



CHAPTER 3

OPERATIONAL RULES, DRILLING RULES

Section 1. Notices: General and Emergency.

(a) A written notice of intent to do work on an Application for Permit to Drill (APD, Form 1) and a drilling and completion plan (Chapter 3, Section 8(c)), or on a Sundry Notice (Form 4) to change plans previously approved on the original Form 1, must be filed with the Supervisor, unless otherwise directed, and must reach the Supervisor and receive his approval before the work is begun. Approval must be sought to acidize, cleanout, flush, fracture, or stimulate a well. The sundry notice must include depth to perforations or the openhole interval, the source of water and/or trade name of fluids, type of proppants, as well as estimated pump pressures. Routine activities that do not affect the integrity of the wellbore or the reservoir, such as pump replacements, do not require a sundry notice. The Supervisor may require additional information.

(b) In case of emergency, or a situation where operations might be unduly delayed, any written notice required by these Rules and Regulations to be given to the Supervisor may be given orally or by wire and, if approval is obtained, the transaction shall be confirmed in writing, as a matter of record.

(c) Chapter 5 of this volume provides rules of practice and procedure for matters which are set to be heard before the Commission and also for actions which can be taken by the Supervisor as he administers the Wyoming Conservation Act and these rules which have been adopted. The Supervisor, at his discretion, may set for hearing before the Commission any request for administrative approval of operations covered by these rules. The manner and time for giving notice is provided by the Wyoming Conservation Act and by these rules and regulations. Further, WYO. STAT. ANN. § 30-5-111(f), provides that in addition to the notice prescribed by these rules, such additional notice as is deemed necessary and proper may be required. The Commission maintains a mailing list for persons interested in receiving notice of the matters scheduled to be considered at its monthly hearings.

Section 2. Location of Wells/Drilling and Spacing Units (All Lands Except Tribal).

(a) In the absence of special orders of the Commission establishing drilling units or authorizing different well density or location patterns for particular pools or parts thereof, each oil and gas well shall be located in the center of a forty (40) acre governmental quarter-quarter section, or lot or tract or combination of lots or tracts substantially equivalent thereto, as shown by the most recent governmental survey, with a tolerance of two hundred feet (200') in any direction from the center location (a "window" 400 feet square) provided:

(i) No oil or gas well shall be drilled less than nine hundred twenty feet (920') from any other well drilling to or capable of producing oil or gas from the same pool; and

(ii) No oil or gas well shall be completed in a known pool unless it is located more than nine hundred twenty feet (920') from any other well completed in and capable of producing oil or gas from the same pool.

(b) Any gas wells drilled in the area described as Township 12 North through Township 28 North and Range 89 West through Range 121 West shall be located in the center of a one hundred sixty (160) acre subdivision, or lot or tract or combination of lots and tracts substantially equivalent thereto, not closer than one thousand, one hundred twenty feet (1,120') to the exterior boundaries of the quarter section. All areas subject to existing orders for drilling and spacing units in the above described area shall be exempt from the aforesaid gas well location requirements. Further, this rule is vacated for all federal exploratory units in the above described area provided that no gas well will be drilled closer than one thousand, one hundred twenty feet (1,120') to the exterior boundaries of the unit or to any uncommitted acreage within the unit. Upon unit contraction, lands deleted from the unit shall thereafter be subject to this rule.

(i) The following areas shall be exempt from this subsection
(b):

Township 13 North, Ranges 91 through 94 West
Township 14 North, Ranges 91 through 94 West
Township 15 North, Ranges 91 through 99 West
Township 16 North, Ranges 91 through 99 West
Township 17 North, Ranges 91 through 98 West
Township 18 North, Ranges 91 through 96 West
Township 18 North, Range 97 West
Sections 1 through 3
Sections 10 through 15
Sections 19 through 36
Township 19 North, Ranges 91 through 96 West
Township 20 North, Ranges 91 through 96 West
Township 21 North, Ranges 91 through 96 West
Township 22 North, Ranges 91 through 96 West
Township 23 North, Ranges 91 through 95 West

Any gas well proposed to be drilled within the above described lands shall be located within a governmental quarter section of land, or a lot or tract, or combination of lots or tracts substantially equivalent thereto, not closer than four hundred sixty feet (460') to the exterior boundary of such quarter section, providing that a

maximum of two gas wells from the same pool shall be permitted in any one such quarter section, or lot or tract, or combination of lots or tracts substantially equivalent thereto, but exempting from these provisions all areas within these lands subject to existing orders from the Commission establishing drilling and spacing units for a particular pool or reservoir, as to the pool or reservoir involved in such orders, and further exempting from these provisions all federal exploratory units within the described lands, provided that no gas well shall be drilled closer than four hundred sixty feet (460') to the exterior boundaries of such a federal unit or to any uncommitted tract within such federal unit and, providing further that upon unit contractions, lands deleted from the unit shall again become subject to provisions of this rule.

(c) Any proposed exploratory wells in the Powder River Basin projected to test the Frontier, Muddy, and/or Dakota Formations in excess of eleven thousand feet (11,000') total depth shall be granted a temporary spacing unit of six hundred forty (640) acres consisting of the governmental section in which the well is proposed. The temporary spacing unit shall be for the purpose of providing for the orderly development of the anticipated pool and not for the establishment of property rights. The granting of a temporary spacing unit shall be deemed as a decision by the Commission to call a hearing for the establishment of drilling units and upon completion of the well, the Commission shall call such hearing or in the alternative shall vacate the temporary spacing unit, depending upon the data obtained from the completed well. Said well may be located anywhere within the one hundred sixty (160) acre "window" (i.e., SE1/4 NW1/4, SW1/4 NE1/4, NE1/4 SW1/4, NW1/4 SE1/4) but not less than one thousand three hundred twenty feet (1,320') from the section line. Exceptions may be granted by the Commission for good cause.

(d) Any proposed well in the Powder River Basin projected to test the gas potential of any coal member or pool within the Fort Union and/or Wasatch Formations shall be granted a vertical ("standup") drilling and spacing unit of eighty (80) acres consisting of one-half of a governmental one hundred sixty (160) acre quarter section, or lot or tract, or combination of lots or tracts substantially equivalent thereto, and the authorized wells in such drilling and spacing units shall be located in the center of the northeast quarter and the center of the southwest quarter of the governmental 160-acre quarter section, or lot or tract, or combination of lots and tracts substantially equivalent thereto, with a two hundred foot (200') tolerance in any direction from such center locations. All areas subject to existing orders for drilling and spacing units for the Fort Union and/or Wasatch Formations in the Powder River Basin shall be exempt from the requirements of this subsection (d), as will all wells previously drilled or permitted; in addition, the unspaced areas as to the coals in the Wasatch and Fort Union Formations in the following lands shall be exempt from this subsection (d):

Township 45 North, Ranges 71 and 72 West;
Township 46 North, Ranges 71 and 72 West;
Township 47 North, Ranges 71, 72 and 73 West;

Township 48 North, Ranges 71, 72 and 73 West;
Township 49 North, Ranges 71, 72, and 73 West;
Township 50 North, Ranges 72 and 73 West;
Township 51 North, Ranges 72 and 73 West;
Township 52 North, Ranges 72 and 73 West.

Further, this rule is vacated for all federal exploratory units in the Powder River Basin for the Fort Union and/or Wasatch Formations provided that no well will be drilled closer than four hundred sixty feet (460') from the exterior boundaries of a federal exploratory unit or any uncommitted tract within a federal exploratory unit. Upon contraction of a federal exploratory unit, lands deleted from the unit shall thereafter be subject to the requirements of this subsection (d).

(e) To the extent not previously herein exempted, this rule is vacated for all federal exploratory units in Wyoming, provided that no oil or gas wells shall be drilled closer than four hundred sixty feet (460') from the exterior boundaries of a federal exploratory unit or any uncommitted tract within a federal exploratory unit. Upon contraction of a federal exploratory unit, lands deleted from the unit shall thereafter be subject to the requirements of this rule.

(f) The following conditions apply to any horizontal well as defined in Chapter 1, Section 2(y):

(i) The surface location may be anywhere on the leased premises;

(ii) In the absence of a special spacing order, no portion of the horizontal interval within the potentially productive formation shall be closer than six hundred sixty feet (660') to a drilling or spacing unit boundary, federal unit boundary, uncommitted tract within a unit, or boundary line of a lease not committed to the drilling of such horizontal well. The horizontal interval of wells drilled in the Powder River Basin below eleven thousand feet (11,000') to test the Frontier, Muddy, and/or Dakota Formations shall not be closer than one thousand, three hundred twenty feet (1,320') to the exterior governmental section line or federal unit boundary;

(iii) Any horizontal interval to be completed closer than one thousand, three hundred twenty feet (1,320') to such boundaries, tracts or lines must be oriented such that an azimuth of at least eighteen degrees (18°) is created between the well path and such boundaries, tracts or lines, allowing up to three degrees (3°) of azimuth tolerance for unintended drift;

(iv) Any horizontal interval shall be no closer than one thousand, three hundred twenty feet (1,320') to any vertical well completed in and producing from the same formation. Vertical wells drilled to and completed in the same

formation as is a horizontal well are subject to applicable drilling or spacing unit orders of the Commission or the other paragraphs of this rule which do not specifically pertain to horizontal wells and may be drilled and produced as provided therein;

(v) A temporary six hundred forty (640) acre spacing unit, consisting of the governmental section in which the horizontal well is located, is established for the orderly development of the anticipated pool; and

(vi) In addition to any other notice required by the statute or these Rules, notice of the Application for Permit to Drill (APD) a horizontal well shall be given by certified mail to all Owners within the boundaries of the designated temporary spacing unit.

(vii) Horizontal wells in federally supervised units or in API units are exempt from the above-referenced conditions (iv), (v), and (vi).

(viii) Exceptions to any of the above referenced conditions (i) through (vi) may be approved upon proper application and notice for such exception(s) in accordance with Commission Rules. Additional horizontal wells brought upon application may be approved by Commission order after a hearing is held in accordance with WYO. STAT. ANN. § 30-5-109(a) and (d).

(g) If granting permission to drill a horizontal well is contested by those entitled to notice, permission shall be granted if doing so will prevent waste or protect correlative rights.

(h) The Supervisor shall have the discretion to determine the pattern location of wells adjacent to an area spaced by the Commission, or under application for spacing, where:

(i) There is sufficient evidence to indicate that the pool or reservoir spaced or about to be spaced may extend beyond the boundary of the spacing order or application; and

(ii) The uniformity of spacing patterns is necessary to insure orderly development of the reservoir or pool.

(i) Owners/Operators who apply for a permit to drill a gas well in the area described in subsections (b) and (c) may contemporaneously or subsequently file an application to establish spacing for an area not to exceed nine (9) sections, which application will be held in abeyance until the permitted well is completed. Notice of such application must be given to all Owners within the application area. Upon completion of the permitted well, the application to establish spacing will either be heard by the Commission or dismissed, depending upon the data obtained from the completed well.

During the pendency of the application to establish spacing, all permits to drill gas wells will be held in abeyance pursuant to the provisions of Section 8 of this chapter, provided that permits to drill will be approved for additional gas wells in the area subject to the application on not less than a six hundred forty (640) acre pattern at a location consistent with the initial well. The area to be spaced may be increased in size prior to the hearing upon a proper showing of need to the Supervisor and after notice to all Owners in the area to be added.

Section 3. Exceptions to Locations of Wells and Well Spacing Orders.

(a) Upon proper application therefore, the Supervisor may approve, as an administrative matter, an exception to Section 2 of this chapter, or any order of the Commission establishing well spacing for a pool. If for any reason the Supervisor shall fail or refuse to approve such an exception, the Commission may, after notice and hearing, grant the exception. If the Supervisor or the Commission approves the exception application, the approval will be valid for one year from the date it was granted.

(b) The application for an exception shall state fully the reasons why such an exception is necessary or desirable, and shall be accompanied by a plat showing:

(i) The location at which an oil or gas well could be drilled in compliance with Section 2 of this chapter or the applicable order;

(ii) The location at which the applicant requests permission to drill; and

(iii) The locations at which oil or gas wells have been drilled or could be drilled, in accordance with Section 2 of this chapter, or the applicable order, directly or diagonally offsetting the proposed exception.

(c) No exception shall prevent any Owner from drilling an oil or gas well on adjacent lands, directly or diagonally offsetting the exception, at locations permitted by Section 2 of this chapter, or any applicable order of the Commission establishing oil or gas well spacing units for the pool involved.

Section 4. Bonding Requirements (Forms 8, 8A, 8E, and 8F).

(a) Except where a bond in satisfactory form has been filed by the Owner/Operator in accordance with state, federal or Tribal lease requirements, and evidence that such bond had been filed with and approved by the appropriate agency has been furnished the Supervisor, the Commission shall require from the Owner/Operator a good and sufficient bond running to the state of Wyoming conditioned that each well shall be operated and maintained in such a manner as not to cause waste or damage the environment and upon permanent abandonment each well shall be plugged in accordance

with the Rules and Regulations of the Commission. The minimum amount of bond or bonds required to be furnished shall be as follows:

(i) For wells of less than two thousand feet (2,000') in depth, an individual bond in the amount of ten thousand dollars (\$10,000.00) for each such well;

(ii) For wells of two thousand feet (2,000') or more in depth, an individual bond in the amount of twenty thousand dollars (\$20,000.00) for each such well; or,

(iii) In the alternative, a blanket bond in the amount of seventy-five thousand dollars (\$75,000.00) covering all wells, including wells less than two thousand feet (2,000') in depth. If the Commission has an acceptable blanket bond in the amount of twenty-five thousand dollars (\$25,000.00) from an Owner/Operator prior to July 1, 2000, such Owner/Operator is not required to post the additional coverage under this subsection (iii).

(b) The bond or bonds required by these rules shall remain in full force and effect until:

(i) The permanent plugging and abandonment of the well or wells has been approved by the Supervisor;

(ii) The well has been properly converted to a water well in a manner approved by the Supervisor, in conjunction with the State Engineer;

(iii) The successive Owner/Operator or purchaser of the well or wells and/or the site(s) has provided a bond or other surety in an amount and form acceptable to the Commission; or

(iv) The bond has been released by the Commission.

(c) In the event an Owner/Operator has a blanket bond covering wells on fee or patented lands, the Commission will normally not ask for additional coverage if the wells are producing, monitoring, injecting, or disposing. Wells which are not producing, injecting, or disposing are deemed to be idle. The Supervisor may require an increased bonding level up to ten dollars (\$10.00) per foot for each idle well as soon as the Operator's total footage of idle wells exceeds two thousand, five hundred feet (2,500') or seven thousand, five hundred feet (7,500') depending upon which level of blanket bond is in place. As wells are removed from idle status, up to ten dollars (\$10.00) per foot bonding requirements will be reduced accordingly. The bond amount will be increased every three (3) years by the percentage change in the Wyoming consumer price index. An Owner/Operator may request the Supervisor to set a different bonding level based on an evaluation of the specific well conditions and circumstances. The Operator shall submit a

written cost estimate to provide plugging, abandonment and site remediation, prepared by a Wyoming contractor with expertise in well plugging, abandonment and site remediation.

(d) For wells on which the additional bonding is required, the Supervisor may allow the Operator to post at least 5.55% of the new bond each month for eighteen (18) months or until the total amount of the bond has been posted.

(e) In lieu of additional bonding, the Supervisor may accept a detailed plan of operation which includes a time schedule to permanently plug and abandon idle wells or take such action as may be necessary to remove the well from idle status. This plan and time schedule is subject to approval by the Supervisor, and shall not exceed one (1) year from the date of filing. Plans filed by the first Owner/Operator go with the property in the event of a sale. The next Owner/Operator is responsible for completing the plans of the previous Owner/Operator unless the Supervisor accepts an alternate plan.

(f) In addition, the Supervisor must be advised by the Owner on the Commission's Form 7 (Notice of Change of Owner) of all transfers of wells at least thirty (30) days before the closing date of the transfer. The purpose of the notice is to provide the Supervisor with an opportunity to evaluate the status and number of wells that may be involved in the transfer and determine the need for additional bonding by the new Operator. In the event the Supervisor determines the new Owner needs additional bonding, he shall notify the new Owner of this no later than fifteen (15) days before the closing. The previous Owner shall remain liable for plugging the wells until the new Owner provides the additional requested bonding.

(g) Nothing in this rule shall be construed to prevent the Commission, upon notice and hearing and for good cause shown, from requiring bonds in special cases in amounts greater than set out in this rule.

(h) The Commission may require from the Owner/Operator a good and sufficient bond running to the state of Wyoming conditioned for or securing the performance that pits constructed to receive water produced in association with hydrocarbons, or noncommercial, centralized pits located within a lease, unit, or communitized area used for field operations shall be operated and maintained in such a manner as to not damage the environment or to not cause undue harm to health and safety of employees and people residing in close proximity to the pit and that upon permanent abandonment of the project or last use of the pit, the pit shall be closed and the adjacent areas reclaimed in accordance with the Rules and Regulations of the Commission.

(i) Separate bonding amounts for these pits, if required by the Commission, shall be set by the Supervisor following evaluation of site-specific conditions and circumstances. The Owner/Operator shall, within a reasonable time after a request by the Supervisor or his duly Authorized Agents, provide a written cost estimate prepared by a Wyoming registered professional engineer with expertise in surface pit

remediation for closure of the pit and remediation of the surface and access areas closely adjacent to the pit. The surface landowner shall receive a copy of said cost estimate from the Owner/Operator prior to construction.

(ii) Because the construction of pits for the retention of water produced in association with the recovery of coalbed methane gas in the Powder River Basin may be of benefit to the landowner, the Supervisor, in his sole discretion, may waive the bonding for such pits otherwise provided for by this subsection (h) and allow such pits to remain open after the cessation of production operations if a notarized statement of acceptance signed by the landowner, sufficient to meet the satisfaction of the Supervisor and including, at a minimum, the following items, accompanies the Form 14, Construction of Pits, when it is provided to the Commission:

- (A) The surveyed location including latitude and longitude;
- (B) The exact size and depth of the pit; and
- (C) A statement accepting all future responsibility for the structure and its contents.

Prior to the waiving of bonding for pit closure and prior to acceptance by the surface landowner, the Owner/Operator shall provide the surface landowner a current written cost estimate for pit closure prepared by a Wyoming registered professional engineer with expertise in surface pit remediation.

(i) In the event that an Owner/Operator is required to post a bond or other surety with the Commission as required by WYO. STAT. ANN. § 30-5-402, said surety bond must comply with the formatting requirements of the Commission. An Owner/Operator may post a cashier's check, certificate of deposit or letter of credit if it complies with Chapter 3, Sections 5 and 6, as applicable. The minimum amount of bond shall be two thousand dollars (\$2,000.00) per well site. Upon approval of the Supervisor, after attempted good faith negotiations with the surface owner, the Owner/Operator may submit a bond or other guaranty to cover all oil and gas operations on the surface owner's land as identified by an oil and gas operator in the written notice required under WYO. STAT. ANN. § 30-5-402(e), in an amount determined by the Supervisor.

(j) Within seven (7) days of receipt of a per well site surety bond or other guaranty, or blanket bond or other guaranty, the Commission shall give written notice of receipt to the surface owner, to be sent certified mail, return receipt requested. This notice shall be sent to the address provided to the Commission by the Owner/Operator and shall contain the following information:

(i) A description of the amount and type of bond or guaranty received;

(ii) A copy of the statement filed by the Owner/Operator with its Application for Permit to Drill (APD) pursuant to WYO. STAT. ANN. § 30-5-403(a); and

(iii) A statement that the surface owner has thirty (30) days from receipt of this notice to file an objection with the Commission.

(k) In determining the amount of bond to be posted, whether a single well site bond or blanket bond, the Supervisor shall consider the proposed plan of work and operations submitted by the Owner/Operator in its notice to the surface owner and may consider any other factors which would materially impact the bond amount needed to secure payment of damages including, but not limited to, the following:

(i) Loss of production and income;

(ii) Loss of land value; and,

(iii) Loss of value of improvements caused by oil and gas operations.

(l) If the surface owner files a written objection to the bond or guaranty amount within thirty (30) days of receipt of the notice required in subsection (i) of this section, the matter shall be set before the Commission at its next regularly scheduled meeting. Each interested party will have an opportunity, subject to the applicable procedural Rules of the Commission, to present evidence in support of or in opposition to the bond amount. The Commission, in determining the accepted amount and type of surety bond or other guaranty shall consider the following:

(i) The surety bond or guaranty objected to;

(ii) Any supporting evidence submitted by the oil and gas Owner/Operator; and,

(iii) The surface owner's objections and supporting documents.

The Commission may consider any other relevant evidence and shall notify the parties of its decision in writing. Proof of the required surety shall be submitted within thirty (30) days of the Commission's final order.

Section 5. Deposit of Cashier's Check or Certificate of Deposit Instead of Bond.

(a) **Generally.** Any person who is required to post a surety bond pursuant to Section 4 of this chapter, or Chapter 4, Section 6(h) of the Commission's Rules, may instead deposit with the Commission a cashier's check or a certificate of deposit. Such a deposit will be accepted in lieu of a surety bond only if it satisfies all of the requirements of this section.

(b) **Deposit of a Cashier's Check.** A deposit of a cashier's check in lieu of a surety bond must satisfy all of the following conditions:

(i) The check must be drawn for an amount equal to or greater than the amount required by Section 4 of this chapter and Chapter 4, Section 6(h) for a surety bond;

(ii) The check must be drawn on a bank with its main office or any branch located in Wyoming or on any other bank that is acceptable to the Supervisor in his sole discretion;

(iii) The check must be payable to the order of "Wyoming Oil and Gas Conservation Commission";

(iv) The date on which the check is issued must be within ten (10) days before the date on which the deposit is received by the Commission;

(v) The Owner/Operator must execute a valid, binding, first-priority pledge agreement as to the proceeds of the collected cashier's check, which agreement shall be on the current form approved by the Commission from time to time;

(vi) The cashier's check and the original of the fully-executed pledge agreement must be delivered to the Commission at the same time;

(vii) By submitting a deposit under this subsection, the Operator authorizes and directs the Commission to deposit and collect the same upon receipt.

(c) **Deposit of a Certificate of Deposit (CD).** Deposit of a CD in lieu of a surety bond must satisfy all of the following conditions:

(i) The CD must be drawn for an amount equal to or greater than the amount required by Section 4 of this chapter and Chapter 4, Section 6(h) of the Commission's Rules, for a surety bond;

(ii) The CD must be issued by an FDIC-insured bank with its main office or any branch located in Wyoming or on any other bank that is acceptable to the Supervisor in his sole discretion;

(iii) The CD must be payable in current funds or such other manner as the Commission may determine at a bank located within the state of Wyoming;

(iv) The CD must be on the current form of certificate of deposit approved by the Commission from time to time;

(v) The CD must be issued for an initial term of not less than one (1) year and automatically renewable from year to year;

(vi) The Owner/Operator must execute a valid, binding, first-priority pledge agreement as to the certificate of deposit, which agreement shall be on the current form approved by the Commission from time to time;

(vii) The originals of both the CD and the fully-executed pledge agreement must be delivered to the Commission at the same time.

(d) **Maturity of CD without Replacement.** If a CD is accepted and retained by the Commission under this section, and if the Owner/Operator has not deposited an acceptable replacement surety bond or other guaranty within thirty (30) days before the CD's maturity date, then the Owner/Operator will be deemed to have authorized and directed the Commission to demand immediate payment on the CD and, upon receipt of the proceeds, retain the same as a deposit of the proceeds of a collected cashier's check under Section 5(b) of this chapter.

(e) **No Interest on Deposits; Retention of Deposit.** Interest shall not accrue, nor be payable by the Commission, on any deposit received by the Commission under this section. Interest that is payable under a CD must be paid by the bank directly to the Operator. The Commission will retain the deposit or CD until:

(i) The Owner/Operator delivers a satisfactory surety bond or other guaranty to replace it; or

(ii) The Commission demands payment of the CD; or,

(iii) The Owner/Operator satisfies the requirements of Section 5(g) of this chapter.

(f) **Replacement.** The Owner/Operator may deliver at any time to the Commission an acceptable surety bond or other guaranty to replace a deposit retained by

the Commission under this section. Upon its receipt and acceptance of such replacement, the Commission will deliver to the Owner/Operator:

- (i) In the case of a CD, the original CD suitably endorsed; or
- (ii) In the case of a cashier's check, funds in an amount equal to the original deposit.

(g) **Return Upon Successful Completion.** If an Owner/Operator has deposited proceeds of a collected cashier's check or a CD, in lieu of a surety bond, and it is determined by the Commission that the Owner/Operator has complied with the Wyoming Conservation Act, the rules and orders of the Commission and the State Oil and Gas Supervisor, or their agents, including, but not limited to, proper plugging of wells and seismic holes, and reclamation of the surrounding affected area, with respect to all operations secured thereby, the Commission shall deliver to the Owner/Operator:

- (i) Funds in an amount equal to the original deposit; or,
- (ii) The original CD suitably endorsed to the Owner/Operator.

The proceeds of a collected cashier's check or CD deposited with the Commission pursuant to the Wyoming Split Estates Act, as defined in Chapter 1, Section 2(III) of these rules, shall be released in accordance with the procedures in Section 7(d) of this chapter.

Section 6. Letter of Credit Instead of Bond.

(a) **Generally.** Any person who is required to post a surety bond pursuant to Section 4 of this chapter, or Chapter 4, Section 6(h) of the Commission's Rules, may instead deposit with the Commission a letter of credit (LOC). Such a deposit will be accepted in lieu of a surety bond only if the letter of credit satisfies all of the requirements of this section.

(i) The LOC must have a face amount equal to or greater than the amount required by Section 4 of this chapter and Chapter 4, Section 6(h) for a surety bond;

(ii) The LOC must be issued by an FDIC-insured bank with its main office or any branch located in Wyoming or on any other bank that is acceptable to the Supervisor in his sole discretion;

(iii) The LOC must be payable in current funds or such other manner as the Commission may determine at sight at the counters of an FDIC-insured bank located within the state of Wyoming;

(iv) The LOC must be on the current form of letter of credit approved by the Commission from time to time;

(v) The LOC shall be issued with an initial expiration date of not less than one (1) year from the date of its issuance and automatically extended from year to year;

(vi) The LOC must be received by the Commission within ten (10) days of its issue date;

(vii) The original LOC must be delivered to the Commission.

(b) **Expiration of LOC without Replacement.** If a LOC is accepted and retained by the Commission under this section, and if the Owner/Operator has not deposited any acceptable replacement surety bond or other guaranty within thirty (30) days before the LOC's expiration date, then the Owner/Operator will be deemed to have authorized and directed the Commission to draw the entire face amount of the LOC and, upon receipt of the proceeds, retain the same as a deposit of the proceeds of a collected cashier's check under Section 5(b) of this chapter

(c) **No Interest; Retention of LOC.** Interest shall not accrue, nor be payable by the Commission, on any LOC received by the Commission under this section. The Commission will retain the LOC until the sooner to occur of the following:

(i) The Owner/Operator delivers a satisfactory surety bond or other guaranty to replace it;

(ii) The Commission demands payment under the LOC; or,

(iii) The Owner/Operator satisfies the requirements of Section 6(f) of this chapter.

(d) **Maturity without Replacement.** If, within thirty (30) days before the LOC's expiration date, the Owner/Operator has not deposited a replacement for any LOC accepted and retained by the Commission under this section, then the Owner/Operator will be deemed to have authorized and directed the Commission to demand immediate payment of the entire face amount of the LOC and, upon receipt of the proceeds, retain the same as a deposit of the proceeds of a collected cashier's check under Section 5(b) of this chapter.

(e) **Replacement.** The Owner/Operator may deliver at any time to the Commission an acceptable surety bond or other guaranty to replace a LOC retained by the Commission under this section. Upon its receipt and acceptance of such replacement, the

Commission will deliver to the Owner/Operator the original LOC.

(f) **Return Upon Successful Completion.** If the Commission determines that the Operator that has deposited a LOC under this section in lieu of a surety bond has complied with the Oil and Gas Conservation Act, the Rules of the Commission, and the orders of the Commission, the State Oil and Gas Supervisor, or their agents including, but not limited to, proper plugging of wells and seismic holes and reclamation of the surrounding affected area, with respect to all operations secured thereby, then the Commission shall deliver to the Operator the original LOC. A LOC deposited with the Commission pursuant to the Wyoming Split Estates Act shall be released in accordance with the procedures in Section 7(d) of this chapter.

Section 7. Forfeiture, Release, or Return of Surety Bond or Other Guaranty.

(a) The purpose of a surety bond or other guaranty posted as security pursuant to the Commission's Rules is to insure that the principal or person posting same complies with the Wyoming Conservation Act, the Commission's Rules, and the orders of the Commission, the State Oil and Gas Supervisor, or his Authorized Agent, including, but not limited to, proper plugging of wells and seismic holes and reclamation of the area affected by same. Site reclamation must be initiated within one (1) year of permanent abandonment of a well or last use of a pit and shall be completed in as timely a manner as climatic conditions allow. For just cause, the Supervisor may grant an administrative variance providing for additional time. Reclamation must be completed in accordance with the landowner's reasonable requests, and/or resemble the original vegetation and contour of adjoining lands. Where practical, topsoil must be stockpiled during construction for use in reclamation. All disturbed areas on state lands will be recontoured and reseeded unless the Office of State Lands and Investments approves otherwise. Appendix F includes information on reseeded.

(b) The proceeds of a surety bond or other guaranty become the property of the Commission and shall not be returned to the person posting same if the principal or person posting same fails to comply with the Oil and Gas Conservation Act, the Commission's Rules, or the orders of the Commission, the State Oil and Gas Supervisor, or their agents. This shall be determined by the Commission after notice and hearing in accordance with these Rules and the Oil and Gas Conservation Act. Notice of the hearing shall be given to the principal and surety on the bond, or to the person posting the cash or certificate of deposit, by mailing a copy of the notice of hearing and a copy of a complaint, stating the grounds for forfeiture or non-return to them, filed by the Commission staff. This shall be done by certified mail, return receipt requested, and addressed to their last known address listed with the Commission. If the principal or surety or person posting the cash or certificate of deposit has a defense to, or otherwise wishes to contest the complaint of the Commission staff, he must file a written statement or answer setting forth same with the Commission at least three (3) working days prior to

the Commission hearing. Any defense or reason for contesting the complaint is waived if he fails to do so. The Commission may treat the failure to file such a defense or reason to contest the complaint or the failure to appear at the hearing on same as a default by the party.

(c) If the Commission determines the principal on the bond delivered pursuant to Sections 4(a) through (e) of this chapter has complied with the Oil and Gas Conservation Act, the Rules of the Commission, and the orders of the Commission, the State Oil and Gas Supervisor, or their agents including, but not limited to, production facility removal, produced water pit closure, proper plugging of wells and seismic holes and reclamation of the surrounding affected area, with respect to all operations secured thereby, then the Commission shall release the obligation of the bond.

(d) Any Owner/Operator may request that its bond or other guaranty posted with the Commission pursuant to WYO. STAT. ANN. § 30-5-402(c) to secure the payment of damages to a surface owner be released upon the submission of a written request and a certified statement of the following:

- (i) That compensation for damages has occurred;
- (ii) An agreement for release has been reached by all parties;
- (iii) Final resolution of the judicial appeal process for any action for damages has occurred and all damages have been paid;
- (iv) That the surface owner has failed to give written notice required under WYO. STAT. ANN. § 30-5-406(a); or,
- (v) Has failed to bring an action for damages within the required time period.

(e) Upon receipt of a request for release, the Commission shall notify the surface owner in writing, by certified mail, of the request. The Commission shall include a copy of the release request and supporting statement to the surface owner. The surface owner shall have fifteen (15) days from receipt of said notice to dispute the release request. If no dispute is received by the Commission, or it is satisfied that the oil and gas operator has complied with the above requirements, the bond may be released. If the original request contains a verified statement from the surface owner that he is in accord with the request to release, the Commission may dispense with the waiting period and proceed to release the bond or other guaranty forthwith. The Supervisor may release any bond or other surety for just cause.

Section 8. Application for Permit to Drill or Deepen a Well (Form 1).

(a) Before any persons shall spud in and begin the drilling of any well on fee, patented, state, or federal lands, or deepen any such wells by drilling to a lower formation, such persons shall file an Application for Permit to Drill or Deepen (Form 1) with the Commission and pay a fee of fifty dollars (\$50.00) for a permit. No drilling activity shall commence until such application is approved and a permit to drill is issued by the Commission.

(b) For wells drilled on fee, patented and state land, prior to construction of the drilling location, approval of Form 14B (Application to Construct a Reserve Pit) must be obtained. The Application for Permit to Drill will not be processed until this requirement is met.

(c) The Application for Permit to Drill or Deepen (Form 1) shall be accompanied by an accurate plat showing the location of the proposed well with reference to the nearest lines of an established public survey. Information to be included in such application and its addendums shall include:

(i) Proposed depth to which the well will be drilled;

(ii) Type of drilling tools to be used;

(iii) Identification of all water sources located within one-half mile of the surface location for proposed oil well, gas well (including coalbed methane wells), dedicated injection well or Commission approved monitoring well, and the depth(s) from which water is being appropriated;

(iv) Formation depth, geological and hydrological detail from public records, published or otherwise known information of useable groundwater underlying the drilling and spacing unit or the Commission approved drilling unit. Consistent with Wyoming Department of Environmental Quality Chapter 8, as revised April 26, 2005, "Quality Standards for Wyoming Groundwaters," and for purposes of these rules, groundwater will be protected, except for Class VI Groundwater of the State that is unusable or unsuitable for use:

(A) Due to excessive concentrations of total dissolved solids or specific constituents; or,

(B) Is so contaminated that it would be economically or technologically impractical to make water useable; or,

(C) Is located in such a way, including depth below the surface, so as to make use economically and technologically impractical.

(v) Estimated depth to the top of important geologic markers, including the estimated depth to the top of objective horizons;

(vi) Proposed casing program, including size, anticipated setting depths, API grade, weight per foot, burst pressure, tensile strength for both body and joint, yield pressure, if new or used casing is planned for the well, and other information required by the Supervisor. Note that prior approval of the Supervisor is required for use of non-API tubular.

(vii) Description, type and setting depths of isolation techniques if used in openhole and uncemented liner stimulations in high angle and horizontal wells,

(viii) Description of the cementing program, including API class of cement, additives to be used, slurry density to be mixed, estimated volumes to be used, including percent of excess volume. For openhole completions, similar information is required for the cement program above the completed interval. The Supervisor must be notified of the intent and give prior approval for the use of non-API class cement and additives.

(ix) Description of the anticipated completion and stimulation program, including the base stimulation fluid and its source, the chemical additives and proposed concentrations to be mixed, identified by additive type as identified in Chapter 3, Section 45 of these rules. If this required data is not available at the time of submission of Form 1, then it must be submitted on a Sundry Notice (Form 4) and no stimulation of the well can occur without approval of the Supervisor.

(x) The Owner or Operator shall provide to the Supervisor, as an addendum to Application for Permit to Drill (Form 1), or as part of a comprehensive drilling/completion/recompletion plan, or on a Sundry Notice (Form 4), additional representative well drilling detail from adjacent or offset drilled wells that would inform and possibly influence drilling and cementing practices on the proposed well. Known information shall be provided regarding hole integrity, such as lost circulation zones by depth and barrels of fluid lost, zones of over or under pressure conditions, hole drift, key seats or tight hole if encountered, stuck pipe and depths experienced, water flows or kicks requiring an increase in mud weight beyond a predetermined amount to control, and depths experienced and as reported on Well Completion Report (Form 3). If any of this information or detail has already been presented to the Supervisor, identifying the wells is sufficient on subsequent wells for compliance with this subsection.

(xi) Where multiple Applications for Permit to Drill (Form 1) will be sought for several wells proposed to be drilled to the same zone within an area of geologic similarity, approval may be sought from the Supervisor to file a comprehensive drilling plan containing the information required above which will then be referenced on

each Application for Permit To Drill (Form 1). No Application for Permit to Drill (Form 1) shall contain the exact well name as another permitted well in the same quarter quarter, section, township and range.

(d) The Application for Permit to Drill or Deepen (Form 1) shall also be accompanied by a statement of compliance with WYO. STAT. ANN. § 30-5-403(a) (Form 1A), if the application is not exempted from the Split Estates Act. Included in this statement shall be the surface owner's name, contact address, telephone number and any other relevant and necessary contact information. The statement shall certify that the Owner/Operator has done the following:

(i) Provided notice of proposed oil and gas operations to the surface owner;

(ii) Engaged in good faith negotiations to reach a surface use agreement with the surface owner; and,

(iii) Satisfied the conditions of WYO. STAT. ANN. § 30-5-402(c) and how they were satisfied.

The Owner/Operator shall not file a copy of any surface use agreement, nor will the terms of any such agreement be disclosed.

(e) The Commission has authority under WYO. STAT. ANN. § 30-5-104(d)(v)(B) to require that each Application for Permit to Drill or Deepen (Form 1) be accompanied by a sworn statement from the Owner/Operator, on a form approved by the Commission, that all underground electrical conductors outside of its facilities, fenced enclosures or posted areas, well site or facilities under control of the Owner or Operator:

(i) Comply with the National Electrical Code in effect for the year electrical conductors were installed and energized; and,

(ii) Comply with the Wyoming Department of Fire Prevention and Electrical Safety Act, WYO. STAT. ANN. §§ 35-9-106 and 35-9-123;

(iii) Owner or Operator shall provide the Commission at least twenty-four (24) hours notice prior to installation of underground electrical conductors outside of its facilities, fenced enclosures, or posted areas. With routine maintenance, emergency or repair work, the Operator shall provide the Commission notice within twenty-four (24) hours of completing the electrical work.

(f) In addition to any other required form or attachment to the Application for Permit to Drill, the following shall be submitted:

(i) For directional wells, a diagram clearly showing the proposed direction of the deviation and the proposed horizontal distance between the bottom of the hole and the surface location;

(ii) For horizontal wells, a diagram clearly showing the wellbore path from the surface through the terminus of the lateral. A horizontal well's number shall be appended with an "H" suffix, denoting horizontal, in Block 8 of Form 1. If more than one lateral borehole extends from the same vertical wellbore, each such lateral must be permitted as an individual horizontal well with an "H" suffix. The surface location and the proposed footage locations of both the initial penetration into the productive formation and the terminus of the lateral shall be entered under "Location". If the application is for a permit to drill a horizontal well, notice of the application shall be given by certified mail to all Owners within one-half (1/2) mile of any point on the entire length of the horizontal wellbore, from the surface location through the terminus of the lateral. In the absence of any special Commission order, notice is not required for horizontal wells in federally supervised units or in API units provided that no portion of the horizontal interval is closer than six hundred sixty feet (660') from a drilling or spacing unit boundary or any uncommitted tract.

(g) After receipt by the Commission at the office of the Supervisor of a proper application from an interested party requesting the establishment of drilling units or the revision of existing drilling units for the spacing of wells within a certain designated area, or upon a decision by the Supervisor or the Commission to call a hearing for the establishment of drilling units or the revision of existing drilling units within a certain designated area, any Application for Permit to Drill within any such designated area will be held in abeyance by the Commission until such time as the matter has been fully heard and determined; except, however, a permit shall be issued by the Supervisor if an Owner files a sworn application and demonstrates therein to the Supervisor's satisfaction that on the date the application requesting such drilling units was filed:

(i) Owner has the right or obligation under the terms of an existing contract to drill said well; and,

(ii) Owner has a leasehold estate or right to acquire a leasehold estate under said contract which will be terminated unless he is permitted to commence the drilling of said well before the matter of spacing can be fully heard and determined by the Commission.

(h) If drilling is not commenced, the permit to drill shall not be valid after the expiration of a period of one (1) year from the date of the issuance thereof by the Commission or its Authorized Agents. A new application shall be submitted prior to the expiration date of the permit to drill, along with a \$50.00 extension fee, in order to request a one (1) year extension from such expiration date.

- (i) All plats shall contain the following information:
 - (i) Section, township, range and county that the well is to be located within;
 - (ii) North arrow;
 - (iii) Scale of drawing, to include a bar graph and a ratio showing the scale of the map;
 - (iv) A description of all monuments found, set, reset or replaced and notation of all distances measured between the corners used in establishing the section boundary in which the well is located;
 - (v) Distances from the nearest established section boundary lines to the proposed well;
 - (vi) Ungraded ground elevation of the well;
 - (vii) Basis of elevations;
 - (viii) Basis of bearings;
 - (ix) Signed Wyoming Registered Land Surveyor Certificate or statement indicating that the well was actually staked by the surveyor or others under his direct supervision as exhibited on the plat.
 - (j) Latitude and longitude in degrees, with five (5) decimal places and the datum used, if not contained on the plat, is to be furnished within thirty (30) days of the completion of the well. Latitude and longitude values shall be accurate to within one hundred fifty feet (150').
 - (k) Within the Special Sodium Drilling Area –A or –B (SSDA –A or –B) as defined in Chapter 1, Section 2(tt) or (uu), a notice of the Application for Permit to Drill shall be given by certified mail to all trona producers holding current valid Department of Environmental Quality permits to mine trona.

Section 9. Application for Permit to Drill Stratigraphic Test or Core Hole (Form 1).

A fifty dollar (\$50.00) filing fee shall be required for the drilling of a stratigraphic test or core hole, and an Application for Permit to Drill shall be filed with the Supervisor and approved by him prior to the drilling of such test or hole.

Section 10. Notice of Intent to Change Plans (Form 4).

Where unexpected conditions necessitate any material change in the plans of proposed work already approved, complete details of the changes must be submitted to and approved by the Supervisor before the work is undertaken. If the change in the nature and scope of well stimulation plans previously disclosed is material, verbal notice to the Supervisor or Authorized Agent is required. Notice of Intent (Form 4) shall be submitted as soon as practical thereafter. Circumstances requiring verbal notice may be limited to those unforeseen material changes in previously approved activities, such as a change in the well stimulation service company, a change in fluid type or chemistry, or a major change in the drilling/completion/recompletion plan.

Section 11. Notice of Intent to Recomplete Well (Form 4).

Before commencing operations to recomplete a well in any pool other than the pool from which such well is then producing, a detailed written statement of the plan of work must be filed with and approved by the Supervisor before the work is started. The Owner or Operator shall provide all information required under Chapter 3, Sections 8(c), and 45(a) through 45(g) of these rules.

Section 12. Well Completion or Recompletion Report and Log (Form 3).

Unless approved by the Supervisor, a report on the operation will be submitted on Form 3 within thirty (30) days of ceasing drilling operations, or within thirty (30) days of completion or recompletion (as defined by Chapter 1, Section 2(o) and (qq), respectively) of a well, stratigraphic test or core hole, or within thirty (30) days of the completion of any remedial work such as plugging back or drilling deeper, acidizing, shooting, formation fracturing, squeezing operations, setting a liner, gun perforating, or other similar operations not specifically covered herein, a report on the operation shall be filed with the Supervisor. Such report shall present a detailed account of the work done and the manner in which such work was performed; the daily production of oil, gas, and water both prior to and after the operation; the size and depth of perforations; the quantity of sand, crude, chemical, or other materials employed in the operation and any other pertinent information of operations which affect the original status of the well and are not specifically covered herein. If the producing interval(s) is not perforated or fully perforated within the above mentioned thirty (30) days, a Sundry Notice (Form 4) shall be filed within that thirty (30) days of completion, indicating the formation(s) perforated or to be perforated and estimated date of completion. A Completion Report (Form 3) shall be filed within thirty (30) days of the producing interval(s) being fully perforated. Data requirements of this section include data in Section 45(d), Section 45(h), Section 45(i) and Section 45(j) of this chapter.

Section 13. Operator's Monthly Report of Wells (Form 2 and Form 16).

(a) A report of all oil, water, and gas production, injection for enhanced recovery purposes, and sales shall be filed with the State Oil and Gas Supervisor on or before the last calendar day of the month succeeding the month covered by the report. Reports shall be submitted on Form 2 or electronic media as prescribed by the Commission for all wells located on fee or patented, state, federal, or Tribal lands regardless of status. Production, sales and injection volumes and pressure data shall be reported on an individual well-by-well basis and by reservoir if the well produces from multiple reservoirs.

(b) Operators of disposal wells shall file a monthly report on Form 16A unless the Supervisor has waived that requirement and approved their reporting on Form 2. Form 16B is an annual application for exclusion from filing the Operator's Monthly Disposal Well Report (Form 16A).

Section 14. Notice of Change of Owner (Form 7).

Any Owner or part Owner, as defined herein, who shall be bound under a performance bond and who shall convey his interest to another, shall file Form 7 with the Supervisor at least thirty (30) days prior to the conveyance. Prior to approval of the transfer, the transferee must submit proof of compliance with the Split Estates Act. Do not use Form 6, Designation of Agent or Operator, for this procedure.

Section 15. Notice of Intent to Abandon Well (Form 4).

(a) Before beginning abandonment work on any well, stratigraphic test, core hole, dry hole, or other exploratory hole, a Notice of Intent to Abandon (Form 4) shall be filed with the Supervisor and approval obtained as to method of abandonment before the work is started. The notice must show the reason for abandonment, and must give a detailed statement of proposed work including such information as kind, location, and length of plugs (by depths), and plans for mudding, cementing, shooting, testing, and removing casing, as well as any other pertinent information. This approval shall be valid for a period of one (1) year. After that time, a new Notice of Intent to Abandon the well shall be submitted.

(b) When the well 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 the Owner/Operator submits a written, notarized request for such use executed by the landowner which assumes the responsibility to plug the well upon its abandonment as a water well in accordance with applicable Rules and a copy of the Application for Permit to Appropriate Ground Water form for the well which has been approved by the Office of the State Engineer. Such written request, assumption of responsibility, and a copy of the State Engineer's approved form attached to a sundry notice shall be filed with the Supervisor requesting that the well be released from the Owner/Operator's bond.

Section 16. Temporarily Abandoned or Shut-In Wells (Forms 2 and 4).

(a) A well may be maintained as temporarily abandoned or shut-in provided any change in the status of the well is reported to the Supervisor on Form 4 and every month subsequent to the reported change, the well is listed on Form 2.

(b) A well may not be maintained as temporarily abandoned or shut-in for more than twenty-four (24) consecutive months from the date the well was first reported as temporarily abandoned or shut-in on Form 4 unless the Operator of the well applies for and receives approval for an extension from the Supervisor. The Supervisor may prescribe forms or other information to be submitted with the extension request. Extensions may be granted for periods up to two (2) years.

(c) Prior to approving a request for extension, the Supervisor may, upon a finding of good cause, require mechanical integrity testing in accordance with provisions of Chapter 4, Section 5(d) of these rules, or other surveillance method approved by the Supervisor, be performed on a temporarily abandoned or shut-in well. A temporarily abandoned or shut-in well which successfully passes a mechanical integrity or surveillance test shall not be required to undergo another test for five (5) years unless the Supervisor finds upon good cause that circumstances have substantially changed to alter the condition of the well.

(d) The Supervisor may require any well which has been temporarily abandoned or shut-in for more than twenty-four (24) consecutive months or any temporarily abandoned or shut-in well which has not been mechanically integrity tested within the preceding five (5) year period to undergo a mechanical integrity or other surveillance test prior to change in operator. Mechanical integrity testing must be performed in a manner consistent with Underground Injection Control (UIC) Program pressure testing rules in Chapter 4.

(e) The manner in which the well is to be maintained must be reported to and approved by the Supervisor on Form 4. Bonding requirements, as provided in Sections 4, 5, and 6 of this chapter will be kept in force until such time as the well is permanently abandoned.

(f) The Commission may, in its sole discretion, approve the Supervisor's use of conservation funds collected in accordance with WYO. STAT. ANN. § 30-5-116(b), to plug wells and seismic holes and reclaim the surrounding area affected by them if the Commission is unable to enforce its Rules and Regulations and laws, up to and including legal action when appropriate, requiring the Owner, Operator, geophysical/seismic company, client company, or hole plugger to plug and reclaim and if there exists neither a plugging bond nor other security adequate to properly plug and abandon and rehabilitate the surface. The Supervisor shall establish and maintain a well

plugging schedule which prioritizes wells for plugging through an assessment of the well's potential to adversely impact public health, public safety, surface or ground waters, surface use or other mineral resources.

Section 17. Subsequent Report of Abandonment (SRA, Form 4).

(a) If a well, stratigraphic test or core hole is plugged and abandoned, a notarized Subsequent Report of Abandonment (Form 4, Sundry Notice) must be filed with the Supervisor within thirty (30) days of the date of the plugging. The reverse side of the SRA (Form 4, Affidavit of Plugging) must be notarized and signed by both the notary and the person appearing before the notary. The SRA shall give a detailed account of the manner in which the abandonment or plugging work was carried out, including the weight of mud and nature and quantities of materials used in plugging and the location and extent (by depths) of the plugs of different materials and accompanied by a job log or cement verification report from the plugging contractor specifying the type of fluid used to fill the wellbore, type of slurry volume of API Class cement used, date of work, and the depth of plugs placed. Records of any test or measurement made, and records of the amount, size and location (by depths) of casing must be included.

(b) Site reclamation must be initiated within one (1) year of permanent abandonment of a well or last use of a pit and shall be completed in as timely a manner as climatic conditions allow. For just cause, the Supervisor may grant an administrative variance providing for additional time. Reclamation must be completed in accordance with the landowner's reasonable requests, and/or resemble the original vegetation and contour of adjoining lands. Where practical, topsoil must be stockpiled during construction for use in reclamation. All disturbed areas on state lands will be recontoured and reseeded unless the Wyoming Office of State Lands and Investments approves otherwise. Appendix F of these rules includes information on reseeding.

(c) When rehabilitation of the surface is complete and the well is ready for inspection and bond release, the Operator or Owner shall so advise the Supervisor by submitting a Sundry Notice (Form 4) marking the area on the form advising such. Inspections for the purpose of bond release will not be made by the Commission staff until that request is provided by the Operator or Owner. The SRA will be approved only after the site has been inspected and recommended for bond release by a Commission staff member.

(d) The Commission accepts copies of reports prepared to satisfy the requirements of the Bureau of Land Management when that agency has jurisdiction over the subject well.

Section 18. Plugging of Wells, Stratigraphic Tests, Core, or Other Exploratory Holes (Form 4).

(a) It shall be the duty of any Owner, Operator, or person who assumes ownership, or contractor, drilling any well, seismic, stratigraphic test, core, or other exploratory hole, whether cased or uncased, regardless of diameter, to plug said hole in accordance with the requirements of the Supervisor or as set forth hereinafter and in a manner sufficient to properly protect all fresh water bearing formations and possible or probable oil or gas bearing formations.

(b) For wells as defined in Chapter 1, Section 2(hhh) of these Rules and Regulations, and all stratigraphic test wells being abandoned, plugging must be accomplished by the following:

(i) All cement and additives shall consist of API class cement and additives, unless use of non-API cement and additives has prior approval from the Supervisor.

(ii) Wells without production casing must be plugged by placing cement plugs of at least one hundred foot (100') length consisting of approved cement and additives, mixed at a density approved by the Supervisor or his Authorized Agent over the following:

(A) Open hole porous and permeable formations;

(B) At least every two thousand five hundred feet (2,500') if porous and permeable formations are not encountered;

(C) In the base of the surface casing and at least one hundred feet (100') inside the casing at the surface. If multiple casing strings are present, a minimum one hundred foot (100') plug will be placed in the annulus between each casing string at the outside casing shoe and a minimum one hundred foot (100') plug in each annulus at the surface;

(D) At any other depth as required by the Supervisor;

(E) The spacer between all cement plugs must be a fluid consistent with that which was used to drill the well or as approved by the Supervisor.

(iii) Wells with production casing must be plugged by placing cement plugs of at least one hundred foot (100') length consisting of approved cement and additives, mixed at a density approved by the Supervisor or his Authorized Agent at least every two thousand five hundred feet (2,500'), in the base of the surface casing, and at least one hundred feet (100') inside the casing at the surface. If multiple casing strings are present, a minimum one hundred foot (100') plug must be placed in the annulus between each casing string at the outside casing shoe, and a minimum one hundred foot (100') plug in each annulus at the surface.

(A) Prior to commencing plugging operations, all produced fluids must be circulated from the well using fresh water or other fluid as required to maintain an overbalance of the producing formation.

(B) All perforations must be isolated by squeeze cementing utilizing a mechanical cement retainer set no more than fifty feet (50') above the uppermost perforation, or by a method approved by the Supervisor. The volume of cement will be no less than the volume between the retainer and the deepest perforation plus fifty percent (50%) excess. A minimum one hundred foot (100') plug must also be placed on top of the cement retainer. If access to the perforated areas of the wellbore has been lost, alternative procedures may be proposed by the Owner/Operator. The Supervisor shall determine or approve which method and the quantity of cement that shall be used or the alternative method of plugging, if access to perforations is lost;

(C) The Owner/Operator may leave the production casing in place, provided that the Owner/Operator demonstrates that the casing exhibits mechanical integrity in a manner prescribed or approved by the Supervisor. If casing fails a mechanical integrity test, the casing leaks must be isolated and squeeze cemented utilizing a mechanical cement retainer, or by a method approved by the Supervisor.

(D) If it is determined that any formation containing fresh water and potable water, as defined under Chapter 1, Section 2(s) of these Rules and Regulations, was not sealed or separated when production casing was cemented, the casing must be perforated at the base of the fresh water and potable water zone and squeeze cemented utilizing a mechanical cement retainer, or by a method approved by the Supervisor, with a volume of cement sufficient to cover the formation. The Supervisor may also require the production casing to be perforated at a depth of the shoe of the surface casing and that cement be squeezed or circulated through the perforations through the uncemented zone; and,

(E) If an attempt is made to recover production casing after the retrievable part of the production casing has been removed, cement must be circulated to fill at least a one hundred foot (100') interval of which fifty feet (50') must be inside the casing stub. The remainder of the hole shall be plugged in the manner prescribed under subsection (b)(i) of this section.

(iv) Powder River Basin Coalbed Methane Wells.

(A) The minimum density requirement for cement slurry shall be 13.5 pounds per gallon (ppg) with no less than twenty-five percent (25%) of cement by weight with a yield not greater than 1.29 cubic feet per sack. The Supervisor may approve alternate cement blends submitted by the Operator.

(B) Each completed section of the well shall be isolated by filling the underreamed or perforated section of the hole with bentonite hole plug extending a minimum of twenty feet (20') above the completed section, or isolating the underreamed or perforated section with a mechanical bridge plug set no higher than thirty feet (30') above the underreamed or perforated section. The Supervisor may approve other material for the openhole portion in lieu of the bentonite hole plug.

(C) The bentonite plugs and/or mechanical bridge plugs shall be topped with a one hundred foot (100') cement plug, and one hundred foot (100') plugs will also be set every seven hundred fifty feet (750') along with a one hundred foot (100') plug at the surface.

(c) In plugging horizontal wells, a continuous cement plug shall be placed from at least one hundred feet (100') into the lateral back to one hundred feet (100') into the vertical portion of the wellbore, unless an alternate plugging program is approved by the Supervisor. The remaining portion of the vertical wellbore shall then be plugged in accordance with the preceding requirements.

(d) No substance of any nature or description other than those normally used in plugging operations shall be placed in any well at any time during plugging operations.

(e) Verbal approval to plug and abandon or approval of a Notice of Intent to Abandon (Form 4) must be obtained prior to commencing actual plugging operations. Under Chapter 4, Section 11 of these rules, special plugging orders or variances from normal practice may be obtained or set forth when conditions dictate to protect fresh water bearing formations.

(f) When the well has been plugged, a notarized Subsequent Report of Abandonment (Form 4) accompanied by a job log or cement verification report from the plugging contractor specifying the type of fluid used to fill the wellbore, type of slurry volume of API Class cement used, date of work, and depth of plugs placed must be submitted to the Supervisor. Copies of plugging reports or other pertinent information for wells drilled on federal lands must be filed with the Commission in a timely manner in order that field information for UIC area reviews is current.

(g) In addition to the requirements under subsection (b) of this section, all wells within the Special Sodium Drilling Area – A, as defined in Chapter 1, Section 2(tt), shall have a directional survey run from the base of the Trona Interval to surface if not previously run. A cement bond log or other appropriate log shall be run from the base of the Trona Interval to top of cement to determine the integrity of the cement in casing annuluses.

(h) In addition to the requirements under subsection (b) of this section, all wells in the SSDA – A or – B shall be plugged by placing a continuous cement plug, at a minimum, through the Trona Interval in all open zones, open casing zones, and all open or inadequately cemented casing annuluses. Perforation and squeeze cementing shall be used where required by the Supervisor.

Section 19. Well Designations and Markers.

(a) The Owner/Operator shall mark each drilling, producing, or injection well in a conspicuous place with his name, name of lease, well number, and legal description of the location of the well. All signs shall be maintained in a legible condition. Signs for wells in multi-well pad locations shall be located near the multi-well pad or may be placed near the pad entrance and provisions shall be made on or near each wellhead to enable positive identification of each well.

(b) Plugged and abandoned wells shall be marked with a permanent monument on which shall be shown the operator, the lease, the well number, and location of the well. The monument shall consist of a piece of pipe not less than four inches (4") in diameter and not less than ten feet (10') in length of which four feet (4') shall be above the ground level, the remainder being securely embedded in cement. The top of the pipe must be permanently sealed.

(c) In order to lessen visual impact of a large number of dry hole markers, or for other reasonable cause, the Supervisor may waive the requirement to erect a dry hole marker. Requests for approval of this procedure shall be submitted on the Notice of Intent to Abandon or on a separate Sundry Notice (Form 4). If that option is desired, the well casing must be cut off at least three feet (3') below the recontoured surface and a plate with well designation as provided in subsection (b) of this section permanently welded onto the top of the casing stub. In the event a marker is not erected, the Owner/Operator must leave a temporary steel fence post marked with the well number and location adjacent to the well bore so the field inspectors can easily find the location.

Section 20. Well Records and Reports.

The Owner/Operator shall keep on the leased premises, or at his headquarters in the field, or otherwise conveniently available to the Supervisor, 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 kinds, weight, size, and landed depth of casing used in drilling each well on the leased premises, and any other information obtained in the course of the well operation.

Section 21. Filing of Well Logs.

(a) Within thirty (30) days after logs are run on any well or within thirty (30) days after the completion of any further operation on it, if such operations involve drilling deeper or re-drilling any formation, the Owner/Operator shall submit to the Supervisor one (1) copy of the well log on the Commission's Form 3 as well as one (1) copy of the electrical, radioactive, or other similar conventional logs run, which must be submitted on continuous paper. If requested by the Owner/Operator, the Supervisor may grant an extension to the thirty (30) day reporting period for any well. The Owner/Operator shall submit logs in digital form in addition to those mentioned above. The format shall be LAS, Log ASCII standard or any other format approved by the Supervisor.

(b) In addition, Operators shall file one (1) copy of drill stem test charts, directional deviation surveys that portray the bottomhole location, formation water analyses, porosity, permeability or fluid saturations, core analyses, and lithologic log or sample descriptions and bottomhole pressure data subsequent to initial completion within thirty (30) days of being run or compiled by the Operator.

(c) As prescribed under Chapter 2, Section 6 and Chapter 3, Section 25 of these rules for horizontal wells, the directional deviation, and/or measurement-while-drilling (MWD) survey shall be filed within thirty (30) days of being run. Further, said directional deviation and/or MWD survey shall not be held confidential as provided hereinafter for other logs.

(d) The making and filing of reports, well logs, and directional surveys on exploratory or "wildcat" wells marked confidential shall be kept confidential for six (6) months after the filing due date as required by subsection (a) of this section unless the Owner gives written permission to release such information at an earlier date. When an Application for Permit to Drill is received marked "Confidential", the Commission will release only the first page of the Commission's Form 1 or the Bureau of Land Management's Form No. 3160-3 and the surveyor's plat to the public and news media. Permission to extend the confidential status for periods longer than the original six (6) month period must be obtained from the Supervisor, however, if a well has been completed and/or production is being reported on it, subsequent requests to keep it confidential shall be denied.

Section 22. General Drilling Rules.

(a) The following shall apply to the drilling of all wells unless altered, modified, or changed for a particular well, pool, unit, area or lands upon hearing before the Commission:

(i) Surface casing shall be run to reach a depth below all known or reasonably estimated utilizable groundwater (as defined in Chapter 3, Section 8(c)(iv)) to protect the Use Class category and to prevent blowouts or uncontrolled flows. Unless otherwise approved by the Supervisor, surface casing shall be set at a minimum of three (3) joints or approximately one hundred (100) to one hundred twenty (120) feet below the depth of any Wyoming Office of State Engineer permitted water supply wells designated for domestic, stock water, irrigation or municipal use, within a minimum of one-quarter (1/4) mile radius and shall be cemented to surface. Any coalbed methane well receiving a Ground Water Appropriate Permit (Form UW 5) from the State Engineer's Office is exempt from this specific subsection. Fresh water flows detected during drilling, including seismic, core, or other exploratory holes, shall be recorded on Form 19 (Report of Fresh Water Flows) and reported to the Commission on the next business day. Information contained on the form shall describe the depth at which the sand was encountered, the thickness, and the rate of water flow, if known. In areas where pressures and formations are unknown, surface casing shall be of sufficient size to permit the use of an intermediate string or strings of casing. Surface casing shall be set in or through an impervious formation and shall be cemented by the 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 Supervisor. The Supervisor may require the Owner or Operator to pump a specified quantity of excess cement above the design volume if severe washed out hole conditions are known to exist on the surface hole portion of wells in the immediate vicinity of the well to be drilled. If cement is not circulated to the surface during the primary operation, the Owner/Operator shall perform supplemental cementing operations to assure that the annular space from the casing shoe to the surface is filled with cement. The Supervisor may require the Owner or Operator to provide cased hole bond logs to be run for casing strings to demonstrate isolation from the placement of cement across and above the productive intervals or above the last casing shoe in the well, if there is a demonstrated reason to believe an inadequate cement job was performed.

(ii) Unless otherwise provided by specific order of the Commission for a particular well or wells or for a particular pool or parts thereof, cemented casing string shall stand under pressure until the cement at the shoe has reached a compressive strength of five hundred pounds per square inch (500 lbs./sq. in.). In addition, the API free-water separation for all cement slurries used shall average no more than four (4) milliliters per two hundred fifty (250) milliliters of cement. All cements used shall achieve a minimum compressive strength of one hundred (100) psi in twenty-four (24) hours measured at eighty degrees Fahrenheit (80° F.). Testing for these

properties shall be in accordance with accepted industry standards. The term "under pressure" as used herein shall be complied with if one float valve is used or if pressure is otherwise held;

(iii) There shall be installed and maintained on all wells blowout preventers and related equipment in accordance with Chapter 3, Section 23(i) of these rules;

(iv) Setting depths of all casing strings shall be determined by taking into account formation fracture gradients and the maximum anticipated pressure to be maintained within the wellbore;

(v) If and when it becomes necessary to run a production string, such string shall be cemented by the pump and plug method and shall be properly tested by the pressure method before cement plugs are drilled;

(vi) Natural gas, which may be encountered in a substantial quantity in any section of cable tool drilled hole above the ultimate objective, shall be shut off with reasonable diligence either by mudding, by casing, or other approved method, and confined to its original source to the satisfaction of the Supervisor. 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.

(b) Before drilling commences, approval to construct proper and adequate reserve pits for the reception and confinement of mud and cuttings and to facilitate the drilling operation shall be applied for and received in accordance with Chapter 4, Section 1 of these rules. Special precautions including, but not limited to, an impermeable liner and/or membrane, monitoring systems, or closed systems, shall be taken, if necessary, to prevent contamination of streams and potable water and to provide additional protection to human health and safety in instances where drilling operations are conducted in close proximity to water supplies, residences, schools, hospitals, or other structures where people are known to congregate. Pits, wellheads, pumping units, tanks, and treaters shall be located no closer than three hundred fifty feet (350') from any of the aforementioned items. The Supervisor may impose greater distances for good cause and likewise grant exceptions to the 350-foot rule.

(c) Before drilling commences, the Owner/Operator shall notify the Commission of his intent to spud the well and an approximate time the BOP test will be run.

(d) For each well drilled within the Special Sodium Drilling Area – A or – B (SSDA – A or – B), as defined in Chapter 1, Section 2(tt) and (uu) of these rules, a complete proposed casing and cementing program shall be submitted on the Application for Permit to Drill (Form 1). For the life of the well each drilling and casing program,

unless altered, modified, or changed for a particular well, pool, unit, area or lands upon hearing before the Commission, shall be designed to:

- (i) Provide suitable and safe operating conditions for the total measured depth proposed;
 - (ii) Confine fluids to the wellbore;
 - (iii) Prevent migration of fluids from one stratum to another;
 - (iv) Assure control of well pressures encountered;
 - (v) Prevent contamination of freshwater;
 - (vi) Prevent significant damage to Trona Mineral Resources;
- and,
- (vii) Provide well control until the next casing is set.

All pertinent factors for well control should be considered, including formation fracture gradients, formation pressures, casing setting depths, proposed total depth, and projected mining.

(e) In addition, the following requirements apply to all wells drilled within the Special Sodium Drilling Area – A (SSDA – A), as defined in Chapter 1, Section 2(tt) of these rules, unless altered, modified, or changed for a particular well, pool, unit, area or lands upon hearing before the Commission:

(i) Any oil or gas wells that will be drilled within the area of influence of underground trona mining shall be:

(A) Designed and installed to withstand the forces and potentially damaging influences from mining as certified by a Registered Professional Engineer registered in the state of Wyoming or

(B) Demonstrated to be located outside the mining influence area. Mining influence includes surface subsidence and underground formation collapse, faulting fracturing and related stresses that may provide avenues for communication with active or inactive underground mine works, open mine voids, and corrosive mine fluids that may cause well casing corrosion or failure as a result of mining.

(ii) Conductor casing must be set to a depth of at least forty feet (40') or into a competent stratum, whichever is greater. The casing must be cemented with a quantity of cement to fill the annular space up to the surface and topped off if not

at the surface. Cement fill must be verified by observation of cement returns.

(iii) Centralized surface casing shall be set below the Trona Interval from the surface. Centralizers shall be spaced to ensure enough casing annulus is maintained on all sides of the casing to allow cement fill space throughout the cased interval. The casing shall be set into a competent stratum and cemented with sufficient cement in the annulus to circulate to the surface. If cement does not circulate to the surface, the open annulus must be cemented to the surface before drilling ahead. A cement bond log or cement evaluation tool must be run to verify adequate cement around surface casing. Remedial cementing may be required if it is determined that insufficient bonding occurred.

(iv) Prior to well completion, a directional survey shall be run from the base of the Trona Interval to surface to verify wellbore location relative to surface location. Results of the survey shall be submitted to the Supervisor pursuant to Chapter 3, Section 21 of these rules.

(v) Intermediate and/or production casings, if required to be cemented, shall be cemented with a sufficient quantity of cement to provide annular fill up from the surface casing shoe to two hundred feet (200') above the Trona Interval. All casing annuluses reaching the production zones shall be cemented for two hundred feet (200') or more above the highest producing zone. All casings shall be centralized throughout their cemented annulus intervals. Before drilling ahead, all casings shall be tested in accordance with subsection (e)(vii) of this section.

(vi) Liners may be set and cemented as an extension of casings provided that the cemented liner has a minimum of two hundred feet (200') of cemented lap within the next larger casing. Before drilling ahead, a cemented liner and lap must test in accordance with subsection (e)(vii) of this section, to determine that a seal between the liner top and next larger casing has been achieved.

(vii) Before drilling out the liner after cementing, all casing, liners, and liner laps must be tested to a surface pressure of one thousand five hundred (1,500) psig, or 0.25 psi/ft multiplied by the true vertical depth of the casing shoe, whichever is greater; however, surface pressure must not subject the casing to a hoop stress that will exceed seventy percent (70%) of the minimum yield strength of the casing. Sufficient notice of pressure test must be given, so that a representative of the Commission may witness the test. A cement bond log or other appropriate log shall be obtained to evaluate cement integrity in each cemented zone for each cemented casing annulus and the results submitted to the Supervisor for approval, pursuant to Chapter 3, Section 21 of these rules. If there are indications of improper cementing, or the pressure declines more than ten percent (10%) in 30 minutes, corrective measures shall be taken.

(viii) Casing annuluses not cemented through the Trona Interval that extend to the surface shall be continually monitored for leaks by equipping the surface termination with a rupture disk (fail open) pressure relief valve with tattle-tale (or similar device) to detect, alarm, and relieve excess annular pressure buildup. The device shall be set to fail open at one hundred (100) psi. Blocking of this pressure relief valve in an open position shall be prohibited. In the event the monitored casing pressure exceeds one hundred (100) psi, the Supervisor and the trona producers holding valid Wyoming DEQ permits to mine trona shall be notified as soon as possible and remedial actions shall be implemented with the Supervisor's approval. The pressure relief device shall be tested every two (2) years to insure it is functioning properly. Tattle-tale monitoring units that cease to monitor or communicate shall be promptly repaired. Pressure devices shall be repaired or replaced immediately upon failing a pressure test or following a rupture.

(ix) If a well has not been tested for mechanical integrity within five (5) years and is shut-in for an extended period the casing strings capable of being tested shall be evaluated for mechanical integrity during the shut-in period.

(x) Cathodic protection or other equivalent corrosion prevention shall be applied to all casing strings.

(f) Within the Special Sodium Drilling Area – A or – B, as defined in Chapter 1, Section 2(tt) or (uu) of these rules, or all wells defined in Chapter 1, Section 2 of these rules unless altered, modified, or changed upon hearing before the Commission, or shown to contain no Trona Mineral Resources, shall only use stimulation methods that do not significantly damage the Trona Mineral Resources. A plan of work for any stimulation operation shall be submitted to the Supervisor and approved before the work is undertaken.

(i) Well stimulation operations within the Trona Interval shall include a post stimulation survey that identifies the extent of induced fractures. Results of the survey shall be submitted to the Supervisor for evaluation to determine if induced fractures have significantly intersected the Trona Mineral Resources and if corrective action is required.

(ii) Stimulation fluids shall be designed to prevent significant dissolution to the Trona Mineral Resources. The Supervisor shall require corrective action if it is determined that significant damage to the Trona Mineral Resources has, or is likely to occur.

(g) Within the boundaries of the Special Sodium Drilling Area – A or – B, as defined in Chapter 1, Section 2(tt) or (uu) of these rules, all wells defined in Chapter 1, Section 2 of these rules unless altered, modified, or changed upon hearing before the Commission, shall use drilling fluids that will not significantly dissolve the Trona Mineral Resource.

Section 23. Blowout Preventers.

(a) Blowout preventers (BOPs) and related equipment shall be installed and maintained during the drilling of all wells in accordance with the following rules unless altered, modified, or changed, for a particular pool or pools, upon hearing before the Commission:

(i) **General Rules.**

(A) The required working pressure rating of all blowout preventers and related equipment shall be based on known or anticipated subsurface pressure, geologic conditions, or accepted engineering practices, and shall equal or exceed the maximum anticipated pressure to be contained at the surface. In the absence of better data, the maximum anticipated surface pressure shall be determined by using a normal pressure gradient of 0.22 psi per foot and assuming a partially evacuated hole. A schematic diagram of the BOP and wellhead assembly shall be submitted to the Supervisor with the Application for Permit to Drill (APD; Form 1). The schematic diagram should indicate the minimum size and pressure rating of all components of the wellhead and blowout preventer assembly.

(B) The Supervisor, on a site specific basis, may require the use of blowout preventers or other methods of controlling shallow coalbed methane wells, at which time all current BOP rules shall be applicable.

(C) All blowout preventers, choke lines, and choke manifolds shall be installed above ground level. Casing heads and optional spools may be installed below ground level provided they are visible and accessible.

(D) Blowout preventer equipment and related casing heads and spools shall have a vertical bore no smaller than the inside diameter of the casing to which they are attached.

(E) Pressure tests on blowout preventers and related equipment shall be tested as outlined in this section, at least:

(I) Prior to spud or upon installation;

(II) After the disconnection or repair of any pressure containing seal in the BOP stack, choke and kill lines, or choke manifold, but limited to the affected component; and,

(III) Every 30 days after initial installation, or as determined by the Supervisor.

(F) The Supervisor may require an affidavit covering the initial pressure tests after installation signed by the Owner/Operator or contractor attesting to the satisfactory pressure tests. The Supervisor is to be advised at least twenty-four (24) hours in advance of all tests.

(G) Blowout prevention equipment used when reasonable expectations of encountering hydrogen sulfide or sour gas formations that could potentially result in the partial pressure of the hydrogen sulfide or sour gas exceeding 0.05 psia (00034 MPa) in the gas phase at the maximum anticipated pressure, shall be suitable for use in such areas.

(H) All ram BOPs shall be equipped with hydraulic locking devices or manual locking devices with hand wheels extending outside of the rig's substructure.

(I) Blowout prevention equipment installed on the well shall have a rated working pressure equal to, or higher than, the working pressure specified in the approved APD.

(J) In addition to the minimum BOP requirements outlined in this section, wells drilled while using tapered drill strings shall require either a variable bore pipe ram preventer or additional ram type blowout preventers to provide a minimum of one set of pipe rams for each size of drill pipe in use, and one set of blind rams.

(ii) **Minimum requirements for 2,000 psi system:**

(A) BOP equipment shall consist of at least one double-gate preventer with pipe and blind rams or two single-ram type preventers; one equipped with pipe rams, and the other with blind rams. Ram preventers or a drilling spool must have side outlets with a minimum inside diameter of two inches to accommodate choke and kill lines. Outlets on the casing head may not be used to attach choke or kill lines. One annular BOP may be substituted for ram type BOPs, providing the annular BOP is pressure tested in the CSO (complete shut off) configuration.

(B) Additional BOP equipment shall include one upper kelly cock, and one drill pipe safety valve with subs to fit all drill string connections in use.

(C) Choke manifold and related equipment shall consist of one kill line valve, one choke line valve, choke line, two manual adjustable chokes each with one valve located upstream of the choke, one bleed line valve and one mud service pressure gauge with a valve upstream of the gauge. The arrangement of the

valves shall be a functional equivalent of the arrangement outlined in Appendix G, Figure 3-1 or 3-1A, of these rules.

(D) All choke manifold valves, choke and kill line valves and the choke line shall be full bore. Choke line valves, choke line and bleed line valves shall have an inside diameter equal to or greater than the minimum requirement for the BOP or drilling spool outlet.

(E) The choke line should be as straight as possible, and any required turns shall be made with flow targets at bends and on block tees. Choke hoses with flanged connections designed for that purpose will be accepted in lieu of a steel choke line.

(F) The accumulator shall have sufficient capacity to operate the BOP equipment as outlined in this section, and have one independently powered pump system. BOP controls may be located at the accumulator or on the rig floor.

(iii) **Minimum requirements for 3,000 psi system:**

(A) BOP equipment shall consist of at least one annular BOP and one double-gate preventer with pipe and blind rams or two single-ram type preventers; one equipped with pipe rams and the other with blind rams. Ram preventers or a drilling spool must have side outlets with a minimum inside diameter of two inches on the kill side, and three inches on the choke side to accommodate choke and kill lines. Outlets on the casing head may not be used to attach choke or kill lines.

(B) Additional BOP equipment shall include one upper kelly cock, and one drill pipe safety valve with subs to fit all drill string connections in use.

(C) Choke manifold and related equipment shall consist of one kill line valve, one check valve, two choke line valves, choke line, two manual adjustable chokes each with one valve located upstream of the choke, one bleed line valve and one mud service pressure gauge with a valve upstream of the gauge. The arrangement of the valves shall be a functional equivalent of the arrangement outlined in Appendix G, Figure 3-2, of these rules.

(D) All choke manifold valves, choke and kill line valves and the choke line shall be full bore. Choke line valves, choke line and bleed line valves shall have an inside diameter equal to or greater than the minimum requirement for the BOP or drilling spool outlet.

(E) The choke line should be as straight as possible, and any required turns shall be made with flow targets at all bends and on block tees. All connections exposed to well bore pressure shall be welded, flanged or clamped. Choke hoses with flanged connections designed for that purpose will be accepted in lieu of a steel choke line.

(F) The accumulator shall have sufficient capacity to operate the BOP equipment as outlined in this section, and have two independently powered pump systems connected to start automatically after a 200 psi drop in accumulator pressure, or one independently powered pump system connected to start automatically after a 200 psi drop in accumulator pressure and an emergency nitrogen back-up system connected to the accumulator manifold. BOP controls may be located at the accumulator or on the rig floor.

(iv) **Minimum requirements for 5,000 psi system:**

(A) BOP equipment shall consist of at least one annular BOP and one double-gate preventer with pipe and blind rams or two single-ram type preventers; one equipped with pipe rams and the other with blind rams. Ram preventers or a drilling spool must have side outlets with a minimum inside diameter of two inches on the kill side, and three inches on the choke side to accommodate choke and kill lines. Outlets on the casing head may not be used to attach choke or kill lines.

(B) Additional BOP equipment shall include one upper kelly cock, lower kelly cock, one drill pipe safety valve and one inside BOP with subs to fit all drill string connections in use.

(C) Choke manifold and related equipment shall consist of two kill line valves, one check valve, one choke line valve, one remote controlled choke line valve, choke line, one manual adjustable choke and one remote controlled adjustable choke each with two valves located upstream of the choke, two bleed line valves and one mud service pressure gauge with a valve upstream of the gauge. The arrangement of the valves shall be a functional equivalent of the arrangement outlined in Appendix G, Figure 3-3, of these rules.

(D) All choke manifold valves, choke and kill line valves and the choke line shall be full bore. Choke line valves, choke line and bleed line valves shall have an inside diameter equal to or greater than the minimum requirement for the BOP or drilling spool outlet.

(E) The choke line should be as straight as possible, and any required turns shall be made with flow targets at all bends and on block tees. All connections exposed to well bore pressure shall be welded, flanged or clamped. Choke

hoses with flanged connections designed for that purpose will be accepted in lieu of a steel choke line.

(F) The accumulator shall have sufficient capacity to operate the BOP equipment as outlined in this section, and have two independently powered pump systems connected to start automatically after a 200 psi drop in accumulator pressure, plus an emergency nitrogen back-up system connected to the accumulator manifold. BOP controls shall be located on the accumulator with additional remote controls located on the rig floor.

(v) **Minimum requirements for 10,000-15,000-20,000 psi systems:**

(A) BOP equipment shall consist of at least one annular BOP and one double-gate preventer with pipe and blind rams or two single-ram type preventers; one equipped with pipe rams and the other with blind rams located above a drilling spool. One drilling spool with side outlets with a minimum inside diameter of two inches on the kill side, and three inches on the choke side. One ram-type preventer with pipe rams, located below the drilling spool. Outlets on the casing head may not be used to attach choke or kill lines.

(B) Additional BOP equipment shall include an upper kelly cock, lower kelly cock, one drill pipe safety valve and one inside BOP with subs to fit all drill string connections in use.

(C) Choke manifold and related equipment shall consist of two kill line valves, one check valve, one choke line valve, one remote controlled choke line valve, choke line, two manual adjustable chokes and one remote controlled adjustable choke each with two valves located upstream of the choke, two bleed line valves and one mud service pressure gauge with a valve upstream of the gauge. The arrangement of the valves shall be a functional equivalent of the arrangement outlined in Appendix G, Figure 3-4, of these rules.

(D) All choke manifold valves, choke and kill line valves and the choke line shall be full bore. Choke line valves, choke line and bleed line valves shall have an inside diameter equal to or greater than the minimum requirement for the BOP or drilling spool outlet.

(E) The choke line shall be a steel line and be as straight as possible, and any required turns shall be made with flow targets at all bends and on block tees. All connections exposed to well bore pressure shall be welded, flanged, or clamped.

(F) The accumulator shall have sufficient capacity to operate the BOP equipment as outlined in this section, and have two independently powered pump systems connected to start automatically after a 200 psi drop in accumulator pressure, plus an emergency nitrogen back-up system connected to the accumulator manifold. BOP controls shall be located on the accumulator with additional remote controls located on the rig floor.

(vi) **Minimum requirements for diverter systems:**

(A) The diverter system shall consist of a low-pressure diverter or an annular blowout preventer with large diameter vent lines installed below the diverter and extending to a flare pit a safe distance from the well.

(B) The valves on the vent lines shall be full bore and full opening, and be hydraulically controlled in a manner to insure that at least one vent line valve is opened before the diverter packer closes.

(C) The diverter and all valves shall be function tested when installed and at appropriate times during the operation.

(vii) **Minimum requirements for BOP equipment testing:**

(A) All blowout preventers and related equipment that may be exposed to well pressure shall be tested first to a low pressure and then to a high pressure.

(I) A stable low of 200-300 psi shall be maintained for at least five (5) minutes prior to initiating the high-pressure test.

(II) When performing the low-pressure test, it is not acceptable to apply a higher pressure and bleed down to the low-test pressure. The higher pressure could initiate a seal that may continue to seal after the pressure is lowered and therefore misrepresent a low-pressure condition.

(III) The high-pressure test shall be to the rated working pressure of the ram type BOPs and related equipment, or to the rated working pressure of the wellhead on which the stack is installed, whichever is lower. A stable high-pressure test shall be maintained for ten (10) minutes.

(IV) Annular BOP shall be high pressure tested to fifty percent (50%) of the rated working pressure, and maintain a stable pressure for ten (10) minutes.

(V) Manual adjustable chokes not designed for complete shut off (CSO) shall be pressure tested only to the extent of determining the integrity of the internal seating components to maintain back pressure. Hydraulic chokes designed for CSO shall be pressure tested to fifty percent (50%) of the rated working pressure.

(B) All casing below the conductor pipe shall be pressure tested to 0.22 psi per foot or one thousand five hundred (1,500) psi, whichever is greater, but not to exceed seventy percent (70%) of the minimum internal yield strength of the casing. A stable pressure shall be maintained for thirty (30) minutes.

(C) During BOP pressure testing the casing shall be isolated with a test plug set in the wellhead, and the appropriate valve opened below the test plug to detect any leakage that may occur due to failure of the test plug.

(D) The choke and kill line valves, choke manifold valves, upper and lower kelly cocks, drill pipe safety valves and inside BOP shall be tested with pressure applied from the wellbore side. All valves, including check valves, located downstream of the valve being pressure tested, will be in the open position.

(E) All manually operated valves and chokes on the BOP stack, choke and kill lines, or choke manifold shall be equipped with a handle provided by the manufacturer, or a functionally equivalent fabricated handle, and be lubricated and maintained to permit operation of the valves without the use of additional wrenches or levers.

(F) Operators may install BOP equipment of a higher pressure rating than that specified in the approved APD. In that event the BOP equipment shall be pressure tested at the working pressure specified in the approved APD.

(G) All operational components of the BOP equipment shall be functioned at least once a week to verify the components' intended operations.

(H) The results of all BOP equipment pressure tests and function tests shall be recorded on the tour sheet and shall include the type of test, testing sequence, low and high pressures, duration of each test, and results of each test.

(viii) **Minimum requirements for accumulator system testing:**

(A) The precharge pressure on each accumulator bottle shall be checked prior to each BOP pressure test, and adjusted if necessary. The minimum precharge pressure for a 3,000-psi working pressure accumulator unit should be one thousand (1,000) psi. The minimum precharge pressure for a 2,000-psi working pressure

accumulator unit should be one thousand (1,000) psi. The minimum precharge pressure for a 1,500-psi working pressure accumulator unit should be seven hundred fifty (750) psi. Only nitrogen gas shall be used for accumulator precharge. The precharge should be adjusted to within one hundred (100) psi of the selected pressure.

(B) Accumulator response time is the elapsed time between activation and the complete operation of a function. The accumulator system shall be capable of closing each ram BOP within thirty (30) seconds. Closing time shall not exceed thirty (30) seconds for annular BOPs smaller than eighteen and three-quarter inches (18-3/4") nominal bore, and forty-five (45) seconds for annular BOPs of eighteen and three-quarter inches (18-3/4") nominal bore and larger, when closed on the smallest diameter drill string component in use.

(C) BOP accumulator systems shall have sufficient usable hydraulic fluid volume (with pumps inoperative) to close one annular BOP, two ram BOPs from a full open position, open one hydraulic valve against zero wellbore pressure, and retain two hundred (200) psi or more above the minimum recommended precharge pressure.

(D) The accumulator pump system shall have sufficient quantity and sizes of pumps to satisfactorily perform the following: with the accumulator bottles isolated from service, the accumulator pump system shall be capable of closing the annular BOP on the minimum size drill pipe being used, or one ram-type BOP if the stack does not include an annular BOP, and open the hydraulic choke line valve within two (2) minutes.

Section 24. Vertical Drilling.

Unless otherwise ordered by the Commission upon hearing, 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 be at all times a practical minimum. Horizontal wells are exempt from this rule.

Section 25. Directional Drilling.

(a) Before beginning controlled directional drilling, other than whipstocking because of hole conditions, when the intent is to direct the bottom of the hole away from the vertical, notice of intention to do so shall be filed with the Supervisor and his approval obtained. The approval will be valid for one year from the date it was granted. Such notice shall state clearly:

- (i) The depth;
- (ii) Exact surface location of the wellbore;

- (iii) Proposed direction of deviation; and,
 - (iv) Proposed horizontal distance between the bottom of the hole and surface location.
- (b) If approval is obtained, the Owner/Operator shall file with the Supervisor within thirty (30) days after the completion of the work an accurate and complete copy of the survey made.
- (c) Additional notice to directional drill shall not be required if the proposed bottomhole location will be drilled to an authorized location pursuant to Section 2 of this chapter, a drilling and spacing order, or any other special order of the Commission.
- (d) Specification for Certification of Directional Surveys pursuant to Wyoming Oil and Gas Conservation Commission rules and regulations, Chapter 2 Section 6(a), and Chapter 3, Sections 21(c), 25(b) and 25(c). The Commission provides additional requirements for a complete Certified Directional Survey as follows:
- (i) The accepted standard for directional survey calculation shall be the minimum curvature method with straight line extrapolation acceptable from last data point in survey to Total Measured Depth. If other methods are to be used they must be identified on the Application for Permit to Drill (APD, Form 1) when submitted for approval. If the APD is approved with another method, the other method must be duly noted by the Operator on the Operator's Certification Form and by the directional drilling contractor on the Directional Survey Certification Form.
 - (ii) Directional drilling contractor shall provide the Final Survey in electronic (ASCII) file format directly submitted to the Wyoming Oil and Gas Conservation Commission. Final Survey file must also include a Plan versus Actual plot with all dimensions and directions clearly marked. A copy of the Directional Survey Certification Form with the Plan versus Actual plot is acceptable in .pdf format, but must be complete and signed.
 - (iii) The directional survey or measurement while drilling (MWD) contractor is responsible for ensuring that all MWD tools are calibrated in accordance to their standard calibration procedures.
 - (iv) The Operator shall provide on the drilling well location a copy of the approved APD and provide the directional survey contractor(s) with a legible and reproducible copy of the certified surface location plat.

(A) Bottom hole location (BHL) shall be tied back to the well surface location utilizing the most recent governmental survey as required by the most recent required governmental survey, such as NAD 83.

(v) A change out of the directional survey tools is required if the Operator has to trip out of the hole during the build section or while steering the well in the event of failure of MWD itself or failure of direction survey tool; however, the Operator will be allowed to proceed as long as the surveys are replaced with MWD check shots or gyro survey.

(vi) For a Commission approved permitted Directional Well:

(A) In the vertical hole the Operator shall provide directional surveys at no greater than two hundred (200) foot intervals and at the terminus of the vertical section, or at the discretion of the Supervisor, to document the deviation of the upper hole.

(vii) A proper magnetic spacing must be maintained in order to ensure azimuth accuracy.

(viii) When deviation is less than five (5) degrees dogleg rate, directional survey shall be taken at intervals no greater than three hundred (300) feet.

(ix) When deviation is five (5) degrees dogleg rate or greater, a directional survey shall be taken at intervals no greater than one hundred (100) feet.

(x) Regardless of the directional survey tools in use, the Commission requires in the build section that directional surveys shall be taken at intervals no greater than one hundred (100) feet in the lateral portion of the wellbore while rotating. Should a survey be missed, the Owner or Operator must take a survey at the next possible opportunity and an explanation of the reason for the missing survey shall be included on the Directional Survey Report.

(xi) The Operator shall provide on their Certification Form the method of bottom hole location (BHL) projection used from the last surveyed point to Total Measured Depth. The Operator Certification Form must be completed and signed. This form must be attached to the Completion Report (Form 3). The Operator must include with the Completion Report (Form 3) a printed copy of the final well directional survey.

(A) Certification forms are to be attached to the Completion Report (Form 3).

(xii) At the Supervisor's discretion and if the Commission well survey analysis compels the need, the Supervisor may require additional directional surveys, accuracy requirements and reported data.

(xiii) All wells must be depicted exactly as drilled. The original laterals and any sidetrack shall be kept separately, appropriately labeled as to what they depict (Leg 1, Leg Sidetrack 1, etc.) and filed in their entirety from the tie-in point to a projection to total measured depth of each leg or sidetrack.

(xiv) When additional laterals and/or sidetracks are surveyed, the tie-in point should be listed as the first survey. Do not include any surveys prior to the tie-in as they are required to be filed with the previous lateral or sidetrack. The survey point used for the tie-in should be the last survey run immediately above the sidetrack depth.

(xv) All surveys must be submitted and no portion of any survey should be deleted at any time. All surveys must be corrected to True North. In the event that a gyro survey is run after the well has been drilled with an MWD tool, all surveys must be submitted and the "master survey" will be considered the gyro survey.

(xvi) Additional requirements:

(A) On highly deviated and/or horizontal wells, the Commission may require check shot surveys at various depths, not repeats of mandatory survey shot depths as required in Section 25(d)(vi) through (d)(x). This requirement will be a stipulation on the approved Application for Permit to Drill (Form 1) on a case-by-case basis.

(e) Commission required Certification Forms:

(i) Directional Survey Certification Form shall be attached to the Final Report as a separate cover sheet, on the contractor's letterhead, and must contain, as a minimum, the following information:

- (A) MWD/Directional Survey Company Name;
- (B) MWD/Directional Survey Job Number and Job Type;
- (C) Well Name and API Number;
- (D) Operator/Client Name;

(E) Well Surface Location by Footage and Latitude/Longitude, and Datum 1/4 1/4 Section, Township and Range, and County;

(F) Final Report Date;

(G) MWD/Directional Survey Run Date;

(H) Surveyed from measured depth (MD) of A feet to B feet;

(I) Survey Tool Type and Relation to the Bit;

(J) Drilling Rig Contractor Name, Rig Number and Rig Kelley Bushing Height feet;

(K) MWD/Directional Surveyor's Name;

(L) The following certification statement:

“The data and calculations for this survey have been checked by me and conform to the calibration standards and operational procedures set forth by [MWD/Directional Survey Company Name]. I am authorized and qualified to review the data, calculations and this report, and that the report represents a true and correct Directional Survey of this well based on the original data corrected to True North and obtained at the well site. Wellbore coordinates are calculated using [minimum curvature or other] method.”

(M) Well Planner Printed Name and Signature;

(N) Date Signed;

(O) Optional: Notarization of Signature.

(ii) Operator Certification Form shall be attached to the Completion Report (Form 3) with a copy of the Final Directional Survey, as a separate cover sheet on the Operator's letterhead, and must provide, as a minimum, the following information:

(A) Operator Company Name and Company Representative's Office Address;

(B) Well Name and API Number;

(C) Well Surface Location by Footage and Latitude/Longitude, and Datum 1/4 1/4 Section, Township and Range, and County;

(D) Producing Interval Top Location by Footage and Latitude/Longitude and Datum 1/4 1/4 Section, Township and Range, and County;

(E) Producing Interval Bottom Location by Footage and Latitude/Longitude and Datum 1/4 1/4 Section, Township and Range, and County (if different than Bottom Hole Location);

(F) Well Bottom Hole Location by Footage and Latitude/Longitude and Datum 1/4 1/4 Section, Township and Range, and County;

(G) The following certification statement:

“I am authorized and qualified to review the Final Directional Survey data for this well and by my signature certify that the above Bottom Hole Location represents a true and correct Bottom Hole Location of this well based on the Final Directional Survey Report corrected to True North as provided by [MWD/Directional Survey Company Name]; and that the Bottom Hole Location is in compliance with Wyoming Oil and Gas Conservation Commission rules and orders. The method of projection from the last directionally surveyed point to the Total Measured Depth as represented as the Bottom Hole Location is the [straight line or other] method.”

(H) Operator Representative Printed Name and Signature;

(I) Date Signed;

(J) Optional: Notarization of Signature.

(f) The following definitions are provided:

(i) **Azimuth** means the deviation in the horizontal plane of a wellbore expressed in terms of compass degrees.

(ii) **Certified directional survey** means a survey conducted and reported pursuant Chapter 2, Section 6(b), and Chapter 3, Sections 21(c) and 25(b) and (c) of these rules.

(iii) **Directional drilling methods** include industry standard tools, including gyro and electronic single shot, as used separately or in combination with Measurement While Drilling (MWD) or Logging While Drilling (LWD).

(iv) **Directional drilling survey** means the compiled report of the survey, providing as a minimum the following, represented as report columns: Survey Measured Depth (MD) as feet; Inclination as degrees; Azimuth as degrees; Course Length as feet; True Vertical Depth (TVD) as feet; Borehole Bearing Coordinates as degrees N/S and E/W; Closure as Distance in feet and as Azimuth in degrees; Dogleg Severity as degrees; and Horizontal Coordinates as feet N/S and E/W.

(v) **Directional well** means a wellbore that is intentionally deviated from vertical with an intentional azimuth.

(vi) **Dogleg severity** means a significant rate of change in azimuth as well as inclination in a short distance along the path of the well resulting in a crooked well profile and expressed as degrees per 100 feet.

(vii) **Drilling and Spacing Unit (DSU)** means Commission-approved boundary based upon rules and orders appropriate for the area and pools, within the lease boundary, property lines, unit lines, communitized area boundary, or participating areas boundary.

(viii) **Drill pipe stand** means drill pipe in triples, approximately 94-96 feet for each stand. If the drilling rig drill pipe is doubles (approximately 60-64 feet) or singles (approximately 30-32 feet), or if coiled tubing is used, then the footage requirements must be used for survey frequency.

(ix) **Horizontal Well** means a wellbore drilled laterally at an angle of at least eighty degrees (80°) to the vertical and with a horizontal projection exceeding one hundred feet (100') measured from the initial point of penetration into the productive formation through the terminus of the lateral in the same common source of hydrocarbon supply.

(x) **Inclination** means the deviation angle away from the vertical plane expressed as degrees.

(xi) **Kick-off Point (KOP)** means the point at which a directional well is intentionally deviated from vertical.

(xii) **Lateral hold section** or **tangent section** means a portion of the directional well past the point where the wellbore has been intentionally departed from the vertical with no intentional inclination or azimuth changes.

(xiii) **Penetration point** means the point where a directional well penetrates the top of the pool from which it is intended to produce.

(xiv) **Producing interval** means that portion of a directional well drilled inside a pool's vertical limits between its penetration point and to pool's terminus.

(xv) **Producing area** means the area in which the operator has an approved Drilling and Spacing Unit (DSU) from the Commission and in conformance with the setback requirements from the outer boundary of the approved DSU, or as per requirements set out in Chapter 3, Section 2 of these rules, for the applicable pool.

(xvi) **Vertical well** means a well that does not have an intentional departure or course deviation from vertical. A wellbore meeting this definition does not require submittal of the Operator's Bottom Hole Location Certification Form.

Section 26. Protection of Productive Strata.

The Owner/Operator shall not drill, deepen, complete, or recomplete an oil or gas well for the purpose of producing oil or gas from a lower or upper stratum until all productive strata are protected to the satisfaction of the Supervisor.

Section 27. Open Flows and Control of "Wild" Wells.

The Owner/Operator shall take reasonable precaution to prevent any oil, gas, or water well from blowing open or "wild" and shall take immediate steps and exercise due diligence to bring under control any such well or burning oil or gas well. Within the boundaries of the Special Sodium Drilling Area – A, as defined in Chapter 1, Section 2(tt) of these rules, the Supervisor and adjacent trona mine operators shall be notified as soon as possible upon detecting a leak at or below the surface. All leaks shall be corrected as quickly as possible or plugged by cementing methods outlined in Chapter 3, Section 18 of these rules.

Section 28. Use of Gas for Artificial Lifting.

Gas may be used for artificial lifting of oil where all such gas returned to the surface with the oil is used without waste. Where the returned gas is not to be so used, the use of gas for artificial lifting of oil is prohibited unless otherwise specifically authorized by the Supervisor.

Section 29. Classification of Gas Production.

Whenever in any pool the Commission after due notice and hearing, limits the total amount of gas which may be produced to an amount less than that which the pool could produce if no restriction was imposed, then, for the purpose of allocating and distributing the allowable production of such gas as required by WYO. STAT. ANN. § 30-5-102, each well in said pool the principal production of which at the mouth of the well is

oil, which also unavoidably produces with said oil, gas in excess of the amount required for lease fuel or other lease purposes, and in quantities found by the Commission, after due notice and hearing, to be sufficient to make it economically feasible for the producer to save or use all or any part of such gas shall be classified as a gas well under WYO. STAT. ANN. § 30-5-101(a)(vii), and as an oil well under WYO. STAT. ANN. § 30-5-101(a)(vii), as applicable, so that each producing property will have the opportunity to produce or to receive its just and equitable share of both oil and gas.

Section 30. Measurement of Oil.

(a) The volume of production of oil shall be computed in terms of barrels of clean oil on the basis of meter measurements or tank measurements of oil-level difference, made and recorded to the nearest one-quarter inch (1/4") of one hundred-percent-capacity tables, subject to the following corrections:

(i) Correction for Impurities: The percentage of impurities (water, sand, and other foreign substances, not constituting a natural component part of the oil) shall be determined to the satisfaction of the Supervisor, and the observed gross volume of oil shall be corrected to exclude the entire volume of such impurities;

(ii) Temperature Correction: The observed volume of oil corrected for impurities shall be further corrected to the standard volume of sixty degrees (60°) Fahrenheit in accordance with A.S.T.M. D-1250, Table 6 or Table 7, or any revisions thereof and any supplements thereto or any close approximation thereof approved by the Supervisor; and

(iii) Gravity Determination: The gravity of oil at sixty degrees (60°) Fahrenheit shall be determined in accordance with A.S.T.M. D-1250, Table 5, or any revisions thereof and any supplements thereto approved by the Supervisor.

Section 31. Measurement of Gas.

(a) Gas of all kinds shall be measured by meter unless otherwise authorized by the Supervisor. For computing the volume of gas to be reported to the Supervisor, the standard pressure base shall be 14.73 pounds per square inch absolute (psia), regardless of the atmospheric pressure at the point of measurement, and the standard temperature base shall be sixty degrees (60°) Fahrenheit. All volumes of gas to be reported to the Supervisor shall be adjusted by computation to these standards, regardless of pressures and temperatures at which the gas was actually measured, unless otherwise authorized by the Supervisor.

(b) Conversion from some common measurement bases is accomplished as follows:

<u>Measured Volume At</u>		<u>Factor</u>		<u>Equals Volume At</u>
14.4 psia	x	.9776	=	14.73 psia
14.65 psia	x	.9945	=	14.73 psia
14.73 psia	x	1.0000	=	14.73 psia
16.4 psia	x	1.1134	=	14.73 psia

Section 32. Report for Gasoline or Other Extraction Plants (Form 9, Sheets 1 and 2).

All Owners/Operators of gasoline or other extraction plants shall make monthly reports to the Commission on Form 9, Sheets 1 and 2. Such forms shall contain all information required therein and shall be filed with the Supervisor by the 20th day of the succeeding month.

Section 33. Vacuum Pumps.

The installation of vacuum pumps or other devices for the purpose of imposing a vacuum at the wellhead on any oil or gas well or any oil or gas bearing reservoir is permitted only upon order of the Commission, or upon approval of the Supervisor, obtained pursuant to an application therefore filed in accordance with the Rules of Practice and Procedure. The application shall set forth the names of all Owners within one-half (1/2) mile of the affected well or wells and shall be accompanied by a plat showing the location of all wells on an applicant's lease and all offset wells of interested parties which have been or may be capable of being completed in the same pool or pools.

Section 34. Surface Commingling of Production or Multiple Zone Completion or Commingling in One Wellbore.

(a) Except as provided in subsection (c) of this section, the multiple zone completion of a well and the production of oil or gas from more than one pool from one well without segregation of such production are permitted only upon order of the Commission, or approval of the Supervisor, pursuant to an application filed in accordance with the Rules of Practice and Procedure, Chapter 5.

(b) The application shall set forth:

(i) The manner and method of completion proposed, including a diagrammatic sketch of the mechanical installation for a multiple zone completion;

(ii) The names of all Owners within one-half (1/2) mile of the well or wells in which the multiple zone completion is to be attempted or in which the production is to be commingled; and,

(iii) A plat showing the location of all wells on the applicant's lease and all offset wells on direct and diagonally offsetting leases which have been or may be capable of being completed in the same pool or pools.

(c) Except as indicated below, the multiple zone completions and recompletions within wells producing gas and associated hydrocarbons from coal zones of the Fort Union Formation in the Powder River Basin shall be permitted at the discretion of the Supervisor without order of the Commission, upon the filing and approval of Form 4, Sundry Notice of Intent, after the well has been drilled, completed, or recompleted. Such Form 4 notice shall indicate the coal zones in which production is to be commingled. This subsection (c) shall not apply:

(i) When the coal zones to be commingled do not have common ownership both as to working interests and royalty interests;

(ii) When the well is not located on an eighty (80) acre drilling and spacing unit established by order or rule for the production of gas and associated hydrocarbons from the Fort Union Formation coal zones or on a federal exploratory unit in which Fort Union Formation coal zones are unitized.

The sundry notice shall identify the eighty (80) acre drilling and spacing unit, including the order or rule under which it was established or shall identify the federal exploratory unit, as applicable.

(d) The Supervisor may require such tests as deemed necessary to determine the effectiveness of the segregation of the different productive zones in a multiple zone completion.

(e) The production from each well must be measured by meters, gauge or by some other method the Commission has approved after notice and opportunity for hearing. An Owner/Operator may not, prior to metering or measurement as required under Chapter 3, Section 13(a), 30(a) or 31(a), commingle production from two or more oil or gas wells with diverse working interest or royalty interest ownership, specifically excluding overriding royalty interests, without prior approval of the Commission after notice and opportunity for hearing. Notice must be provided to working interest and royalty interest owners.

(f) If commingled wells have common working interest and royalty interest ownership, specifically excluding overriding royalty interests, the production from each well need not be measured at the wellhead if the Owner/Operator of the wells

demonstrates to the Supervisor that the production from each well can be accurately determined at reasonable intervals by other means.

Section 35. Production Test and Gas-Oil Ratio Report. (Forms 10 through 13).

(a) Gas-oil ratio reports can be required by the Supervisor on certain wells if it is deemed necessary to obtain information of this nature.

(b) An initial gas well test can be required by the Supervisor when such test is deemed necessary; the initial tests shall be multipoint back-pressure tests (stabilized multipoint or constant time multipoint or isochronal multipoint) or acceptable one-point back-pressure tests. The results shall be furnished to the Supervisor on acceptable forms. The methods prescribed in the Interstate Oil and Gas Compact Commission's "Manual of Gas Well Testing" or an alternate method approved by the Supervisor shall be used.

(c) As a guideline for multipoint tests, each flow rate duration shall be set at a minimum of thirty (30) minutes and a maximum of two (2) hours depending on stabilization. The shut-in period shall be a minimum of seventy-two (72) hours.

(d) On one-point tests, the flow rate shall be a minimum of twenty-four (24) hours, and the shut-in period shall be a minimum of seventy-two (72) hours.

(e) Gas-oil ratio reports for horizontal wells shall be filed upon initial completion and annually thereafter on Form 10.

Section 36. Remedy in Case of Rule or Order Violations.

The Supervisor or the Authorized Agent with the approval and order of the Commission has authority to shut down any operation and place under seal any property or equipment for failure to comply with these oil and gas operating regulations or orders issued hereunder.

Section 37. Designation of Agent or Operator (Form 6).

A Designation of Agent or Operator (Form 6) shall be submitted to the Supervisor prior to the commencement of operations. A Designation of Agent or Operator will be accepted as authority of the Agent or Operator to fulfill the obligations of the Owner and to sign any papers or reports required under these oil and gas operating regulations, and all authorized orders or notices given by the Supervisor when given in the manner hereinafter provided shall be deemed service of such orders or notices upon the Owner and the lessee. All changes of address and any termination of the Agent's or Operator's authority shall be immediately reported in writing to the Supervisor and in the

latter case the designation of a new Agent or Operator shall be immediately made. If the designated Agent or Operator shall at any time be incapacitated for duty or absent from his or their address, the Owner shall designate in writing a substitute to serve in his or their stead and in the absence of such Owner or of notice of appointment of a substitute then in such case notices may be given by the Supervisor by delivering a registered letter to the United States Post Office at Casper, Wyoming, directed to the Agent or Operator at the address shown on the current Designation of Agent or Operator on file in the Supervisor's office, and such notice will be deemed service upon the Owner and lessee.

Section 38. Oil Mining Requirements.

Before beginning oil mining operations, the Owner/Operator shall first apply for and obtain a permit to do so from the Commission or Supervisor, and shall furnish the Commission with a bond or other security approved under the Commission's Rules. The application for a permit may be denied or the permit revoked by the Supervisor if he finds the oil mining operation will violate or has violated the Rules and orders of the Commission, the orders of the Supervisor, or the Commission or their agents, or the Oil and Gas Conservation Act. If denied or revoked, the oil mining owner has the right to a hearing before the Commission, which may deny or revoke the permit on the same grounds as noted above for denial or revocation by the Supervisor. The conditions of the bond or other security shall be in compliance with the Wyoming Conservation Act, the Commission's Rules and orders. The bond or other security may be forfeited or released under the procedure specified under Section 7 of this chapter. Before changing an oil mining operation as approved by the Commission or Supervisor under the permit, the oil mining owner shall notify the Commission by Sundry Notice (Form 4). Oil mining operations shall comply with the Commission's Rules and Regulations, except where compliance is waived in writing by the Supervisor. The Commission shall regulate oil mining for the purpose of conservation of oil, gas, and environmental resources and to protect correlative rights.

Section 39. Authorization for Flaring and Venting of Gas.

(a) Venting or flaring under the following circumstances has not and does not constitute waste and is authorized by the Commission:

(i) Emergencies or upset conditions: During temporary emergency situations, such as compressor or other equipment failures, relief of abnormal system pressures, or other conditions which result in the unavoidable short-term venting or flaring of gas at a lease, gas plant or other facility;

(ii) Well purging and evaluation tests: During the unloading or cleaning up of a well during routine purging or drill stem, producing, or evaluation tests;

(iii) Production tests: During initial or recompletion evaluation tests not exceeding a period of fifteen (15) days, unless a longer test period is authorized by the Supervisor;

(iv) The Commission encourages the Owner or Operator to employ technologies that minimize or prevent the venting and flaring of gas during drilling and completion operations.

(b) Low rate casing head gas. Unless it is determined by the Supervisor or the Commission that waste is occurring, up to sixty (60) MCF of gas per day is authorized to be vented or flared from individual oil wells. Venting or flaring is authorized either at the well or at a lease facility which serves several wells.

(c) Unless flaring or venting is authorized under subsection (a) or (b) of this section, an Owner/Operator must apply for retroactive or prospective venting or flaring authorization under subsection (c) or (d) of this section. Authorization may be granted upon review of an application, provided that the venting or flaring does not constitute waste. An application to vent or flare shall contain the following items as a minimum:

(i) A statement of reason for venting or flaring;

(ii) The estimated duration of venting or flaring;

(iii) The estimated daily volume of gas in thousands of standard cubic feet per day (MCFD);

(iv) The estimated daily volume and type of associated produced fluids, gas or plant products in barrels, MCFs, gallons or tons per day, as applicable;

(v) A compositional analysis of the gas if hydrogen sulfide is present or if the gas stream has a low BTU content;

(vi) A legal description of the well(s), plant or facility and distance to the nearest potential sales point or pipeline(s); and,

(vii) A discussion of applicable safety factors and plans such as use of a constant flare igniter, facility pressure release, or emergency protection practices.

(d) The Supervisor may grant temporary authorization of verbal requests, including plant start-up/shut-down. Follow-up documentation of the request may be requested of the applicant containing, at a minimum, the items set forth in subsection (c) of this section above within fifteen (15) days of the initial request.

(e) All operations shall be conducted in a safe and workmanlike manner. If the gas stream is sour or venting would present a safety hazard, a constant flare igniter system or other Commission approved method to safely manage sour gas may be required.

(f) Venting of gas containing a hydrogen sulfide content in excess of 50 PPM is not allowed. Venting does not include emissions associated with fugitive losses from valves, fittings, surface piping, pneumatic devices, and other production equipment, including the wellhead. Supervisor approval is required for venting of gas containing a hydrogen sulfide content in excess of 50 PPM for specific job tasks in controlled environments, such as well repairs, pipeline purging, well failures, decommissioning of facilities, etc., or where necessary as a safety measure where flaring would be dangerous due to the introduction of an ignition source at the work site or when the operation is conducted under the authority and regulations of the Department of Environmental Quality.

Section 40. Tertiary Certification.

(a) Certification of tertiary projects and determination of base level production for projects qualifying for the tertiary oil tax exemption shall be accomplished in the following manner:

(i) In order for tertiary production to qualify for the severance tax exemption provided under WYO. STAT. ANN. § 39-14-205(c), the applicant shall present evidence demonstrating that the recovery technique or techniques utilized in the project area qualify for a tertiary determination and the Commission must certify the project as a tertiary project.

(ii) For tertiary projects certified by the Commission after March 31, 2003, and before March 31, 2008:

(A) As part of the process of certifying tertiary projects which qualify for the severance tax exemption under WYO. STAT. ANN. § 39-14-205(c), the applicant shall furnish the Commission an extrapolation of expected non-tertiary oil production from the project. The extrapolation shall be for not less than seventy-two (72) months commencing with the first month after the month in which the application for tertiary certification is made. The extrapolation shall be based on production history, reservoir and production characteristics and the application of generally accepted petroleum engineering practices. The extrapolated production volumes approved by the Commission shall serve as the base level production for purposes of determining the tertiary oil production which qualifies for the tax exemption; and,

(B) The applicant shall provide a statement as to all assumptions made in preparing the extrapolation and any other information concerning the project that the Commission may reasonably require in order to evaluate the applicant's extrapolation.

(iii) An application for tertiary certification may be approved administratively by the Supervisor. The Supervisor shall review the material within fifteen (15) days after receipt of the application and advise the applicant of the decision. If the Owner/Operator disagrees with the Supervisor's decision, they may request a hearing before the full Commission. The Supervisor, on his own motion, may also refer the matter to the Commission if the proper decision is in doubt.

Section 41. Payment of Conservation Tax (Form OG-001).

(a) Purchasers and producers of oil and gas who are responsible for payment of conservation tax shall notify the Commission in order to receive reporting forms from the Commission's staff. Reporting forms will be available on the Commission's website. Forms will be mailed to the Owner/Operator only upon written request of the producer or purchaser. Producers whose tax liability is thirty dollars (\$30.00) or less per month may make semi-annual reports with payments due the periods ending June 30th and December 31st of each year.

(b) The form of the tax return shall be prescribed by the Commission. The gross amount of sales of oil and gas shall be the total of the monthly amounts reported on the Commission's Form 2 (Operator's Monthly Report of Wells). The fair cash market value of sales for conservation mill tax calculations shall be the same as used by an Owner/Operator in making its calculation for severance tax purposes to the Wyoming Department of Revenue and Taxation for return for tax assessment to the State Board of Equalization of Wyoming, Ad Valorem Tax Division, pursuant to WYO. STAT. ANN. § 39-14-201, *et seq.*

(c) Payments and corresponding forms must be submitted on or before the 25th day of the second month following the month in which the production occurs. Any tax not paid within the time herein specified shall bear interest at a rate of one percent (1%) per month from the date of delinquency until paid. This tax, together with the interest, is a lien upon the oil or gas against which it is levied and assessed. A tax due of less than one dollar (\$1.00) does not need to be remitted.

(i) Checks submitted for payment of taxes should include and identify the taxpayer's name, address, and phone number. Cash or coin is not an acceptable method of payment of the tax.

(ii) Tax returns must be signed prior to submission to the Commission.

(d) Purchasers have the option of paying the tax for producers, but doing so does not reduce the producer's liability for full payment of the tax. Purchasers and producers shall make arrangements between themselves to ensure that there will be no duplication of taxes paid. If the purchaser pays the tax, the producer shall still submit a return showing volumes, values, and name of the company paying the tax.

(e) Operators are responsible for making settlements with the non-operators in leases or units according to their customary joint interest accounting.

Section 42. Unit Operations.

Any person desiring to obtain the benefits of WYO. STAT. ANN. § 30-5-110, insofar as the same relates to any method of unit or cooperative development or operation of a field or pool or a part of either, shall file an application with the Supervisor for approval of such agreement which shall have attached a copy of such agreement.

Section 43. Carbon Sequestration Unitization Process.

(a) The purpose of WYO. STAT. ANN. §§ 35-11-313 through 35-11-318 is the protection of corresponding rights, compliance with environmental requirements and to facilitate the use and production of Wyoming energy resources.

(i) “Corresponding rights” is defined as the right of all pore space owners in a unit area who will be affected by the unit operations, either now or in the future, to concurrently share in the economic benefits generated by using the pore space in the unit area.

(b) Any interested person may file an application with the Wyoming Oil and Gas Conservation Commission Supervisor requesting an order providing for the operation and organization of a unit of one (1) or more parts as a geologic sequestration site and for the pooling of interests in pore space in the proposed unit area for the purpose of conducting the unit operation. The application shall contain those items set out in WYO. STAT. ANN. § 35-11-315(a). An application checklist is provided to ensure all requirements for a complete application have been met.

(c) Upon receipt of an application, the Wyoming Oil and Gas Conservation Commission shall promptly set the matter for hearing. In addition to any notice otherwise required by law or the Commission's Rules, the applicant shall give notice of the hearing, specifying the time and place of hearing, and describing briefly its purpose and the land and pore space affected, to be mailed by certified mail at least thirty (30) days prior to the hearing to all persons whose names and addresses are required to be listed in the application. A copy of the notice and mailing matrix shall be filed with the Commission.

(d) After considering the application and hearing the evidence offered in connection therewith, the Wyoming Oil and Gas Conservation Commission shall enter an order setting forth the following findings as set out in WYO. STAT. ANN. § 35-11-316(b) and approving the proposed plan of unitization and proposed operating plan, if any, if the commission finds that:

(i) The material allegations of the application are substantially true;

(ii) The purposes specified in WYO. STAT. ANN. § 35-11-314 will be served by granting the application;

(iii) The application outlines operations that will comply with environmental requirements;

(iv) Granting the application will facilitate the use and production of Wyoming energy resources;

(v) The applicant must provide the method used to determine the quantity of pore space storage capacity to be allocated to each separately owned tract within the permit area. This allocation represents, so far as can be practically determined, each tract's actual share of the pore space to be used in the sequestration permit area;

(A) Ratification of pore space storage capacity within the unit area shall address the following possible pore space use scenarios:

(I) Carbon dioxide injected into the pore space for permanent carbon storage and sequestration only and excluding carbon dioxide injected for enhanced recovery purposes;

(II) Water withdrawal from the pore space for permanent carbon storage and sequestration only and excluding water withdrawal associated with the production of hydrocarbons; and,

(III) A combination of carbon dioxide injected into the pore space and excluding carbon dioxide injected for enhanced recovery purposes or water withdrawal associated with the production of hydrocarbons.

(vi) The method by which the allocation of economic benefits generated from use of pore space within the unit area between pore space owners; and between pore space owners and the unit operator or others is fair and reasonable, taking into consideration the costs required to capture, transport and sequester the carbon dioxide;

(vii) The method of generating economic benefits from the use of pore space in the unit area is fair and equitable and is reasonably designed to maximize the value of such use. (Economics related to the sequestration of carbon are currently unknown. However, economic drivers will be in place in the future to value the carbon being sequestered; generation of electricity, methane from coal gasification, cap and trade credits, as examples.).

(e) No order of the Wyoming Oil and Gas Conservation Commission authorizing the commencement of unit operations shall become effective until the plan of unitization has been signed or in writing ratified or approved by those persons who own at least eighty percent (80%) of the pore space storage capacity within the unit area.

(f) The Commission may hold supplemental hearings and make findings as may be required to determine when and if the consent will be obtained. Notice shall be given as required by statute.

(g) If the required percentages of consent have not been obtained within a period of six (6) months from and after the date on which the order of approval is made, the order shall be ineffective and revoked by the Commission, unless, for good cause shown, the Commission extends that time.

(h) Any interested person may file an application with the Wyoming Oil and Gas Conservation Commission requesting an order applicable only to the proposed unit area described in the application which shall provide for the percentage of approval or ratification to be reduced from eighty percent (80%) to seventy-five percent (75%). The application shall contain the information required by WYO. STAT. ANN. § 35-11-315(a) and any order of the Commission entered pursuant to the application shall comply with WYO. STAT. ANN. § 35-11-316(b). Notice of the hearing on the application shall be given in the same manner and to the same persons as required by WYO. STAT. ANN. § 35-11-316(a).

(i) An order entered by the Wyoming Oil and Gas Conservation Commission under this section may be amended as provided by WYO. STAT. ANN. § 35-11-316(e).

(j) The Wyoming Oil and Gas Conservation Commission, upon its own motion or upon application, and with notice and hearing, may modify its order regarding the operation, size or other characteristic of the unit area in order to prevent or assist in preventing a substantial inequity resulting from operation of the unit, provided that no such modification may amend any permit issued under WYO. STAT. ANN. §§ 35-11-313 and 35-11-316(d).

(k) Any owner of pore space within a geologic sequestration site who has not been included within a unitization application or order authorizing a unit under this section, may petition for inclusion in the unit area, as provided by WYO. STAT. ANN. § 35-11-316(g).

Section 44. Change of Address.

Any Owner/Operator of a well shall, at all times, keep the Commission apprised of their current mailing and physical address. This may be done on a Sundry Notice (Form 4) or in the form of a letter.

Section 45. Well Stimulation.

(a) An approved Application for Permit to Drill (APD, Form 1) or an approved Sundry Notice (Form 4) is required prior to the initiation of any well stimulation activity. Additional stimulation fluid information shall be provided to the Commission as an addendum to the APD (Form 1), or as part of a comprehensive drilling/completion/recompletion plan, or on a Sundry Notice (Form 4). A federal fieldwide development document or similar document may be accepted by the Supervisor. The Supervisor may require, prior to the well stimulation, the Owner or Operator to perform a suitable mechanical integrity test of the casing or of the casing-tubing annulus or other mechanical integrity test methods using procedures set forth in Chapter 2, Section 6 and Chapter 4, Section 7(e)(i).

(b) Where multiple stimulation activities will be undertaken for several wells proposed to be drilled to the same zone(s) within an area of geologic similarity, approval may be sought from the Supervisor to accept a comprehensive master drilling/completion/recompletion plan containing the information required. The approved master drilling/completion/recompletion plan will then be referenced on each individual well's Application for Permit to Drill (Form 1).

(c) The Owner or Operator shall provide geological names, geological description and depth of the formation into which well stimulation fluids are to be injected.

(d) The Owner or Operator shall provide detailed information to the Supervisor as to the base stimulation fluid source. The Owner or Operator or service company shall provide to the Supervisor, for each stage of the well stimulation program, the chemical additives, compounds and concentrations or rates proposed to be mixed and injected, including:

(i) Stimulation fluid identified by additive type (such as but not limited to acid, biocide, breaker, brine, corrosion inhibitor, crosslinker, demulsifier,

friction reducer, gel, iron control, oxygen scavenger, pH adjusting agent, proppant, scale inhibitor, surfactant);

(ii) The chemical compound name and Chemical Abstracts Service (CAS) number shall be identified (such as the additive biocide is glutaraldehyde, or the additive breaker is aluminum persulfate, or the proppant is silica or quartz sand, and so on for each additive used);

(iii) The proposed rate or concentration for each additive shall be provided (such as gel as pounds per thousand gallons, or biocide at gallons per thousand gallons, or proppant at pounds per gallon, or expressed as percent by weight or percent by volume, or parts per million, or parts per billion);

(iv) The Owner or Operator or service company may also provide a copy of the contractor's proposed well stimulation program design including the above detail;

(v) The Supervisor may request additional information under this subsection prior to the approval of the Application for Permit to Drill (Form 1) or of the Sundry Notice (Form 4);

(vi) The Supervisor retains discretion to request from the Owner or Operator and/or the service company, the formulary disclosure for the chemical compounds used in the well stimulation(s).

(e) The Owner or Operator shall provide a detailed description of the proposed well stimulation design, which shall include:

(i) The anticipated surface treating pressure range;

(ii) The maximum injection treating pressure;

(iii) The estimated or calculated fracture length and fracture height.

(f) Upon prior request via Application for Permit to Drill (Form 1), and/or a comprehensive drilling/completion/recompletion plan, or by Well Completion Report (Form 3), or by Sundry Notice (Form 4), and/or by written letter to the Supervisor justifying and documenting the nature and extent of the proprietary information, confidentiality protection shall be provided consistent with WYO. STAT. ANN. § 16-4-203(d)(v) of the Wyoming Public Records Act for the following records: "trade secrets, privileged information and confidential commercial, financial, geological or geophysical data furnished by or obtained from any person."

(g) The injection of volatile organic compounds, such as benzene, toluene, ethylbenzene and xylene, also known as BTEX compounds or any petroleum distillates, into groundwater is prohibited. The proposed use of volatile organic compounds, such as benzene, toluene, ethylbenzene and xylene, also known as BTEX compounds or any petroleum distillates for well stimulation into hydrocarbon bearing zones is authorized with prior approval of the Supervisor. It is accepted practice to use produced water that may contain small amounts of naturally occurring petroleum distillates as well stimulation fluid in hydrocarbon bearing zones.

(h) The Owner or Operator or service company shall provide the Supervisor, on a Well Completion or Recompletion Log (Form 3), or on a Sundry Notice (Form 4) for an existing well, the following post well stimulation detail:

(i) The actual total well stimulation treatment volume pumped;

(ii) Detail as to each fluid stage pumped, including actual volume by fluid stage, proppant rate or concentration, actual chemical additive name, type, concentration or rate, and amounts;

(iii) The actual surface pressure and rate at the end of each fluid stage and the actual flush volume, rate and final pump pressure;

(iv) The instantaneous shut-in pressure, and the actual 15-minute and 30-minute shut-in pressures when these pressure measurements are available;

(v) In lieu of (i) through (iv) above, Owner or Operator shall submit the actual well stimulation service contractor's job log, without any cost/pricing data from the field ticket, or an Owner or Operator representative's well treatment job log or any report providing the above required information. If information on the actual field ticket describes the Owner's or Operator's proprietary completion design and/or well stimulation design, confidentiality may be afforded per subsection (f) above.

(i) During the well stimulation operation, the Owner or Operator shall monitor and record the annulus pressure at the bradenhead. If intermediate casing has been set on the well being stimulated, the pressure in the annulus between the intermediate casing and the production casing shall also be monitored and recorded. A continuous record of the annulus pressure during the well stimulation shall be submitted on Well Completion or Recompletion Log (Form 3) or on a Sundry Notice (Form 4).

(i) If during the stimulation, the annulus pressure increases by more than five hundred (500) pounds per square inch gauge (psig) as compared to the pressure immediately preceding the stimulation, the Owner or Operator shall verbally notify the Supervisor as soon as practicable but no later than twenty-four (24) hours following the incident. The Owner or Operator shall include a report containing all

details pertaining to the incident, including corrective actions taken, as an attachment to the Well Completion Report (Form 3).

(j) The Owner or Operator shall provide information to the Supervisor on Well Completion Report (Form 3) or on Sundry Notice (Form 4) as to the amounts, handling, and if necessary, disposal at an identified appropriate disposal facility, or reuse of the well stimulation fluid load recovered during flow back, swabbing, and/or recovery from production facility vessels. Storage of such fluid shall be protective of groundwater as demonstrated by the use of either tanks or lined pits. If lined pits are utilized to store fluid for use in well stimulation, or for reconditioning, for reuse, or to hold for appropriate disposal, then the requirements of Chapter 4, Section 1 of these rules shall be met to protect wildlife and migratory birds.

Section 46. Groundwater Baseline Sampling, Analysis and Monitoring

Note: Effective date of Chapter 3, Section 46 is March 1, 2014.

(a) All operators are required to submit a groundwater baseline sampling, analysis and monitoring plan with an Application for Permit to Drill or Deepen a Well (Form 1). The groundwater monitoring program will consist of initial baseline water sampling and testing followed by a series of subsequent sampling and testing after setting the production casing or liner. This Rule will not apply to an existing oil or gas well that is converted to an injection well for enhanced recovery or disposal purposes.

(b) If four (4) or fewer available water sources are present within a one-half (1/2) mile radius of the location of a proposed oil well, gas well (including coalbed methane wells), dedicated injection well, or Commission approved monitoring well, the operator shall collect a sample from each available water source.

(c) If more than four (4) available water sources are present within the one-half (1/2) mile radius, the operator shall submit a plan for approval to the Supervisor for selecting the available water sources based on all of the following criteria:

(i) Available water sources closest to the location of the proposed oil well, gas well (including coalbed methane wells), dedicated injection well, Commission approved monitoring well or multi-well pad are preferred.

(ii) Sample locations shall be chosen in a radial pattern around the permitted location.

(iii) Where available water sources are completed in different aquifers, a sample shall be collected from each aquifer. Where multiple available water sources are present in a single aquifer, an operator shall give adequate consideration to vertical separation and aquifer zones in selecting available water sources for sampling.

(iv) If groundwater flow direction is known or reasonably can be inferred, samples from both up-gradient and down-gradient available water sources are required, if available.

(d) An operator may request a variance from the requirements of this Rule, by filing a Sundry Notice (Form 4), along with necessary supporting documentation. The Supervisor may approve a variance based on the following criteria:

(i) No water sources are located within a one-half (1/2) mile radius of a proposed oil well, gas well (including coalbed methane wells), dedicated injection well, Commission approved monitoring well or multi-well pad; or

(ii) Available water sources are determined to be improperly maintained, non-operational, or other issues exist that would not allow the operator to obtain a representative sample. An operator seeking a variance on these grounds shall document the condition of the water source it considers unsuitable for sampling and provide that information to the Supervisor and owner of the water source; or

(iii) The owner of a water source declines to grant access or requires payment for access, despite an operator's reasonable efforts to obtain consent to conduct sampling. For purposes of this section, reasonable efforts shall mean notice to an owner of a water source eligible for sampling and testing under this program. If the operator's attempts to obtain access fail, the operator shall provide final notice by certified mail. If the owner of a water source does not respond within 30 days, the operator shall be considered to have made a reasonable effort. Any operator seeking a variance on these grounds shall document the efforts used to obtain access to the water source from the owner.

(e) The initial sampling and testing shall be conducted within the twelve (12) month period prior to spudding the well or the first well on a multi-well pad. The first round of subsequent sampling and testing shall be conducted between twelve (12) and twenty-four (24) months after setting the production casing or liner. A second subsequent sampling and testing shall be conducted between thirty-six (36) and forty-eight (48) months after setting the production casing or liner. The second subsequent sampling shall be conducted at least twenty-four (24) months after the first subsequent sampling. An operator shall make a reasonable attempt to conduct all sampling during the same month of the year. An operator may request in writing approval from the Supervisor to deviate from the subsequent sampling and testing timeframes in its Application for Permit to Drill or Deepen a Well (Form 1) based on site specific geologic and hydrologic conditions (e.g., flow rate and direction). Previously sampled water sources, including samples obtained by other operators, may be used if collection of the sample or samples meet all of the requirements of this rule and are approved by the Supervisor by Sundry Notice (Form 4). If additional development requiring an Application for Permit to Drill

or Deepen a Well (Form 1) occurs on a well pad or multi-well pad after all subsequent sampling and testing has been completed, an operator shall be required to comply with all provisions of Chapter 3, Section 46, Groundwater Baseline Sampling, Analysis and Monitoring.

(f) All sampling, analysis, evaluation, and reporting shall be conducted pursuant to the requirements and protocols of the sampling and analysis procedures contained in Appendix K, unless the operator receives approval from the Supervisor to deviate from such requirements and protocols after submitting a request in writing citing the circumstances that render compliance with the sampling and analysis procedures technically infeasible or demonstrating that a deviation would meet or exceed the sampling and analysis procedures contained in Appendix K. Appendix K shall be updated periodically to remain current with evolving industry, government, and scientific standards.

(g) Copies of all final laboratory analytical results developed per the sampling and analysis procedures contained in Appendix K and spatial coordinates of the available water source shall be provided by the operator or its representative to the Commission and water source owner within three (3) months of sample collection. All analytical results and spatial coordinates of the available water source will be made available to the public unless the data is otherwise considered confidential under Wyoming statute.

(h) The initial and subsequent sampling and testing described in this section shall at a minimum include temperature, pH, oxidation-reduction potential, specific conductance, turbidity, dissolved oxygen, total dissolved solids (TDS), dissolved gases (methane, ethane, propane), alkalinity (total bicarbonate and carbonate as CaCO_3), major anions (bromide, chloride, fluoride, sulfate, nitrate and nitrite as N, phosphorus), major cations (calcium, iron, magnesium, manganese, potassium, sodium), other elements (barium, boron, selenium and strontium), presence of bacteria (iron related, sulfate reducing, slime forming), total petroleum hydrocarbons (TPH), BTEX compounds (benzene, toluene, ethylbenzene and xylenes), and naphthalene. Field observations such as odor, water color, sediment, bubbles, and effervescence shall also be documented.

(i) If free gas or a dissolved methane concentration greater than 5.0 milligrams per liter (mg/L) is detected in a water sample, gas compositional analysis and stable isotope analysis of the methane (carbon and hydrogen – ^{12}C , ^{13}C , ^1H and ^2H) shall be performed to determine gas type.

(j) The operator shall provide verbal and send written notification to the Supervisor, the Director of the Department of Environmental Quality, and water source owner within twenty-four (24) hours if test results indicate:

(i) The presence of thermogenic or a mixture of thermogenic

and biogenic gas;

(ii) The dissolved methane concentration increases by more than 5.0 mg/L between sampling periods;

(iii) The dissolved methane concentration is detected at or above 10.0 mg/L; or

(iv) BTEX compounds or TPH is detected at or above Department of Environmental Quality action levels in the water sample as noted in Appendix K.

(k) Nothing in this Rule is intended, and shall not be construed, to preclude or limit the Supervisor from requiring other sampling or monitoring consistent with Commission rules, regulations and statutes.

(l) The operator may submit a master groundwater baseline sampling, analysis and monitoring plan for a geographic area of development. The Supervisor may approve the operator's plan if the Supervisor determines that the plan meets or exceeds the requirements of Chapter 3, Section 46, Groundwater Baseline Sampling, Analysis and Monitoring.

(m) The sampling results obtained to satisfy the requirements of this Rule, including any changes in the constituents or concentrations of constituents present in the samples, shall not create a presumption of or against liability, fault, or causation against the owner or operator of a well or multi-well pad who conducted the sampling, or on whose behalf sampling was conducted by a third-party. The admissibility and probative value of any such sampling that results in an administrative or judicial proceeding shall be determined by the presiding body according to applicable administrative, civil, or evidentiary rules.

APPENDIX K
SAMPLING AND ANALYSIS PROCEDURES
FOR THE
WYOMING OIL AND GAS CONSERVATION COMMISSION
GROUNDWATER BASELINE SAMPLING, ANALYSIS, AND MONITORING PROGRAM

1.0 PURPOSE AND SCOPE

This sampling and analysis procedure (SAP) provides the minimum requirements and protocols that shall be followed by oil and gas operators or their contractors per Chapter 3, Section 46 of the Wyoming Oil and Gas Conservation Commission (WOGCC) Rules and Regulations for the groundwater baseline sampling, analysis and monitoring program. Operators shall implement this SAP in lieu of developing a project specific SAP unless otherwise approved by the Supervisor.

The purpose of the SAP is to document field sampling procedures and laboratory methods that will be used to ensure that consistent and representative data is collected, and that a uniform method of data reporting to the agencies is established.

2.0 SAMPLING PROCEDURES

The purpose of this section is to describe the procedures to be used when selecting sampling locations, groundwater monitoring parameters and procedures, sample handling, and field documentation requirements.

2.1 SAMPLING LOCATION SELECTION

Groundwater sampling locations shall be selected as part of the groundwater baseline sampling, analysis and monitoring plan to be submitted with the Application for Permit to Drill (APD) (Chapter 3, Section 46(a)). Sampling locations shall be selected in accordance with Chapter 3, Section 46, and are dependent upon the Supervisor's approval of the plan.

Information sources that may be useful for identification of available water sources that could be selected as sampling locations include:

- 1) The Wyoming State Engineer's Office (SEO) maintains records of permitted water wells and diversions. The water well records may be accessed via the SEO website at: <https://sites.google.com/a/wyo.gov/seo/>
- 2) The United States Geological Survey (USGS) has data and reports available online about water and groundwater resources within the state of Wyoming on the water resources of Wyoming website at: <http://wy.water.usgs.gov/>
- 3) Additional groundwater information may be available through the USGS National Hydrography Dataset for Wyoming, which can be downloaded at: <http://nhd.usgs.gov/>
- 4) The Wyoming State Geological Survey (WSGS) may also be a useful source for information regarding geology and hydrogeology of the basins. The WSGS data may be accessed at: <http://www.wsgs.uwyo.edu/Data/GIS/Default.aspx>

2.2 GROUNDWATER MONITORING PARAMETERS

The following parameters in Table 1 have been identified as the minimum required constituent list for the purpose of the baseline sampling program. The operator may desire to analyze for additional constituents, but is not required. All groundwater samples shall be collected and analyzed according to the summary of analytical methods, holding times, sample containers, preservatives, and reporting limits included on Table 1, or by EPA approved equivalent methods, subject to approval by the Supervisor. Samples shall be collected for the compositional analysis of dissolved gases, with the instruction for the lab to run the compositional analysis only if the dissolved methane concentrations exceeds 5 mg/L.

TABLE 1. MINIMUM REQUIRED BASELINE SAMPLING

<i>ANALYTE</i>	<i>CAS #</i>	<i>FIELD METHOD</i>	<i>ANALYTICAL METHOD</i>	<i>SAMPLE CONTAINERS</i>	<i>PRESERVATIVES</i>	<i>REPORTING LIMIT</i>	<i>HOLDING TIME</i>
INORGANIC COMPOUNDS							
Alkalinity (total bicarbonate, and carbonate as CaCO ₃)	471-34-1	Unfiltered	SM 2320b	2x 250-mL poly	Cool to 4° C	10 mg/L	14 days
Bromide	24959-67-9		EPA 300.0 or 9056			0.1 mg/L	28 days
Chloride	16887-00-6		EPA 300.0 or 9056			0.2 mg/L	28 days
Fluoride	16984-48-8		EPA 300.0 or 9056 or SM 4500 F-C			0.2 mg/L	28 days
Sulfate	14808-79-8		EPA 300.0 or 9056			1.0 mg/L	28 days
Total Dissolved Solids	--		SM 2540 C			10 mg/L	7 days
Phosphorus, Total	7723-14-0		EPA 365.4	1x 250-mL poly	H ₂ SO ₄ to pH<2 Cool to 4° C	0.1 mg/L	28 days
Nitrate and Nitrate as N	14797-55-8		EPA 353.2	1x 100-mL poly			
IRB	--		BART	Lab supplied		1 CFU/mL	2-8 days
SRB/SFB	--		BART				2-8 days
Barium	7440-39-3	0.45 µm filter in field	EPA 200.7/200.8 or SW 846 6010 or SW 846 6020	1x 250-mL poly	HNO ₃ to pH <2 Cool to 4° C	0.05 mg/L	180 days
Boron	7440-42-8					0.005 mg/L	
Calcium	7440-70-2					1.0 mg/L	
Iron	7439-89-6					0.03 mg/L	
Magnesium	7439-95-4					1.0 mg/L	
Manganese	7439-96-5					0.001 mg/L	
Potassium	7440-09-7					1.0 mg/L	
Selenium	7782-49-2					0.001 mg/L	
Sodium	7440-23-5					1.0 mg/L	
Strontium	7440-24-6					0.01 mg/L	

<i>ANALYTE</i>	<i>CAS #</i>	<i>FIELD METHOD</i>	<i>ANALYTICAL METHOD</i>	<i>SAMPLE CONTAINERS</i>	<i>PRESERVATIVES</i>	<i>REPORTING LIMIT</i>	<i>HOLDING TIME</i>
HYDROCARBONS							
Benzene	71-43-2	Unfiltered	SW 846 8260B	3x 40-mL VOA vials (no headspace)	HCL to pH<2 Cool to 4° C	0.001 mg/L	14 days
Ethylbenzene	100-41-4					0.001 mg/L	
Toluene	108-88-3					0.001 mg/L	
Xylenes, Total	--					0.003 mg/L	
Naphthalene	91-20-3					0.001 mg/L	
TPH-DRO	--	Unfiltered	EPA 8015D with silica gel cleanup	2x 1000-mL glass	Sulfuric Acid Cool to 4° C	0.5 mg/L	7 days
TPH-GRO	--		EPA 5035/8015D	3x 40-mL VOA vials (no headspace)	HCL to pH <2 Cool to 4° C	0.02 mg/L	14 days
GASES							
Dissolved Methane	74-82-8	Unfiltered	RSK175	3x 40-mL VOA vials (no headspace)	Cool to 4° C	0.026 mg/L	14 days
Dissolved Ethane	4-84-0						
Dissolved Propane	74-98-6						
GAS COMPOSITIONAL ANALYSIS							
Fixed Gases C1-C6		Dissolved Gases	RSK175	Specialized (lab supplied)	Benzoalkonium	0.026 mg/L	14 days
Stable isotropic concentration of the carbon (¹² C and ¹³ C) and hydrogen (¹ H and ² H) in the methane			Laboratory Specific SOP			Variable	28 days

Notes: IRB – Iron Reducing Bacteria
SRB/SFB – Sulfate Reducing Bacteria/Slime Forming Bacteria
TPH-DRO – Total Petroleum Hydrocarbons Diesel Range Organics
TPH-GRO – Total Petroleum Hydrocarbons Gasoline Range Organics
VOA – Volatile Organic Analysis

All groundwater samples must be collected and analyzed according to the summary of analytical methods, holding times, sample containers, preservatives, and reporting limits included on Table 1, or equivalent, upon approval by the Supervisor.

2.3 SAMPLING PROCEDURES

The following procedures shall be used to collect groundwater samples from selected water sources. These procedures were developed from the Wyoming Department of Environmental Quality (WDEQ) Water Quality Division (WQD) Quality Assurance Project Plan (QAPP), and standard industry practices. Samples shall be collected by properly trained field personnel under the supervision of a state-licensed Professional Engineer or Professional Geologist or other qualified professionals upon approval by the Supervisor based on training and knowledge of standard industry practices.

The operator or their representative shall request the laboratory provide notification to them if the preliminary analytical results indicate one of the following conditions:

- i. The presence of thermogenic or mixture of thermogenic and biogenic gas;
- ii. The methane concentration is detected at or above ~~10~~ 5 mg/L; or
- iii. BTEX compounds or TPH is detected at or above Department of Environmental Quality action levels in the water sample.

TABLE 2 ACTION LEVELS

ANALYTE	ACTION LEVEL
Benzene	0.005 mg/L
Ethylbenzene	0.7 mg/L
Toluene	1 mg/L
Xylenes, Total	10 mg/L
TPH-DRO	1.1 or 10 mg/L
TPH-GRO	7.3 mg/L

Note: Action levels were derived from the EPA Maximum Contaminant Levels (MCLs) or Chapter 17 of the Wyoming Water Quality Rules and Regulations.

2.3.1 WELL PURGING

Samples shall be collected directly from the well if the well is accessible and the sample can be collected without disturbing or removing any down-hole pump and/or wiring. If the well is not accessible for sampling (i.e. sealed), and is equipped with a dedicated pump, the sample shall be collected using the installed pump from a location prior to holding tanks, pressure tanks, or any water treatment system (softeners, reverse osmosis, etc.), if available. If

unavailable, a sample shall be collected from the closest sampling location to the well. Sealed water wells should not be opened. Samples are not required to be collected from non-accessible wells without a dedicated pump, or from non-operational wells as described in Chapter 3, Section 46(d).

A groundwater sample is considered representative of the aquifer being monitored when the well has been purged to remove stagnant water prior to collection of a sample for laboratory analysis. Purging can be considered complete when a sufficient volume of water has been removed from the well and/or stabilization of select groundwater parameters has been achieved. It is important to record the circumstances surrounding each sample collection event. These records can help resolve analytical discrepancies. One of the following purging methods below shall be used prior to sample collection:

a. Purge by Volume Method

For wells where the completion depth and the depth to water are known, or can be reasonably measured, removal of a *minimum* of three casing volumes of water from the well shall be completed prior to collecting a groundwater sample. In addition, groundwater stabilization parameters (temperature, pH, oxidation-reduction potential, specific conductance, dissolved oxygen, and turbidity) shall be collected after removal of every half casing volume of water. Minimum purge volume can be calculated by the following equation:

$$\text{Minimum Purge Volume} = 3 * (\text{Total Well Depth in feet} - \text{Depth to Water in feet}) * \text{Well Capacity}$$

Where Well Capacity (gallons per foot) is based on well diameter:

2 inch well = 0.163	6 inch well = 1.47
4 inch well = 0.653	8 inch well = 2.61

b. Stabilization of Parameters Method

For wells where the completion depth and/or the depth to water are unknown, purging of groundwater until select field parameters have stabilized can be used to demonstrate that a representative sample was collected. Field parameters measured during purging shall include at a minimum temperature, pH, oxidation-reduction potential, specific conductance, dissolved oxygen, and turbidity. Field parameters should be measured every 5 minutes. Collection of parameters is most easily

conducted by utilizing a flow through cell equipped with the applicable sensors.

A minimum of six (6) parameter measurements shall be collected. If field parameters have not stabilized between the last three readings, purging and parameter measurement shall continue until stabilization has been achieved. Stabilization can be demonstrated by a variance of no more than +/- 10% for temperature, turbidity (if >10 NTU), dissolved oxygen (if > 0.5 mg/L), and specific conductance; +/- 10 mV for oxidation-reduction potential; and +/-0.2 standard units for pH.

To measure the purge rate of the well, a 5-gallon bucket and a timer capable of measuring time to seconds should be used. Flow rate is estimated by the recording the time it takes to fill a 5-gallon bucket, and converting to a gallons per minute (gpm) reading.

TABLE 3 FIELD PARAMETERS

PARAMETER	MEASUREMENT SENSITIVITY
Temperature	0.1 degrees Celsius or Fahrenheit
Turbidity	0.1 NTU
Dissolved Oxygen	0.01 mg/L
Specific Conductance	1 μ S/cm or 0.01 mS/cm
pH	0.1 s.u.
Oxidation-reduction Potential	1 mV

c. Sampling Low-Yield Wells

In low-yield wells when low-flow sampling methods are used, the well may be pumped at a flow rate comparable to the recharge rate (ideally < 0.30 ft of stabilized drawdown) and then sampled after at least one casing volume has been removed and field parameters have stabilized. However, in very low-yield wells that are unable to sustain even low-flow sampling rates (i.e. excessive drawdown), a single casing volume shall be removed, and field parameters are not required to stabilize before sampling. Turbidity values of 20 NTU or less may not be achievable in low-yield wells, and samples shall be collected as soon as an adequate volume of water has recovered to allow collection of samples.

d. Sampling from Springs

Sampling from a spring shall be conducted at the location closest to the point of emergence from the ground. For sampling of volatile organic constituents (VOCs, i.e. benzene, toluene, ethylbenzene, xylenes

(BTEX), dissolved gasses) groundwater is drawn into a syringe from a depth of approximately 2-inches below the surface of any pool associated with the seep, and then injected into the appropriate sample container for laboratory analysis. For larger volume samples, a stainless steel container may be used to collect the water sample from a depth of approximately 2-inches below the surface of any pool associated with the spring, taking care to not entrain foreign materials into the sample container (debris, insects), then transferring the collected sample into the appropriate sample container for laboratory analysis.

2.3.2 SAMPLE COLLECTION

Groundwater samples shall be collected immediately after purging the well. Once purging is complete, the flow rate should be reduced in order to minimize the potential for loss of VOCs. Reducing the flow rate by adjusting a valve should be avoided. Closing of a valve does not decrease the flow rate of the pump, and may induce turbulence into the water column. If a pump is equipped with a variable flow controller, the flow rate should be reduced, and the new flow rate calculated. In addition, if the sampling point is equipped with an aerator, the aerator shall be removed, with the consent of the landowner, prior to sampling.

Groundwater sampling shall be conducted by personnel with the proper training and experience. The sampler should wear a new pair of disposable, powder-free 'exam-type' gloves in order to reduce cross contamination of the samples prior to sampling. In addition, gloves should be changed between sampling locations.

Samples shall be collected according to Table 1 in Section 2.2.

Unfiltered samples shall be collected directly from the sampling point into clean, laboratory-provided, and preserved (if required) sampling containers. Care should be taken when collecting the sample to minimize agitation when filling the sampling containers, and not to overfill sample containers containing preservatives. Samples collected for volatile constituents such as BTEX and TPH-GRO, shall be collected into VOA vials with no headspace. If air bubbles are observed after placing on the cap, a new sample shall be collected into a fresh bottle.

The goal of sampling groundwater is to obtain a sample that is representative of existing conditions. This becomes especially difficult when trying to obtain a representative sample for inorganic constituents, such as metals. In order to obtain a sample representative of existing groundwater, filtered samples shall be collected for metals analysis. Filtered samples will be

collected using a disposable in-line 0.45 micron filter. The in-line filter should be connected to disposable tubing that is then connected to the discharge point. Water from the filter shall be collected directly into the appropriate sampling containers. Care shall be taken when collecting the sample to minimize agitation when filling the sampling containers, and not to overfill sample containers containing preservatives. A new in-line filter and tubing shall be used between sampling locations.

To collect a sample for dissolved gases, fill a clean container of sufficient size (5-gallon bucket) with water from the sampling location. Connect a section of disposable tubing to the discharge point, and using a step-down valve, connect a short length of ¼-inch diameter disposable tubing to the valve. Adjust flow through the tubing so that it is low. Submerge the closed sample container to the bottom of the 5-gallon bucket. While under water, open the sample container and place the sampling line into the bottom of the sampling container. Monitor the time to allow enough water volume to flow through the sampling container to flush the sampling container for at least twice its volume. Slowly remove the sample line while maintaining the sample bottle beneath the surface of the water. Place the cap on the sample container while submerged in order to maintain the pressure head of the water. If collecting the sample for the compositional analysis quickly insert the benzalkonium tablet into the container prior to placing the cap. Remove the sample container from the bucket of water and check to make sure there are no air bubbles in the sample. If air bubbles are visible, collect another sample. If the water is effervescent, a gas headspace bubble in the VOA vial is acceptable, but the laboratory must be notified to analyze the gas headspace. Dissolved gas samples shall be stored and packed upside down. New sampling tubing and step-down valves shall be used at each sampling location.

2.3.3 SAMPLE HANDLING

The sample containers and preservatives for each laboratory method are specified on Table 1. Sample containers shall be stored in a cool, dry location, separate from any VOC-containing materials. Sample containers containing laboratory prepared preservatives shall not be used if held on-site for an extended period of time or if exposed to extreme temperature conditions. Once opened, the sample containers shall be used immediately. If the container is used for any purpose other than sample collection, it shall be discarded.

Samples will be identified with a unique sample identification number. It will be up to the operator or the operator's consultant how to identify each sampling location. Sample containers will be labeled using waterproof ink and shall indicate the company, project identifier, sample ID, date, time, sampler, matrix, preservatives.

After labeling, samples shall be placed in an insulated cooler on ice until packed for shipment to the laboratory. Sample containers shall be placed in Ziploc-style baggies and then wrapped in protective packing material (bubble wrap); do not use foam blocks many labs ship the VOA vials in. The foam will insulate the vials and the proper temperature for the sample will not be achieved. Sample containers shall then be placed in the insulated cooler in an up-right position (with the exception of the dissolved gas samples) and surrounded with sufficient ice to maintain a 4 degrees Celsius cooler temperature during shipping. Ice shall be double bagged into Ziploc-style baggies. If the cooler contains a drain outlet, it must be sealed over with tape on the inside and the outside of the cooler prior to sample packing.

A chain of custody form (COC) shall be placed in a Ziploc-style bag and taped to the underside of the cooler lid. The cooler shall be sealed with a custody seal and tape and either hand delivered to the laboratory, or shipped by overnight carrier for delivery to the analytical laboratory. The temperature of all coolers will be measured upon receipt at the laboratory. Therefore, a temperature blank shall be included with each cooler.

2.3.4 CHAIN OF CUSTODY PROCEDURES

Samples will be shipped under COC procedures to document the custody, transfer, handling, and shipping of samples. The sampler will be responsible for filling out the COC form and will sign the COC when relinquishing the samples to anyone else. One COC form will be completed for each cooler of samples collected. The COC will contain the following information:

- Sampler's signature
- Project number
- Date and time of collection
- Sample identification number
- Sample type
- Analyses requested
- Number of containers
- Preservatives
- Requested turn-around time
- Observations on sample condition that may be pertinent (i.e. effervescence)
- Signature of persons relinquishing custody, dates, and times
- Signature of persons accepting custody, dates, and times
- Method of shipment and shipping air bill number (if appropriate)

The person responsible for delivery of the samples to the shipping company will sign the COC form, retain a copy of the COC form, document the method of shipment (shipper/airbill number) and send the original and a second copy of the COC form with the samples. Copies of the final COC forms from the laboratory documenting sample custody shall be kept with the sampling information.

2.3.5 FIELD DOCUMENTATION

All available water source purging data must be recorded in a bound, sequentially page-numbered field log book or on a data sheet that is referenced in the log book using a permanent ink. The field log book or data sheet must contain a complete record of all equipment used, activities conducted, measurements of field parameters per well casing volume produced, calculations, and observations including weather and water odor/color/clarity and effervescence. The information must be sufficient to allow the purging procedure to be reconstructed in sufficient detail to evaluate adequacy of the purging procedure. Field notes shall also include explanations of problems encountered during available water source purging and sampling and an explanation of any trouble-shooting techniques that were used. If a separate data sheet or field form is used, it should be designed with prompts for all of the required data. The following specific items must be included in each day's field notes:

- Facility ID
- Date and time of sample collection
- Weather conditions
- GPS coordinates of the available water source location
- API Number(s) for well(s) associated with the sample location
- Sample type (baseline or subsequent)
- Description of sampling location and condition
- Sample location ID
- Sample matrix, number and volume of samples, and preservatives, and analysis requested
- Personal Protective Equipment (PPE) used during sampling
- Decontamination information
- Equipment calibration information
- Estimated depth to water. Information on use of the available water source prior to sampling. The time of measurement since purging began should also be recorded;
- Depth to bottom of the well based on well construction information or on actual measurement (as appropriate)
- Calculations (casing volume, flow rate)

- Field parameter measurements
- Total volume and physical characteristics of the purged water, including odor, color, clarity, particulate matter, effervescence;
- Complete description of equipment used for purging, including type and capacity of pump used and pumping rate used to purge well,
- Name and affiliation of person(s) conducting purging, and any observers on site.
- The field parameter measurements for the final casing volume
- Photographs taken during the sampling
- Landowners comments on water quality

2.3.6 EQUIPMENT CALIBRATION

The calibration process is necessary to ensure that the instrument is working properly, and that the results are within the range of acceptability as determined by the manufacturer's specifications. Calibration data shall be recorded to maintain a record of the calibration and proof of acceptability.

Equipment used to collect field measurements shall be calibrated at the start of each day. More frequent calibration is commonly necessary, depending on the reliability and inherent stability of the instrumentation, extreme field conditions (weather/climate), continuous or heavy use, or high concentrations of monitored parameters. Where field calibration is possible, calibration should be verified and documented at the end of the day.

Results of the calibration shall be recorded in the field log book, or a field form referenced in the field log book. Calibration results outside of +/- 5% from the standard shall require the calibration procedure to be conducted again.

2.3.7 DECONTAMINATION

Decontamination of non-dedicated or non-disposable equipment is necessary to prevent cross-contamination of sample locations. Dedicated or disposable equipment should be used whenever possible. All non-disposable equipment (e.g. instruments, buckets, non-dedicated pumps) must be decontaminated prior to use and between sample locations by using the following procedures:

- 1) Remove any visible surface contamination with a brush (sludge, sediment, etc) and rinse with tap water.
- 2) Wash with a dilute solution of tap water and non-phosphate laboratory grade detergent such as Alconox or equivalent. Pumps and non-disposable tubing must have water pumped through them.

- 3) Rinse with tap water.
- 4) Rinse with distilled or deionized water.
- 5) Allow to air dry.

Decontaminated equipment should be placed on clean plastic sheeting to dry and then stored in sealed containers when not in use to prevent contamination from airborne particles.

2.3.8 INVESTIGATION DERIVED WASTE

Disposable field equipment (gloves, filters, valves, tubing) shall be bagged and disposed of as municipal solid waste. Unused sampling containers and preservatives shall be returned to the laboratory, or disposed of as municipal waste after disposing of the preservatives into a municipal sewer system diluted with water. Preservatives should not be disposed of in concentrated form or directly into the ground. Purge water will be discharged onto the ground at least 20-feet from and down-gradient of the water source and in a location designated by the landowner. Decontamination water should be collected and disposed of down-gradient from the water source. Purge water and decontamination water, if disposed of onto the surface, shall be discharged in a location to allow for infiltration of the water.

2.4 QUALITY ASSURANCE

Data quality will be considered adequate if sampling was conducted according to this SAP or a Supervisor-approved site-specific SAP, samples were analyzed by approved analytical methods by an accredited/certified laboratory, and a data quality review of the field and laboratory data was conducted.

Samples shall be analyzed by laboratories that are accredited by the National Environmental Laboratory Accreditation Program (NELAP) or American Association for Lab Accreditation (A2LA) for the analytical methods that will be used as part of the baseline sampling program. Analytical methods will conform to approved United States Environmental Protection agency (US EPA) test methods such as Test Methods for Evaluating Solid and Hazardous Waste (SW-846), or other approved methods such as Standard Methods (SM) for the Examination of Water and Wastewater.

2.4.1 QUALITY ASSURANCE (QA) SAMPLES

All field sampling programs require the collection of additional samples to provide quality control for the field or laboratory procedures. These include field duplicates, trip blanks, equipment rinsate blanks, and several kinds of field blanks. A description of each of the various quality control (QC) sample types is

provided below. Table 2 summarizes the minimum rate at which QC samples must be collected.

Field replicates/splits/collocated samples are independent samples of the same medium collected at the same time from the same location. Replicate samples will be collected for all the same analytes as the parent sample. Replicates/splits must be submitted for analysis “blind”, meaning that they should not be identified to the laboratory as duplicate samples. The duplicate samples shall be identified with a nonexistent sample location ID that is similar to, but different from the other sample location IDs at the site. All other labeling shall be identical to the investigative samples. The true identity of the duplicate samples shall be recorded in the field logbook, but not on the COC form or sample labels and tags that are sent to the laboratory.

Trip blanks are required only when samples are collected for analysis of VOCs, including BTEX. They are prepared from analyte-free water by the laboratory, and are transported to the sampling site with the VOC sample bottles for the investigative sampling. They are kept with the samples throughout the sampling program and are shipped for analysis with the samples. They are not opened on site, and are designed to evaluate VOC contamination encountered within the coolers during the shipping and handling procedures. Trip blanks are prepared in 40 ml VOA vials with Teflon septum lids, and must be chilled and handled in the same manner as a water sample for VOC analysis. Two trip blank vials per each shipping container or cooler containing VOC samples are required. Trip blanks shall be analyzed for BTEX.

Equipment blanks or rinse blanks are obtained from the last rinse of analyte-free water during decontamination of sample collection equipment. No extraordinary decontamination procedures should be followed when a rinse blank is collected. The date and time of collection shall be noted, as well as the ID number of the investigative sample collected just prior to decontamination, and the ID number of the next sample collected with the decontaminated equipment. If dedicated or disposable equipment is used, rinse blanks need not be collected.

If contamination is detected in a rinse blank, extensive re-sampling may be required, based on the rate of rinse blanks collected, e.g. 20 locations re-sampled if rinse blanks are collected at the rate of 1 per 20 samples; 10 locations resampled if rinse blanks are collected at the rate of 1 per 10 samples. Rinse blanks shall be collected for metals and BTEX.

Table 4 Guidelines for Minimum QA/QC Samples

Medium	Replicates (duplicates) ¹	Trip Blanks ²	Rinse Blanks ¹
Aqueous	One in 20	One set per shipping container containing VOC samples	One per 20 decontamination procedures

¹ Replicate and rinse blank samples are collected at the minimum rate of 1 per 20 samples/decon procedures. If fewer than 20 samples are collected, one replicate and one rinse blank sample must be collected.

² Trip blanks are prepared in the laboratory or at another off-site location from distilled or deionized water. They are never prepared on-site, or from soils or other solid material.

Laboratory quality assurance samples (matrix spike (MS)/matrix spike duplicates (MSD)) will be prepared and analyzed by the laboratory. The results of the laboratory quality assurance samples shall be reported with the original sample results. A narrative of any quality issues shall be included with the laboratory report from the lab.

2.4.2 DATA QUALITY REVIEW

Data quality reviews shall be conducted by the operator or their consultant on all data once finalized laboratory reports have been received. The results of a data quality review must be documented on a Data Quality Review Sheet and reported with the associated laboratory reports. The objective of a Data Quality Review is to ensure that data was collected and reported properly. A data quality review includes review of both field and analytical data.

2.4.2.1 FIELD DATA REVIEW

Field data to be reviewed includes log books and sampling sheets to confirm that this SAP was followed, that data was properly entered and recorded (transcription/spelling errors), proper field/sampling procedures were used, and that there were no conditions that occurred that could affect the reliability of the data.

2.4.2.2 LABORATORY DATA REVIEW

Procedures to validate laboratory data shall be derived from the U.S. EPA's Contract Laboratory Program, National Functional Guidelines for Organic Data Review, and Contract Laboratory Program, National Functional Guidelines for Inorganic Data Review. Analytical reports shall be checked to verify that holding times were met, proper matrix and

units were reported, all requested analyses were conducted, and that proper analytical methods were used. Also, results of all blanks, surrogate spikes, MS/MSDs, laboratory control samples, and target compound identification and quantitation shall be reviewed/evaluated to determine if results were within method acceptance limits.

The overall completeness of the data package shall also be evaluated. Completeness checks shall be administered on all data to determine whether deliverables are present. At a minimum, deliverables will include sample COC forms, analytical results, and QA/QC summaries. The reviewer shall determine whether all required items are present and request copies of missing deliverables. In addition, any deficiencies in the lab reports requiring corrective action shall be brought to the attention of the lab. The results of the data validation review be summarized in a Data Validation Report for each sample report issued by the laboratory and the reviewer shall certify if the data was collected in accordance with this SAP and is suitable for use.

3.0 DATA REPORTING

This section describes how the analytical results from the baseline sampling shall be reported. Copies of field documents, laboratory reports, and the data quality review results shall be submitted to the WOGCC. In addition, the operator may be required to provide an electronic data deliverable (EDD) of the laboratory data to the WOGCC for potential inclusion into a groundwater database. The WOGCC will make the EDD format available for download for use by the laboratories. The WOGCC will be responsible for making the results of the sampling available to the public and the WDEQ WQD.

The operator or their representative must request the laboratory provide notification to them if the preliminary analytical results indicate one of the following conditions:

- i. The presence of thermogenic or mixture of thermogenic and biogenic gas;
- ii. The methane concentration is detected at or above 10 mg/L; or
- iii. BTEX compounds or TPH is detected at or above Department of Environmental Quality action levels in the water sample.