

MARK-UP

RULE B-19 REQUIREMENTS FOR WELL COMPLETION UTILIZING FRACTURE STIMULATION

a) Definitions

- 1) “ADEQ” means the Arkansas Department of Environmental Quality.
- 2) “AOGC” means the Arkansas Oil and Gas Commission.
- 3) “Chemical Abstract Service” or “CAS” means the chemical registry that is the authoritative collection of disclosed chemical substance information.
- 4) “Hydraulic Fracturing Treatment” means stimulating a well by the application of fluids, which contains proppant such as sand or man-made inert material, with force in order to create artificial fractures in the formation for the purpose of improving the capacity to produce hydrocarbons.
- 5) “MSDS” means a standard Material Safety Data Sheet, which contains key information regarding the Hydraulic Fracturing Treatment additive(s), including the chemical make-up of the subject and certain relevant health, safety and environmental data.
- 6) “RCRA” means Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et. seq.

b) The provisions of this Rule shall apply to all new wells for which an initial drilling permit is issued on or after the effective date of this Rule.

c) Persons applying for a permit to drill shall indicate on the initial drilling application the intent to perform Hydraulic Fracturing Treatment operations and provide the information required in accordance with subparagraph d) below. If the intent to fracture stimulate a well was not provided at the time of the initial drilling application, a Permit Holder desiring to perform Hydraulic Fracturing Treatment operations shall send the information required in accordance with subparagraph d) below via e-mail, fax or mail to the AOGC office where the initial drilling permit was issued, prior to commencement of Hydraulic Fracturing Treatment operations.

d) The application described in subparagraph c) above shall include:

- 1) The following information on the proposed casing program, demonstrating that the well will have steel alloy casing designed to withstand the anticipated maximum pressures to which the casing will be subjected in the well:
 - A) Whether the well will be a vertical well, a directional well, or a horizontal well; and
 - B) The estimated true vertical and measured production casing setting depths; and

- C) The casing grade and minimum internal yield pressure for ~~each the~~ production casing ~~string~~ proposed to be used in the well.
- 2) The following information demonstrating that the well will have sufficient cement volume and integrity to prohibit movement of fracture fluids up-hole into the various casing or well bore annuli:
- A) The proposed cement formulation(s)' minimum compressive strength; and
- B) The estimated top of cement for the production casing string.
- 3) The anticipated surface treating pressure range for the proposed Hydraulic Fracturing Treatment program. The production casing described in subparagraph d) 1) above shall be sufficient to contain the maximum anticipated treating pressure of the Hydraulic Fracturing Treatment, which shall not exceed 80% of the minimum internal yield pressure for such production casing.
- e) Surface casing in the well in which the proposed Hydraulic Fracturing Treatment will occur shall be set, and cemented to the surface, to a depth in accordance with General Rule B-15, and have sufficient internal yield pressure to withstand the anticipated maximum pressures to which the casing will be subjected in the well. If during the drilling of the surface portion of the well, and prior to setting surface casing, a freshwater flow is encountered, or the Permit Holder gains knowledge that freshwater will be encountered, from a deeper zone than was specified on the permit to drill, surface casing shall be set and cemented at least one hundred (100) feet below the deepest encountered freshwater zone.
- f) If during the setting and cementing of production and/or any intermediate casings the cement program does not occur as submitted in accordance with this Rule, and would cause a reasonably prudent Permit Holder to question the integrity of the cementing program with respect to isolating the zone of Hydraulic Fracturing Treatment from movement of fracture fluids up-hole into the various casing or well bore annuli, the Permit Holder shall immediately notify the Director, or his designee, in writing as soon as practicable, but not more than twenty-four (24) hours after the event. In reviewing the report, the Director, or his designee, may require a bond log or other cement evaluation tool to document cement integrity and require additional cementing operations or other appropriate well workover efforts necessary to correct any cement deficiencies prior to initiating any Hydraulic Fracturing Treatments in the well.
- g) The Permit Holder shall monitor all casing annuli that would be diagnostic as to a potential loss of well bore integrity during the Hydraulic Fracturing Treatment. The Permit Holder shall establish methods to timely relieve any excessive pressures to avoid the loss of surface casing integrity.
- h) The Permit Holder must provide written notice to the Director, or his designee, of (i) any change in surface casing annulus pressure ~~that would indicate movement of fluids into the annulus is twenty percent (20%) or greater than the estimated pressure increase due to pressure and/or temperature expansion~~, or (ii) a pressure that exceeds the rated minimum internal yield pressure on any casing string in communication with the Hydraulic Fracturing Treatment. This written notice shall be delivered as soon as possible after the event, but not more than twenty-four (24) hours after the event. Following notification and any request for additional information, the Director, or his designee, may request additional documentation

or well tests to determine if the Hydraulic Fracturing Treatment potentially endangered any freshwater zones. The Director, or his designee, may require appropriate additional cementing operations, or other well workover efforts to correct any well failure. Pending completion of required operations or efforts, the Director, or his designee, may order the cessation of further Hydraulic Fracturing Treatment and/or other well operations. The Director shall report any such incident to the Commission at its next regularly scheduled hearing, and the Commission may take such further action as it deems necessary and appropriate under the circumstances.

- i) All non-exempt RCRA materials and fluids used on-site in the Hydraulic Fracturing Treatment shall be handled and stored in accordance with ADEQ requirements and any spills of these materials and fluids on-site or off-site shall be reported to ADEQ in accordance with applicable ADEQ requirements. All RCRA exempt materials and fluids used on-site in the Hydraulic Fracturing Treatment shall be contained in leak free tanks or other containment vessels. Any on-site spill of these materials or fluids shall be immediately contained, remediation efforts shall be commenced as soon as practical, and the incident shall be reported to the Director, or his designee, within twenty-four (24) hours.
- j) All Hydraulic Fracturing Treatment flow back fluids shall be handled, transported, stored, disposed, or recycled for re-use in accordance with the applicable provisions of General Rule B-17, General Rule E-3 and General Rule H-1, H-2 and H-3.
- k) Following completion of the Hydraulic Fracturing Treatment, the Permit Holder shall, **for purposes of disclosure**, report detailed information of the Hydraulic Fracturing Treatment in the manner customarily reported or presented to the Permit Holder as follows:
 - 1) The maximum pump pressure measured at the surface during each stage of the Hydraulic Fracturing Treatment; and
 - 2) The type and volumes of the base stimulation fluid and proppant used for each stage of the Hydraulic Fracturing Treatment; and
 - 3) The calculated fracture height achieved during Hydraulic Fracturing Treatment; and
 - 4) The type of additives used and specified by general type, such as acid, biocide, breaker, corrosion inhibitor, crosslinker, demulsifier, friction reducer, gel, iron control, oxygen scavenger, pH adjusting agent, scale inhibitor and surfactant; and
 - 5) The specific additive name and, if not previously submitted **in accordance with subparagraph 1) 3) below**, the associated MSDS for each additive type specified in subparagraph k) 2) or 4) above; and
 - 6) The actual rate or concentration for each additive specified in subparagraph k) 2) or 4) above, expressed as pounds per thousand gallons, gallons per thousand gallons, percent by weight, percent by volume or parts per million or billion; or
 - 7) The Permit Holder shall supply field service company tickets (excluding pricing) and reports regarding the Hydraulic Fracturing Treatment, as used in the normal course of business to satisfy some or all of the foregoing information requirements.
- l) Any person performing Hydraulic Fracturing Treatments within the State of Arkansas shall:

- 1) Be authorized to do business in the State of Arkansas; and
 - 2) Be required to file Organization Reports in accordance with General Rule B-13, and include the length of time the entity has been in the business of performing Hydraulic Fracturing Treatments; and
 - 3) Provide the MSDS for any and all additives utilized in performing Hydraulic Fracturing Treatments within the State of Arkansas; and
 - 4) Provide the chemical listings and CAS numbers associated with each MSDS (excluding proprietary formulation information) required in subparagraph l) 3) above.
- m) No Permit Holder shall utilize the services of another person to perform a Hydraulic Fracturing Treatment unless the person performing a Hydraulic Fracturing Treatment is in compliance with subparagraph l) above.