

ARKANSAS REGISTER

Proposed Rule Cover Sheet



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RULE D-23: GENERAL RULE FOR THE REGULATION OF UNDERGROUND
NATURAL GAS STORAGE PROJECTS

a) Authority and Applicability

- 1) The underground storage of Natural Gas promotes conservation, permits the building of reserves for orderly withdrawal in periods of peak demand, makes more readily available and economical natural gas resources to the domestic, commercial, and industrial consumers, and promotes the public interest and welfare of the State of Arkansas. Therefore, the Arkansas Oil and Gas Commission may find and determine, in accordance with Ark. Code Ann. § 15-72-603, that the underground storage of natural gas is in the public interest.
- 2) All Natural Gas Public Utilities engaged in the process of the storage of natural gas in underground reservoirs within the State of Arkansas, as specified in Ark Code Ann. § 15-72-601, et seq., are subject to the provisions of this rule. This rule does not apply to gas injection or withdrawal operations conducted as a part of, or in conjunction with, any secondary or tertiary recovery methods utilized in a unitized pool or unit area established by the Commission.
- 3) Underground Storage Facilities established by the Commission, which are in existence at the time of the adoption of this rule, are not subject to the provisions contained herein with the exception of subparagraph (m) below.
- 4) All Underground Natural Gas Storage Facilities are subject to the provisions of this rule unless any provision contained herein are less stringent than any applicable federal requirement enumerated in subparagraph (m).

b) Definitions

- 1) “Certificate of Storage” shall mean an order issued by the Commission that:
 - A) Identifies an underground stratum or formation that is suitable for the underground storage of natural gas and that its use for such purposes is in the public interest;
 - B) Designates the horizontal and vertical boundaries of the storage facility, such boundaries to include any necessary or reasonable buffer zone for the purpose of ensuring the safe operation of the storage facility and to protect the storage facility from pollution or invasion, or escape or migration of gas therefrom;
 - C) Designates the minimum and maximum operating pressures of the storage facility;
 - D) Designates the storage operator for said facility; and
 - E) Adopts special rules for the operation of the facility.

- 2) “Commission” shall mean the Oil and Gas Commission.
- 3) “Cushion Gas” shall mean the volume of gas required as permanent storage inventory to maintain adequate reservoir pressure to meet minimum gas deliverability demand (also called “base gas”).
- 4) “Gathering Line” shall mean a pipeline that transports gas from a current production facility to a transmission line or main.
- 5) "Native Gas" shall mean gas which has not been previously withdrawn from the earth;
- 6) "Natural Gas" shall mean all natural gas, casinghead gas, and occluded natural gas found in coalbeds, and all other hydrocarbons not defined as oil in General Rule A-4, but not including liquid petroleum gas.
- 7) "Natural Gas Public Utility" shall mean any person, firm, corporation or entity engaged in the business of producing, transporting, or distributing Natural Gas by means of pipelines into, within, or through this State for ultimate public consumption.
- 8) “Observation Well” shall mean any well drilled or converted for the purpose of monitoring reservoir pressures, temperatures, or integrity of a USR.
- 9) “Storage Operations” shall mean the process of injecting Natural Gas into a USR.
- 10) “Storage Operator” shall mean any company, person, corporation, partnership, limited partnership, association of persons, municipality, association of municipalities, public utility, gas district, or any other entity, authorized by the Commission to operate any USF.
- 11) “Storage Well” shall mean any well drilled or converted, within a USF, for the purpose of Natural Gas injection and Natural Gas withdrawal.
- 12) "Underground Storage" shall mean the storage of Natural Gas in an USR.
- 13) “Underground Storage Facility” (USF) shall mean a USR, the injection and withdrawal wells and well tubular goods, the wellhead, and related equipment to the last positive shut-off valve before the gathering line that is used or to be used for the underground storage of Natural Gas, and all surface and subsurface rights and appurtenances necessary or useful in the operation of the facility for the underground storage of Natural Gas, including any necessary or reasonable buffer zone as identified and recommended by the Storage Operator and approved by the Commission for the purpose of ensuring the safe operation of the storage of Natural Gas, and to protect the storage facility against pollution or invasion, or escape or migration of Natural Gas therefrom.
- 14) “Underground Storage Reservoir” (USR) shall mean any porous subsurface sand, stratum, or formation which is completely separated from any other porous zone and is suitable for, or capable of, being made suitable for the injection and storage and withdrawal of Natural Gas.

15) “Working Gas” shall mean the portion of the storage volume that can be removed from a USR for deliveries, and still maintain pressure sufficient to meet design deliverability.

c) Eminent Domain

1) Any Natural Gas Public Utility desiring to exercise the right of eminent domain in accordance with Ark. Code Ann. § 15-72-606, to acquire or take any property for the Underground Storage of Natural Gas, shall first obtain from the Commission a Certificate of Storage setting forth the following:

A) The amount of recoverable oil and Native Gas, if any, remaining in the USR and a determination as to proper allocation of that amount;

B) That the property to be taken or acquired is suitable for the Underground Storage of Natural Gas; and

C) That the use of the USR for storage of Natural Gas is in the public interest.

2) The Natural Gas Public Utility shall present to the circuit court of the county wherein the land is situated, or to the judge thereof, a petition setting forth the purpose for taking the property, a legal description of the property to be taken, and the names of the title owners thereof as shown in the public record of the county.

3) The petitioner shall file the Certificate of Storage issued by the Commission as a part of its petition, and no order by the court granting the petition shall be entered without the Certificate of Storage being filed therewith.

d) Issuance Certificate of Storage

1) Any Natural Gas Public Utility may file an application to have the Commission issue a Certificate of Storage for the Underground Storage of Natural Gas in a USR.

2) The Commission shall publish notice at least once each week for two (2) successive weeks in a newspaper of general circulation in the county or counties where the proposed USR is to be located. The first publication of the notice must be at least ten (10) days prior to the date of the hearing.

3) Only the area of the USR that may reasonably be expected to be penetrated by Natural Gas displaced or injected into the USR, as determined by the Commission, may be covered by the Certificate of Storage.

4) The Certificate of Storage granted in this section shall not prejudice the rights of the owner or owners of the lands (or of other rights or interests therein), to drill or bore through the USR as established by rules of the Commission, and shall not prejudice to the rights of the owner or owners of the lands (or other rights or

interests therein) as to all other uses of the lands not inconsistent with the operation of the USF.

- 5) All Natural Gas which has been reduced to possession and which is subsequently injected into a USR shall at all times be deemed the property of the Storage Operator, or his or her heirs, successors, or assigns. This Natural Gas shall not be in any manner subject to the right of the surface owner of the lands or the owner of any mineral interest under or above the USF, or subject to the right of any other person or entity. The Storage Operator, or his or her heirs, successors, and assigns, has the sole and only right to produce, take, or reduce to possession this Natural Gas in the USR, and no other person may waste, or otherwise interfere with or exercise any control over the USR or any Natural Gas therein. The Storage Operator, or his or her heirs, successors, and assigns, shall have no right to Natural Gas in any other underground reservoir that is not subject to the Certificate of Storage.
- 6) After notice and hearing, the Commission may issue a Certificate of Storage if it affirmatively finds, based upon substantial evidence, that the proposed USR is geologically suitable and has a greater value or utility as a USR for the purpose of ensuring an adequate supply of Natural Gas for any particular class or group of consumers of Natural Gas, or for the conservation of Natural Gas, than for the production of relatively small volumes of Native Gas which may remain therein. The Commission shall not issue a Certificate of Storage if the proposed USR is capable of producing oil, in paying quantities, through any known recovery method, or is a USDW as defined in General Rule H-1.

e) Contents of Application for Certificate of Storage

- 1) No USF shall be constructed or operated without the Storage Operator obtaining or holding the necessary and sufficient property rights for construction and operation of the USF. The Storage Operator shall provide evidence of holding such rights for any real or personal property, or evidence the Storage Operator can obtain such property through eminent domain proceedings related to that property. A Certificate of Storage shall expire twelve (12) months from the date of issuance if the Storage Wells have not been drilled and completed, or within twenty-four (24) months if the Storage Wells have been drilled and completed and if Storage Operations have not commenced.
- 2) Application for a Certificate of Storage shall include the following:
 - A) A plan view map showing:
 - i) The surface and extent of the USF, indicating the proposed location of Storage Wells, Observation Wells, and the location of all proposed pipelines and other surface facilities within the boundary of the USF;
 - ii) Locations of all other wells or boreholes, including but not limited to, water wells, oil and natural gas exploration and development wells within the boundary of the USF and extending ¼ mile outside the boundary of the USF;

- iii) The subsurface extent of the USR and any buffer zone.
- B) Applicant shall submit evidence and/or information showing that the proposed USR is not a USDW, and identify any freshwater bearing horizons known to be developed in the immediate vicinity of the USR.
- C) Applicant shall conduct an evaluation to identify any productive oil and natural gas zones occurring stratigraphically above, below, or within the USR, and if productive natural gas zones are present within the USR, the applicant shall identify and determine the remaining reserves of Native Gas within the USR.
- D) A geologic evaluation of the USR, including an isopach map of the USR, a structure map of the top and base of the USR, identification of all structural spill points or stratigraphic discontinuities controlling the isolation of stored Natural Gas, and a structural and stratigraphic cross-section that describes the geologic conditions of the USR.
- E) A geologic evaluation of all existing information on all geologic strata overlying the USR, including the immediate containment formation (caprock) characteristics and all designated subsurface monitoring zones. The evaluation shall focus on the proposed USR and provide a description of mechanisms of geologic confinement with regard to the ability of that confinement to prevent migration of Natural Gas beyond the proposed USR. The evaluation shall include any available geophysical data and assessments of any regional tectonic activity, local seismicity and regional or local fault zones, and a comprehensive description of local and regional structural or stratigraphic features which may impact confinement.
- F) A review of all wells within the proposed USR, which penetrate the USR or primary and/or secondary confining layers overlying the USR, and all the wells, within one mile of the USR, which penetrate the geologic formation to be used for storage. This review shall determine if all abandoned wells have been plugged, and whether all unplugged wells are constructed in a manner that prevents the movement of Natural Gas from the USR.
- G) The proposed calculated maximum volume of the USR to be used for storage, shall include Working Gas, Native Gas, and Cushion Gas volumes. In the event the Storage Operator of a USF recalculates the actual reservoir volume determined and identified to the Commission after continued operation of the Storage Facility, then the Storage Operator shall file an application for a redetermination of the allowed volume.
- H) The proposed maximum bottom-hole injection pressure to be utilized for the USR shall be measured in psig, shall be no greater than ninety percent (90%) of the formation fracture pressure as determined by a step-rate test (or other approved method), unless a higher percentage is

approved by the Commission. The USR shall not be subjected to injection pressures in excess of the calculated fracture pressure. The maximum allowable stabilized reservoir pressure (gauge) shall be no greater than seventy-five percent (75%) of the fracture pressure of the USR, as determined by a step rate test or as calculated by a method acceptable to the Commission. The average USR pressure shall be no greater than ninety percent (90%) of the fracture pressure.

- D) A corrosion monitoring and prevention plan for all wells and surface facilities, and a leak detection and monitoring plan for surface facilities and wells, which shall include subsurface observation wells to monitor any movement of Natural Gas from the USR.
- J) A detailed description of the proposed public safety and emergency response plan. The response plan shall detail the safety procedures concerning the USF and any residential, commercial, and public land use within one (1) mile, or any other distance as deemed necessary by Commission beyond the outside boundary of the USF. The plan shall include contingency plans should Natural Gas leak from any well, flow line, or any other USF. These emergency response procedures should be updated as necessary throughout the operational life of the USF.
- K) Authority to conduct an injectivity test, step rate test, or other injection test to determine the suitability of the USR, prior to the issuance of the Certificate of Storage. This authority may be approved by the Director upon issuance of the test well permit in accordance with subsection (f) below. The Director shall establish the parameters of the test for the protection of public safety, the USDW, and any oil and gas resources potentially impacted by the test, and may require the submission of any information or test data deemed necessary.

f) Permitting Storage Wells

- 1) No person shall drill, deepen, re-enter, recomplete or operate any Storage or Observation Well until a Certificate of Storage and applicable well permits have been issued by the Commission, application for which shall be made on forms prescribed by the Director. Permits are valid only for the permit holder stated on the permit, and shall remain valid only if the permit holder is in compliance with established operating requirements specified in this rule. Permits to drill, deepen, or re-enter shall automatically expire six (6) months from the date of issuance, unless commencement of the drilling, deepening or re-entry of plugged well operations authorized by the permit has occurred and are continued with due diligence, but not to exceed one (1) year from the date of commencement of the drilling, deepening or re-entry of plugged well operations authorized by the permit. If the activity authorized in the permit is not completed within one (1) year, the well shall be plugged, casing set, or a new permit application, along with a new permit fee and plat, must be filed. Failure to comply with the operating requirements in this rule may result in revocation of the Storage or Observation Well permit in accordance with General Rule B-1 (c).

- 2) No Storage Well or Observation Well may be drilled at a surface location other than that specified on the permit. However, if a permit holder has commenced drilling operations and the Storage or Observation well is lost due to adverse drilling conditions prior to surface casing being set, the permit holder may request an amendment of the permit without a fee for the new location, provided the Storage or Observation Well remains on the same property where the Storage or Observation Well was originally permitted, and all other aspects of the permit request remain the same. Movement of the Storage or Observation Well location off the original surface owners' property, or after surface casing has been set, will require the filing of a new permit application, along with a new permit fee and plat. Drilling may not commence prior to the issuance of a new permit.
- 3) Upon issuance of a permit, a copy of the permit shall be displayed at the site where the Storage Well or Observation Well is being drilled for review by Commission staff.
- 4) The application to drill, deepen, re-enter or recomplete a Storage Well or Observation Well shall include, at a minimum:
 - A) The information required by subparagraph (f)(6) below, for the existing or proposed well, and any additional information deemed necessary by the Director for public safety and the protection of USDWs;
 - B) A permit fee in the amount of three hundred dollars (\$300.00), if the Storage Well or Observation Well is drilled, deepened, or re-entered;
 - C) The minimum financial assurance of thirty-five thousand dollars (\$35,000) per well. The Director is authorized, however, to require additional financial assurance based on, but not limited to, how long a permit holder has operated in the State of Arkansas, environmental consideration of the well location, other factors impacting the cost of plugging the well and restoring the associated well site, and the compliance history of the permit holder. The required financial assurance shall be submitted in accordance with General Rule B-2;
 - D) A Form 1 Organizational Report in accordance with General Rule B-13;
 - E) An oath that the application is executed under penalty for perjury;
 - F) If the applicant is a corporation, limited liability company, limited liability partnership or other business entity, it must be incorporated, organized, or authorized to do business in the State of Arkansas. The applicant must state that by filing an application, the applicant irrevocably waives, to the fullest extent permitted by law, any objection to the jurisdiction of the Commission or to a hearing before the Commission, or in a court of competent jurisdiction in the State of Arkansas; and
 - G) If the applicant is an individual, partnership, or other entity that is not domiciled in the State of Arkansas, the applicant must be authorized to do business in the State of Arkansas. By filing an application, the

applicant irrevocably waives, to the fullest extent permitted by law, any objection to the jurisdiction of the Commission or to a hearing before the Commission, or in a court of competent jurisdiction in the State of Arkansas.

- 5) If the application does not contain all of the required information or documents, the Director shall notify the applicant in writing. The notification shall specify what additional information or documents are necessary for an evaluation of the application and shall state to the applicant that the application will be deemed denied unless the information or documents are submitted within sixty (60) days following the date of notification.
- 6) The application for a Storage Well shall include the following:
 - A) On a form prescribed by the Director, the applicant shall provide the name, address, phone, fax, and e-mail (if available) of the local or on-site supervisory or field personnel responsible for the Storage Well;
 - B) A survey plat of the location and ground elevation of the proposed Storage Well or existing well. The survey plat shall include all wells within ¼ mile of the proposed or existing well and the current well status of each well;
 - C) The name and the approximate top and bottom elevation, from sub-sea, of the formation (indicating the perforated or open hole interval) into which Natural Gas will be injected. If an existing well is to be converted, a geophysical log of the well shall be submitted showing the above information. For a proposed well, an induction log from a well in the immediate vicinity of the proposed disposal well shall be submitted; and
 - D) A well bore diagram of the proposed or existing well showing casing for the Storage Well, indicating from the well head to total depth of the well, all casings and cementing of casings, tubing and packer setting depth, and all perforations and or open hole intervals. If application is for an existing well, a cement bond log shall be submitted with the application, or if submitted after the application is filed, the cement bond log shall be submitted prior to commencement of operations as a condition of the permit. If a cement bond log must be run, it shall be witnessed by a Commission representative.
- 7) If the application does not satisfy the requirements of this rule, the application shall be denied. If the application is denied under this section, the applicant may request to have the application referred to the Commission for determination in accordance with General Rules A-2, A-3, and other applicable hearing procedures.
- g) New Non-Storage Wells Drilled, Re-Entered or Deepened Through the Storage Reservoir
 - 1) Any new well drilled, after the effective date of this rule, through the USR within a USF, for any purpose other than storage shall comply with the casing programs contained in (i)(1) below.

- 2) Any new well re-entered or deepened, after the effective date of this rule, through a USR within a USF, shall be evaluated for compliance with (i)(2) below. Wells not in compliance shall be reworked and cemented, in accordance with (i)(2), to achieve the necessary isolation of the USR.
 - 3) Well plugging requirements of a non-storage well located within the USF area shall be the same as for a Storage Well as outlined in (k) below, and any other additional requirements in General Rule B-9.
- h) Existing Non-Storage Wells
- 1) Any non-storage well penetrating a USR, in existence on or after the effective date of this rule, shall be evaluated to determine adequate isolation of the USR. The Director may require a cement bond log, cement evaluation log or other logs, to determine adequate isolation of the USR. Non-storage wells which the Director has determined do not provide adequate isolation of the USR, may be required by the Commission, after notice and hearing, to be reworked to properly isolate the USR.
 - 2) All casing strings or liner strings run in any existing well, which extends through the USR, shall be cemented in accordance with (i)(2) below.
 - 3) Well plugging requirements of a non-storage well located within the USF area shall be the same as for a Storage Well as outlined in subsection (k) below, and any other additional requirements in General Rule B-9.
- i) Storage Well Construction, Operation, Maintenance and Decommissioning Requirements
- 1) All Storage Wells drilled after the effective date of this rule, for the purpose of Underground Storage, shall comply with the following requirements:
 - A) All casing used in Storage Wells shall meet American Petroleum Institute standards, shall be rated for the pressures to be encountered during the operational life of the well, and shall either be new casing or reconditioned casing of new quality;
 - B) All casing strings shall be centralized throughout the intervals to be cemented, and all casings shall be cemented to surface. Casing set through the USR shall have centralizers placed near the top and bottom of the USR;
 - C) All cement used for casing cement shall meet or exceed current American Petroleum Institute standards or recommended practices. Cement should be of the appropriate type and class of cement for the intended use and mixed to the appropriate weight. Cement pumping pressures shall not exceed the fracture pressure of the USR. Cement slurry samples shall be taken and properly labeled and stored by the Storage Operator for further testing as necessary;
 - D) Surface casing shall be:

inspection log or a combination of these methods to demonstrate mechanical integrity. All mechanical integrity alternate test methods shall be witnessed by a Commission representative.

- 5) If a Storage Well fails to demonstrate or maintain mechanical integrity, the well shall be removed from service immediately. The Storage Operator shall notify the Commission's regional office within four (4) hours of any well that fails or loses mechanical integrity. The Storage Operator must take action to isolate the cause of the failure and demonstrate to the Director that the well does not pose a threat to a USDW or public safety.
- 6) Storage Wells which fail to demonstrate mechanical integrity shall be repaired within one hundred eighty (180) days, and successfully pass a mechanical integrity test or be plugged.

k) Monitoring and Reporting

- 1) Each Storage Well shall be monitored, on a weekly basis, for wellhead and casing annulus pressure. All monitoring records shall be retained by the Storage Operator for five (5) years and be available to Commission staff for review upon request.
- 2) The operator of the USF shall notify the Commission regional office of any potential leak discovered within four (4) hours of the discovery of the leak.
- 3) The Storage Operator shall file, on a form prescribed by the Director, the monthly volumes of Natural Gas injected and withdrawn from the USR.
- 4) Prior to performing any well servicing activity, cementing, or any wireline logging activities, the Storage Operator of the USF shall provide notice to the Commission regional office where the Storage Well is located so as to allow Commission staff to be present to observe the activity. Any well servicing which requires the resetting of the packer shall require that an internal mechanical integrity test be conducted in accordance with subparagraph (j) above, prior to re-commencement of injection.

l) Storage Well Abandonment

- 1) A well plugging plan shall be filed with the Commission regional office thirty (30) days prior to any planned well plugging activity. All Storage Wells shall be plugged in a manner to permanently isolate the USR from all other oil and Natural Gas reservoirs and any existing USDWs within the USF area.
- 2) The minimum well plugging requirements are as follows:
 - A) The Storage Well shall be plugged as follows:
 - i) Utilizing a cement retainer set fifty (50) feet above the top perforation in the Storage Well, adequate cement shall be pushed into the USR to prevent pressure channeling while the subsequent Storage Well cement plug is setting.

- ii) Following completion of the Storage Well cementing operation, an additional one-hundred fifty (150) feet of cement shall be placed on top of the cement retainer utilized in the Storage Well cementing operation.
 - B) If cement is not present on the backside of the production casing at the required plug depths specified in A) above, cement shall be placed on the backside of the production casing during the Storage Well plugging operations.
 - C) Following the completion of the Storage Well plugging operation, a pressure test shall be run on the casing to determine cement integrity. If the casing fails this test, it shall be repaired and retested prior to the subsequent plugs being set as required in accordance with D) below.
 - D) Subsequent plugs shall be set to satisfy the requirements of Rule B-9.
 - E) If wellbore conditions preclude the setting of a cement retainer for the Storage Well plugging operation, an alternative plugging method may be approved or required by the Director. In determining whether to approve an alternative plugging method, the Director shall consider the time and cost associated with the alternative plugging method, the potential for damage to USDWs or other oil or gas reservoirs, the depth of the reservoir in relation to the depth of the USDWs, well construction characteristics, and the potential for upward migration of wellbore fluids into a USDW.
- m) Decommissioning of Underground Storage Facility
- 1) The Storage Operator of a USF shall file a plan for decommissioning a USF six (6) months prior to commencement of the decommissioning activity. The plan shall include:
 - A) The anticipated date of commencement and final completion of the decommissioning activities;
 - B) A detailed plan and timeline for the activities, including well plugging operations, equipment removal from the well sites and all central or remote facilities in the USF, abandonment of pipelines, and restoration of property as necessary;
 - C) The names and contact information for the persons, consultants, contractors and firms used in the decommissioning activity; and
 - D) The anticipated reservoir pressure at abandonment.
 - 2) The Storage Operator shall file a monthly report on the 15th of each month indicating the work completed for the preceding month during the decommissioning activity.

3) At the completion of the decommissioning, the Storage Operator shall submit a final decommissioning report and termination of storage operations. Upon receipt of the final report and completion of a final inspection of the USF, and all wells and facilities by the Commission staff, the Storage Operator's Certificate of Storage shall be terminated.

n) Federal Requirements

1) The USF is additionally subject to and required to be in compliance with the following federal requirements, unless the following federal requirements are less stringent than any other applicable requirements of General Rule D-23.

2) Required federal requirements are as follows:

A) Operation and maintenance requirements in Federal Regulations 49 CFR, Part 192, as amended;

B) Applicable enforcement provisions of Federal Regulation 49 CFR, Part 190, as amended;

C) Applicable incident and other reporting requirements contained in Federal Regulation 49 CFR, Part 191, as amended (and all such reports shall be submitted to the Oil and Gas Commission); and

D) All Storage Operators of a USF shall be subject to the applicable drug and alcohol testing requirements contained in Federal Regulation 49 CFR, Part 199, as amended.