appropriate fittings to allow safe and convenient determination of pressure and fluid flow.

(2) To allow for COGCC visual inspection at all times, all valves use for annular pressure monitoring will remain exposed and the will not be buried. An operator may use a rigid housing to protect the valves so long as the housing can be easily opened or removed by the operator upon request.

(3) These equipment requirements apply to all wells, regardless of function.

341.b. **Bradenhead monitoring.** The operator will monitor all wells at a Director-indicated frequency for aspects of well integrity necessary to protect public health, safety, welfare, the environment, including protected water, and wildlife resources and in accordance with this Rule 341.

(1) **At Rig Release.** Bradenhead monitoring after rig release and prior to stimulation. An operator will monitor all annular casing pressures on a monthly basis. If at any point the bradenhead pressure is greater than 30% of the true vertical depth (TVD) of the surface casing shoe, the operator will contact the Director before proceeding with stimulation to determine whether mitigation or other measures are necessary to ensure isolation of protected water.

(2) **During stimulation.**

A. An operator will confine the placement of all stimulation fluids ~~shall be confined~~ to the objective formations during ~~treatment~~stimulation to the extent practicable.

B. During stimulation operations, ~~bradenhead annulus pressure shall be~~ an operator will continuously monitor~~ed~~ and ~~recorded~~record bradenhead annulus pressure on all wells being stimulated.

C. If intermediate casing has been set on the well being stimulated, an operator will monitor and record the pressure in the annulus between the intermediate casing and the production casing during stimulation operations.

D. During stimulation operations, an operator will monitor the bradenhead annulus and casing pressures for all wells within 300 feet of the wellbore being stimulated.

E. If at any time during stimulation operations, the bradenhead annulus pressure ~~increases more than 200~~in psig~~,~~ in the well being stimulated or any well being monitored exceeds 30% of the respective well's true vertical depth (TVD) of the surface casing shoe or the operator ~~shall verbally~~ has reason to suspect any potential failure of the production casing or stimulation string, the operator will:

i. Safely and quickly discontinue the stimulation and dissipate the annular pressure.

ii. Notify the Director as soon as practicable~~,~~ but no l~~onga~~ter than 24 hours following the ~~incident.~~occurrence with a Form 42, Field Operations Notice, Notice of High Bradenhead Pressure During Stimulation ~~shall be submitted by the end of the first business day following the event. Within fifteen (~~.

iii. Perform diagnostic testing on the well and related equipment as is necessary to determine (i) whether such a failure has actually occurred, (ii) if the pressure observations can be accounted for due to thermal expansion or pressure "ballooning" of the casing or (iii) the presence or absence of a downhole failure or a migration pathway into any strata containing protected water has actually occurred. The operator will perform diagnostic testing as soon as is reasonably practical after operator has reasonable cause to know of or suspect any such failure.

I. If the operator does not identify a downhole failure or a migration pathway into any strata containing protected water, the operator will notify the Director of the results. The Director will timely grant approval to proceed with stimulation and may do so orally.

II. If the operator identifies a downhole failure or migration pathway into any strata containing protected water, the operator will consult with the Director and, upon request, provide and implement a corrective plan prior to continuing any further stimulation operations on the well and any additional well on the oil and gas location.

v. Submit a Sundry Notice, Form 4, providing all details, including whether a downhole failure or migration pathway occurred, cause of the high pressure or suspected failure and corrective measures taken within 15~~)~~ days after the occurrence~~, the operator shall submit a Sundry Notice, Form 4, giving all details, including corrective actions taken.~~ .

~~If intermediate casing has been set on~~ (3) **Thirty days after stimulation.** For the first thirty days after stimulation or completion if the well ~~being~~has not been stimulated, ~~the~~an operator will monitor and record the flowing or shut-in tubing pressure ~~in the annulus between~~(if applicable) and all annular casing pressures for a well on a daily basis, at a minimum.

(4) **Through the** ~~intermediate~~**remaining life of the well.** For all wells in the state, an operator will monitor and record the flowing or shut-in tubing pressure (if applicable) and all annular casing ~~and the production~~pressures on a monthly basis or at a Director-approved frequency. An operator will

A. Report to the Director, bradenhead pressure greater than 30% of the true vertical depth (TVD) of the surface casing ~~shall also be monitored and recorded.~~ shoe , or a lower threshold set by a Commission Order, or any well that flows liquids or continuous gas from the bradenhead annulus on a Form 17, Bradenhead Test;

~~The operator shall~~B. Take immediate action to remedy such an annular pressure; and

C. Perform diagnostic testing to determine if the annular casing pressure is sustained. An operator will report diagnostic testing results to the Director on a Sundry Notice, Form 4, within 60 days of submitting a Form 17 pursuant to Rule 341.b.(4)A. If the diagnostic testing confirms sustained casing pressure, an operator will develop and implement a pressure management plan and provide the plan with the Sundry Notice.

(5) **Records.** An operator will keep ~~all well stimulation~~bradenhead monitoring records ~~and pressure charts on file and~~ required by Rule 341.b. available for inspection by the ~~Commission~~Director for a ~~period~~minimum of ~~at least~~ five (5) years~~. Under Rule 502.b.(1), an operator may seek a variance from these bradenhead monitoring, recording, and reporting requirements under appropriate circumstances~~ after the monitoring was performed.

341.c. **Annual Bradenhead Testing and Reporting.** For all wells other than coalbed methane wells, an operator will perform an annual bradenhead test and submit the data to the Director on a Form 17 or other Director-approved method. For coalbed methane wells, an operator will perform bradenhead testing in accordance with Rule 608.e.

341.d. **Bradenhead Test Observations.**

(1) If an operator observes a deficiency, the operator will immediately take action to address the deficiency. Actions taken may include the operator performing diagnostic testing on the well to determine whether a deficiency does exist and the best method of repair or if a pressure management plan is needed.

(2) The Director may impose a remediation plan if a deficiency exists, and if imposed, the operator will implement an approved remediation plan or pressure management plan and report results within 30 days or as required by the approved plan.

(3) If the operator is not able to effectively address the deficiency or implement a pressure management plan, the operator will plug and abandon the well within six months of discovering the deficiency.

SAFETY REGULATIONS (600 Series)

603. STATEWIDE LOCATION REQUIREMENTS FOR OIL AND GAS FACILITIES, DRILLING, AND WELL SERVICING OPERATIONS

603.a. **Statewide location requirements.**

(1) At the time of initial drilling, a Well shall be located not less than two hundred (200) feet from buildings, public roads, major above ground utility lines, or railroads. Rule 604 setback requirements apply with respect to Building Units and Designated Outside Activity Areas.

(2) A well shall be located not less than one hundred fifty (150) feet from a surface property line. The Director may grant an exception if it is not feasible for the Operator to meet this minimum distance requirement and a waiver is obtained from the offset Surface Owner(s). An exception request letter stating the reasons for the exception shall be submitted to the Director and accompanied by a signed waiver(s) from the offset Surface Owner(s). Such waiver shall be written and filed in the county clerk and recorder's office and with the Director.

603.b. **Statewide rig floor safety valve requirements.** When drilling or well servicing operations are in progress on a well where there is any indication the well will flow hydrocarbons, either through prior records or present conditions, there shall be on the rig floor a safety valve with connections suitable for use with each size and type of tool joint or coupling being used on the job.

603.c. **Statewide static charge requirements.** Rig substructure, derrick, or mast shall be designed and operated to prevent accumulation of static charge.

603.d. **Statewide well servicing pressure check requirements.** Prior to initiating well servicing operations, the well shall be checked for pressure and steps taken to remove pressure or operate safely under pressure before commencing operations.

603.e. **Statewide well control equipment and other safety requirements.** Well control equipment and other safety precautions and requirements are as follows:

(1) An operator will

A. Design drilling fluid in conjunction with operating procedures and surface equipment to prevent the blowout of any well until the well has been placed into production;

B. Maintain adequate supplies of drilling fluid of sufficient weight and other acceptable characteristics;

C. Perform drilling fluid tests as necessary to ensure well control;

D. Maintain adequate drilling fluid testing equipment on the location at all times;

E. Monitor wellbore fluid levels to ensure well control at all times, including when running or pulling pipe;

F. Monitor mud pit levels visually or mechanically during the drilling process; and

G. Install and operate mud-gas separation equipment as necessary.

(2) The Director will have access to the drilling fluid records related to the fluid's properties used to control the well (fluid type, density, viscosity, fluid loss control, and other rheological properties), and will be allowed to request or conduct any essential tests on the drilling fluid used in the drilling or recompletion of a well. The operator will retain all records for a period of 5 years.

(3) When the conditions and tests indicate a need for a change in the drilling fluid program in order to ensure control of the well, the operator will use due diligence in modifying the program.

(4) An operator will maintain well control using blowout preventer systems and/or diverter systems for wells drilled with air, nitrogen, or foam.

~~(1)~~(5) The operator will install blowout prevention equipment when there is any indication that a well will flow, either through prior records, present well conditions, the planned well work, or special orders of the Commission~~, blowout prevention equipment shall be installed~~.

~~(2)~~(6)When required, blowout prevention equipment shall be in accordance with API Standard 53: "~~Blowout Prevention~~Well Control Equipment Systems for Drilling Wells," ~~4~~5th Edition (~~November 2012).~~ December 2018). Only the ~~4~~5th Edition of the API ~~bulletin~~Standard applies to this rule; later amendments do not apply. All material incorporated by reference in this rule is available for public inspection during normal business hours from the Public Room Administrator at the office of the Commission, 1120 Lincoln Street, Suite 801, Denver, Colorado 80203. In addition, these materials may be examined at any state publications depository library and are available from API at 1220 L Street, NW Washington, DC 20005-4070.

~~(3)~~(7) Drilling after setting the surface casing shall not proceed until blowout prevention equipment is tested and found to be serviceable. Low pressure and high pressure tests shall be performed. Test pressure, test duration, and test frequency shall be in accordance with API Standard 53: "Blowout Prevention Equipment Systems for Drilling Wells," ~~4~~5th Edition (~~November 2012~~December 2018), except that the minimum low pressure for a low pressure test shall be 250 psi. Test pressure loss shall be less than or equal to 10% of the initial stabilized surface pressure at the end of the test when testing with rig pumps against casing. When a test plug is used to isolate the casing from the blowout prevention equipment being tested, then there shall be no unexplainable pressure loss at the end of the test.

~~(4)~~(8) While in service, blowout prevention equipment shall be inspected daily and a preventer operating test shall be performed on each round trip, but not more than once every ~~twenty- four~~ ~~(~~24~~)~~ hour period. Notation of operating tests shall be made on the daily report.

~~(5)~~(9) All pipe fittings, valves and unions placed on or connected with blowout prevention equipment, well casing, ~~casinghead~~wellhead, drill pipe, or tubing shall have a working pressure rating suitable for the maximum anticipated surface pressure and shall be in good working condition as per generally accepted industry standards. The operator will equip wellhead assemblies to monitor pressure containing annuli at surface, unless exempted by the Director.

~~(6)~~(10) Blowout prevention equipment ~~shall contain~~ will include pipe rams, blind rams, annular preventer, or other equipment that enable closure on the pipe being used. The choke line(s) and kill line(s) ~~shall~~will be anchored, tied or otherwise secured to prevent whipping resulting from pressure surges.

(11)The operator will inspect and service the wellhead, tree, and related surface control equipment to maintain pressure control throughout the life of the well.

(12)The operator will conduct pressure testing of the casing string ~~shall be conducted prior to~~ in accordance with Rule 317.

(13)An operator will complete a formation integrity test (FIT) after drilling out ~~any string of~~below the surface casing ~~except conductor pipe. The~~ shoe and any intermediate casing shoes for a minimum ~~test pressure shall be 500 psi. Test pressure loss must be less than or equal to 10%~~ of ~~the initial stabilized surface pressure over a test period~~one well on each oil and gas location if:

A. The fracture gradient of ~~15 minutes, in order for~~the formation at the casing ~~string~~shoe is unknown; or

B. The test is necessary to demonstrate:

i. The casing shoe integrity is sufficient to ~~be considered serviceable. Upon request, the Operator shall provide~~contain the anticipated wellbore pressures of the penetrated formations;

ii. Flow paths to the formations above the casing shoe do not exist; or

iii. The casing shoe is competent to handle an influx of formation fluid or gas.

C. An operator will submit a plan to the Director ~~evidence of performing the pressure test pursuant to Rule 205.f~~for approval if a FIT does not demonstrate the requirements as stated by Rule 603.e.(13)B.

D. The operator will perform the FIT before drilling 50 feet or less of new hole.

~~(7)~~(14) If the blind rams are closed for any purpose except operational testing, the valves on the choke lines or relief lines below the blind rams should be opened prior to opening the rams to bleed off any pressure.

~~(8)~~(15) All rig employees shall have adequate understanding of and be able to operate the blowout prevention equipment system. New employees shall be trained in the operation of blowout prevention systems as soon as practicable to do so.

~~(9)~~(16) Drilling contractors shall place a sign or marker at the point of intersection of the public road and rig access road.

~~(10)~~(17)The number of the public road to be used in accessing the rig along with all necessary emergency numbers shall be posted in a conspicuous place on the drilling rig.

(18) Each operator will have a functioning emergency response plan that provides for the effective management of emergency situations that arise from oil and gas operations.

603.f. **Statewide equipment, weeds, waste, and trash requirements.** All locations, including wells and surface production facilities, shall be kept free of the following: equipment, vehicles, and supplies not necessary for use on that lease; weeds; rubbish, and other waste material. The burning or burial of such material on the premises shall be performed in accordance with applicable local, state, or federal solid waste disposal regulations and in accordance with the 900-Series Rules. In addition, material may be burned or buried on the premises only with the prior written consent of the Surface Owner.

603.g. **Statewide equipment anchoring requirements.** All equipment at drilling and production sites in geological hazard areas shall be anchored. Anchors must be engineered to support the equipment and to resist flotation, collapse, lateral movement, or subsidence. Anchoring requirements in Floodplains are governed by Rule 603.h.

603.h. **Statewide Floodplain Requirements.** When operating within a defined Floodplain:

(1) The following requirements apply to new Oil and Gas Locations and Wells:

A. Effective August 1, 2015, Operators must notify the Director when a new proposed Oil and Gas Location is within a defined Floodplain, via the Form 2A.

B. Effective June 1, 2015, new Wells must be equipped with remote shut-in capabilities prior to commencing production. Remote shut-in capabilities include, at a minimum, the ability to shut-in the well from outside the relevant Floodplain.

C. Effective June 1, 2015, new Oil and Gas Locations must have secondary containment areas around Tanks constructed with a synthetic or geosynthetic liner that is mechanically connected to the steel ring or another engineered technology that provides equivalent protection from floodwaters and debris.

(2) The following requirements apply to both new and existing Wells, Tanks, separation equipment, containment berms, Production Pits, Special Purpose Pits, and flowback pits:

A. Effective April 1, 2016, Operators must maintain a current inventory of all existing Wells, Tanks, and separation equipment in a defined Floodplain. Operators shall ensure that a list of all such Wells, Tanks, and separation equipment is filed with the Director. As part of this inventory, Operators must maintain a current and documented plan describing how Wells within a defined Floodplain will be timely shut-in. This plan must include what triggers will activate the plan and must be made available for inspection by the Director upon request.

B. Effective June 1, 2015 for new and April 1, 2016 for existing, tanks, including partially buried tanks, and separation equipment must be anchored to the ground. Anchors must be engineered to support the Tank and separation equipment and to resist flotation, collapse, lateral movement, or subsidence.

C. Effective June 1, 2015 for new and April 1, 2016 for existing, containment berms around all Tanks must be constructed of steel rings or another engineered technology that provides equivalent protection from floodwaters and debris.

D. Effective June 1, 2015 for new and April 1, 2016 for existing, Production Pits, Special Purpose Pits (other than Emergency Pits), and flowback pits containing E&P waste shall not be allowed within a defined Floodplain without prior Director approval, pursuant to Rule

502.b.

E. An Operator may seek a variance from the effective date for the requirements for existing facilities referenced in subparts 603.h(2)B, C or D by filing a request for an alternative compliance plan with the Director on or before February 1, 2016.

608. COALBED METHANE WELLS

608.a. **Assessment and monitoring of plugged and abandoned wells within one-quarter (1/4) mile of proposed coalbed methane (CBM) well.**

(1) Based upon examination of the Commission and other publicly available records, operators shall identify all plugged and abandoned (P&A) wells located within one-quarter (1/4) mile of a proposed coalbed methane (CBM) well. The operator shall assess the risk of leaking gas or water to the ground surface or into subsurface water resources, taking into account plugging and cementing procedures described in any recompletion or P&A report filed with the Commission. The operator shall notify the Director of the results of the assessment of the plugging and cementing procedures. The Director shall review the assessment and take appropriate action to pursue further investigation and remediation if warranted and in accordance with Colorado Revised Statute 34-60-124(4)(A).

(2) Operators shall use reasonable good faith efforts to obtain access to all P&A wells identified under Rule 608.a.(1) above to conduct a soil gas survey at all P&A wells located within one-quarter (1/4) mile of a proposed CBM well prior to production from the proposed CBM well and again one (1) year and thereafter every three (3) years after production has commenced. Operators shall submit the results of the soil gas survey to the Director within three (3) months of conducting the survey or advise the Director that access to the P&A wells could not be obtained.

608.b. **Water well sampling.**

(1) If a conventional gas well or P&A well exists within one-quarter (1/4) mile of a proposed CBM well, then the two (2) closest water wells within a one-half (1/2) mile radius of the conventional gas well or the P&A well shall be sampled ("Water Quality Testing Wells"). If possible, the water wells selected should be on opposite sides of the conventional gas well or the P&A well not exceeding a one-half (1/2) mile radius. If water wells on opposite sides of the conventional gas well or the P&A well cannot be identified, then the two (2) closest wells within a one-half (1/2) mile radius of the conventional gas well or the P&A well shall be sampled. If two (2) or more conventional wells or P&A wells are located within one- quarter (1/4) mile of the proposed CBM well, then the conventional well or the P&A well closest to a proposed CBM well shall be used for selecting water wells for sampling.

If there are no conventional gas wells or P&A wells located within a one-quarter (1/4) mile radius of the proposed CBM well, then the selected water wells shall be within one-quarter (1/4) mile of the proposed CBM well. In areas where ~~twoor~~two or more water wells exist within one-quarter (1/4) mile of the proposed CBM well, then the two (2) closest water wells shall be sampled. If possible, the water wells selected should be on opposite sides of the proposed CBM well. If water wells on opposite sides of the proposed CBM well cannot be identified, then the two (2) closest wells within one-quarter (1/4) mile radius shall be sampled. If two (2) water wells do not exist within a one-quarter (1/4) mile radius, then the closest single water well within either a one-quarter (1/4) mile radius or within a one-half (1/2) mile radius shall be selected.

If no water well is located within a one-quarter (1/4) mile radius area as described above or if access is denied, then a water well within one-half (1/2) mile of the proposed CBM well shall be selected. If no water wells meet the foregoing criteria, then sampling shall not be required. If the Commission has already acquired data on a water well within one- quarter (1/4) mile of the conventional well or the P&A well, but it is not the closest water well, then it shall be given preference in selecting a water well to be tested.

(2) The "initial baseline testing" described in this section shall include all major cations and anions, total dissolved solids (TDS), iron, manganese, selenium, nitrates and nitrites, dissolved methane, field pH, sodium adsorption ration (SAR), presence of bacteria (iron related, sulfate reducing, slime, and coliform), and specific conductance. Hydrogen sulfide shall also be measured using a field test method. Field observations such as odor, water color, sediment, bubbles, and effervescence shall also be included. The location of the water well shall be surveyed in accordance with Rule 215.

(3) If free gas or a dissolved methane concentration level greater than two (2) milligrams per liter (mg/l) is detected in a water well, gas compositional analysis and stable isotope analysis of the methane (carbon and deuterium) shall be performed to determine gas type. If the test results indicate biogenic gas, no further isotopic testing shall be done. If the test results indicate thermogenic or a mixture of thermogenic and biogenic gas, then the operator shall submit to the Director an action plan to determine the source of the gas. If the methane concentration increases by more than five (5) mg/l between sampling periods, or increases to more than ten (10) mg/l, the operator shall notify the Director and the owner of the water well immediately.

(4) Operators shall make a good faith effort to conduct initial baseline testing of the selected water wells prior to the drilling of the proposed CBM well; however, not conducting baseline testing because access to water wells cannot be obtained shall not be grounds for denial of an Application for Permit-to-Drill, Form 2. Within one (1) year after completion of the proposed CBM well, a "post-completion" test shall be performed for the same analytical parameters listed above and repeated three (3) and six (6) years thereafter or in accordance with the requirements of field rules developed pursuant to Rule 608.f. If the methane concentration increases by more than five (5) mg/l between sampling periods or increases to more than ten (10) mg/l, the operator shall prepare an action plan to determine the source of the gas and notify the Director and the water well owner immediately. If no significant changes from the baseline have been identified after the third test (i.e. the six- year test), no further testing shall be required. Additional "post-completion" test(s) may be required if changes in water quality are identified during follow-up testing. The Director may require further water well sampling at any time in response to complaints from water well owners.

(5) Copies of all test results described above shall be provided to the Commission and the water well owner within three (3) months of collecting the samples. The analytical data and surveyed well locations shall also be submitted to the Director in an electronic data deliverable format.

608.c. **Coal outcrop and coal mine monitoring.**

(1) If the CBM well is within two (2) miles of the outcrop of the stratigraphic contact between the coal-bearing formation and the underlying formation, or within ~~twomiles~~two miles of an active, inactive, or abandoned coal mine, the operator shall make a good faith effort to obtain the access necessary to survey the outcrop or mine prior to drilling the CBM well to determine whether there are gas seeps and springs or water seeps that discharge from the coal- bearing formation in the area.

(2) If a gas seep is identified during the survey, then its location and areal extent shall be surveyed in accordance with Rule 215 and the concentration of the soil gas shall be determined. If possible, a sample of gas shall be collected from the seep for compositional analysis and stable isotope analysis of the methane (carbon and deuterium). Thereafter, the operator will inspect the gas seep, survey its areal extent, and measure soil gas concentrations annually, if access

can be obtained. The operator shall submit the results of the outcrop or mine monitoring to the Commission and the landowner within three (3) months of its completion of the field work. The analytical data shall also be submitted to the Director in an electronic data deliverable format.

(3) If a gas seep is identified during the survey, the Director shall advise the landowners, local government, Colorado Geological Survey (CGS), and the Colorado Division of Reclamation, Mining, and Safety (DRMS), as appropriate, of the findings. In collaboration with state, local, and private interests, the CGS, DRMS, and the Commission may elect to develop a geologic hazard survey and determine whether the area should be recommended to be designated as a geologic hazard in accordance with Colorado Revised Statute 34-1-103 and 24-65.1-103.

(4) If the CBM well is within two (2) miles of the outcrop of the stratigraphic contact between the coal-bearing formation and the underlying formation, the operator shall survey the outcrop, review publicly available geologic and hydrogeologic data, and interview landowners to identify springs or water seeps that discharge from the coal-bearing formation.

If such a water feature is identified, then the operator shall survey its location and areal extent in accordance with Rule 215, measure the flow rate, photograph the feature, and collect and analyze a water sample in accordance with Rule 608.b.(2). Thereafter, the operator will inspect, survey the areal extent of, and measure the flow rate of the spring or water seep annually, if access can be obtained. The operator shall submit the results of the spring or water seep monitoring to the Commission and the landowner within three (3) months of its completion of the field work. The analytical data shall also be submitted to the Director in an electronic data deliverable format.

608.d. **Prior to producing - static bottom-hole pressure survey.** Prior to producing the well, the operator shall obtain a static bottom-hole pressure test on at least the first well drilled on a government quarter (1/4) section. The survey shall be conducted by either a direct static bottom-hole pressure measurement or by a static fluid level measurement. The data acquired by the operator and a description of the procedures used to gather the data shall be reported on a Bottom Hole Pressure, Form 13, and submitted with the Completed Interval Report, Form 5A, filed with the Director. After reviewing the quality of the static bottom-hole pressure data and the adequacy of the geographic distribution of the data, or at the request of the operator, the Director may vary the number of wells subject to the static bottom-hole pressure survey requirement. If an application for increased well density or down spacing is filed with the Commission, then additional testing may be required.

~~**Bradenhead testing.** Upon completion of any well, and on wells presently completed, the operator shall equip the bradenhead access to the annulus between the production and surface casing, as well as any intermediate casing, with approved fittings to allow safe and convenient determination of pressure and fluid flow. All valves used for annular pressure monitoring shall remain exposed and not buried to allow for COGCC visual inspection at all times. A rigid housing may be used to protect the valves, provided that the housing can be easily opened or removed by the operator upon request of COGCC staff. This rule shall apply to all wells, regardless of function, completed for CBM production or below the coal-bearing formation. All wells capable of production, injection, or observation shall be tested by the operator for pressure and flow, with results submitted to the Director on a Bradenhead Test Report, Form 17, and to other applicable regulatory agencies. Bradenhead tests shall be performed on all wells on a biennial basis. Remedial requirements shall be determined by the appropriate regulatory agency. The bradenhead testing requirement shall~~608.e. **Bradenhead testing.** An operator of a coalbed methane well will comply with Rule 341, except as modified by this Rule. The appropriate regulatory agency will determine remedial requirements. The bradenhead testing requirement will not apply if the operator demonstrates to the satisfaction of the Director annular cement coverage greater than ~~fifty (~~50~~)~~ feet above the base of surface casing and zonal isolation is confirmed by reliable evidence such as a cement bond log or cementing ticket indicating that the height of cement coverage is ~~fifty (~~50~~)~~ feet above the base of the surface casing, and zonal isolation is confirmed by two consecutive bradenhead tests

~~preceded by~~that the operator conducts at least 12 months apart. Before beginning a bradenhead test, the operator will shut-in the bradenhead annulus for a minimum shut-in period of ~~seven (~~7~~)~~ days~~ each~~.

608.f. **Locally specific field orders.** The provisions of this Rule 608 may, with the Director's approval, be modified or superseded on a basin, region, or county specific basis by field orders developed by the Commission in consultation with affected parties, including operators, county governments, and other state or local agencies, taking into account the goals of the 600-Series Rules and particular local geologic and operational conditions. In addition, the operator or other affected party shall have the right to file an application with the Commission to develop field orders for the basin, region, or county that modify the Rule 608 requirements as provided herein, which application shall set forth an explanation of good cause for the development of such orders.