

CARBON DIOXIDE (CO₂) STORAGE FACILITIES

82-3-1100. DEFINITIONS: CARBON DIOXIDE (CO₂) STORAGE FACILITIES.

The following terms, as used in these regulations for carbon dioxide (CO₂) storage facilities, shall have the following meanings:

- (a) "Abandonment" means the process of plugging all CO₂ storage wells in a storage facility and the removal of all surface equipment.
- (b) "CO₂" means carbon dioxide.
- (c) "CO₂ capture, sequestration, or utilization machinery and equipment" means any machinery and equipment that are located in this state and meet one of the following conditions:
 - (1) Are used to capture carbon dioxide from industrial and other anthropogenic sources, or to convert this carbon dioxide into one or more products;
 - (2) are used to inject carbon dioxide into a carbon dioxide injection well; or
 - (3) are used to recover carbon dioxide from sequestration.
- (d) "CO₂ closure period" means the period of time from the permanent cessation of active injection or withdrawal operations until the beginning of the CO₂ postclosure period. During this period, the operator is responsible for activities that include the following:
 - (1) Monitoring the plume's pressure;
 - (2) monitoring the horizontal and vertical extent of the plume; and
 - (3) monitoring plugged and abandoned wells.
- (e) "CO₂ postclosure period" means the time after the CO₂ closure period in which all wells are plugged and monitoring of the storage reservoir is no longer necessary because the plume is stable and is not a threat to public health and safety or usable water.
- (f) "CO₂ storage" means the storage of CO₂ in geologic strata that have been converted for CO₂ storage.
- (g) "CO₂ storage facility" and "storage facility" mean the leased acreage and CO₂ storage reservoir. This term shall include the CO₂ storage well, well bore tubular goods, the wellhead, and any related equipment, including the last positive shutoff valve attached to the flow line.
- (h) "CO₂ storage observation well" and "observation well" mean a well either completed or recompleted for the purpose of observing subsurface phenomena, including the presence of CO₂, pressure fluctuations, fluid levels and flow, and temperature.
- (i) "CO₂ storage recovery well" and "recovery well" mean a well used for the withdrawal of storage CO₂ that has migrated from the CO₂ storage reservoir and is trapped in a different reservoir. The wells are used in the recovery of storage CO₂ as remediation of a loss of containment.
- (j) "CO₂ storage reservoir" and "storage reservoir" mean a porous, brine-filled stratum of the earth that is separated from any other similar porous stratum by an impermeable stratum and is capable of being used for the storage of CO₂.
- (k) "CO₂ storage well" means any CO₂ storage injection or withdrawal well, CO₂ storage withdrawal well, CO₂ storage observation well, or CO₂ recovery well completed or recompleted as part of a CO₂ storage facility.

- (l) "CO₂ storage withdrawal well" and "withdrawal well" mean a well used only for the withdrawal of CO₂ stored in a reservoir.
- (m) "Decommission" means a declaration that CO₂ injection or withdrawal will cease at a CO₂ storage field and the storage field will be taken out of service.
- (n) "Fracture gradient" means the pressure gradient, measured in pounds per square inch per feet, that if applied to a subsurface formation, will cause that formation to physically fracture.
- (o) "Fresh water" means water containing not more than 1,000 milligrams of total dissolved solids per liter.
- (p) "Kansas certified laboratory" means a laboratory certified by the Kansas department of health and environment.
- (q) "Leak" means a loss of CO₂. A loss occurs when CO₂ has migrated or is migrating from the wellhead, tubing, or casing or around the packer.
- (r) "Leak detector" means a device capable of detecting by chemical or physical means the presence of CO₂ or the escape of CO₂ through a small opening.
- (s) "Licensed engineer" means an engineer who is licensed or authorized to practice engineering in Kansas by the Kansas state board of technical professions.
- (t) "Licensed geologist" means a geologist who is licensed or authorized to practice geology in Kansas by the Kansas state board of technical professions.
- (u) "Loss of containment" means that CO₂ has migrated or is migrating out of the CO₂ reservoir or facility. Generally, the term "loss of containment" is used when referring to CO₂ that has migrated or is migrating from the CO₂ storage reservoir or beyond the authorized facility boundary.
- (v) "Material change" shall include any of the following:
 - (1) Adding a storage zone;
 - (2) a change in CO₂ storage volume; or
 - (3) a change in the maximum surface operating pressure.
- (w) "Monitoring means" means the steps taken to evaluate pressure data or other data for any indication that a leak or loss of containment could be occurring or has occurred.
- (x) "Normal operating condition" means that the master valve and the first positive shutoff valve must fully open and close with reasonable ease and must be able to hold pressure in the closed position.
- (y) "Packer" means an expanding mechanical device used in a well to seal off certain sections of the well when cementing, testing, or isolating the well from the completed interval.
- (z) "Small, well-defined outside area" means an area, including a playground, recreation area, outdoor theater, and other place of public assembly, that is occupied by 20 or more persons at least five days a week for 10 weeks in any 12-month period. The days and weeks shall not be required to be consecutive.
- (aa) "Usable water" means water containing not more than 10,000 milligrams of total dissolved solids per liter. This upper limit is approximately equivalent to 10,000 parts of salt per million or 5,000 parts of chloride per million.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1101. CO₂ STORAGE FACILITY; PERMIT APPLICATION.

- (a) No entity shall operate a CO₂ storage facility without a permit to operate the facility.
- (b) Each applicant for a permit shall submit the application on a form provided by the conservation division. The applicant shall sign and verify the application. The applicant shall file the original and two copies of the application with the conservation division.
- (c) Each application shall contain the following information:
 - (1) The applicant's name and license number;
 - (2) the name of the proposed CO₂ storage facility;
 - (3) the name, description, and average depth of the CO₂ storage reservoir or reservoirs proposed to be utilized for CO₂ storage;
 - (4) a generalized stratigraphic column of the geologic formations encountered at the proposed CO₂ storage facility supported with geophysical logs:
 - (A) Each generalized stratigraphic column and geophysical log shall identify the geologic formations from the surface through the first formation below the storage reservoir and clearly label all fresh and usable water aquifers and all known active and inactive oil and gas producing horizons within the CO₂ storage facility and within a one-mile radius around the CO₂ storage facility; and
 - (B) minimum required geophysical logging analysis curves for each CO₂ storage well shall be on a scale of 5"=100' and shall include the following: correlation gamma ray, formation density, porosity curves, spontaneous potential, cement bond log and temperature log;
 - (5) a geologic, hydrogeologic, and reservoir evaluation of the proposed CO₂ storage facility, including the predicted amount of CO₂ that will be stored in the reservoir. The evaluation shall describe the geologic, geomechanic, hydrogeologic, and reservoir characteristics of the proposed CO₂ storage reservoir or reservoirs, the adjacent confining layer or layers, and the reservoir conditions that control the trapping mechanism. The evaluation shall consist of written text as specified in this paragraph and shall be illustrated with maps and cross sections. In addition, the evaluation shall identify any petroleum and water resources that have the potential to impact or be impacted by CO₂ storage operations. The evaluation under this paragraph, including all written materials and all accompanying maps, shall be certified by a licensed engineer or licensed geologist. This evaluation shall include the following:
 - (A) An assessment of the regional and local geological setting, including regional or local faulting and structural or stratigraphic features;
 - (B) the geological characterization of the trapping and containment mechanisms of the proposed CO₂ storage reservoir and adjacent confining layers, using all available geophysical data;
 - (C) a geochemistry evaluation to quantitatively predict water-CO₂-rock reactions and their effects on the storage reservoir;
 - (D) an evaluation of the CO₂ concentrations in the proposed storage reservoir and adjacent formations;
 - (E) reservoir evaluation and modeling for long-term distribution of CO₂ in the subsurface, including the rate of dissolution of the CO₂ in the formation water, miscibility, migration rates, direction, and the monitoring of the CO₂ reservoir pressure and migration;

- (F) reservoir modeling of long-term movement of brine displaced by the injection of CO₂;
- (G) exhibits and plan view maps showing the following:
 - (i) All CO₂ storage wells;
 - (ii) all water, oil, and natural gas exploration and development wells and other man-made surface structures and activities within one mile outside of the storage facility boundary;
 - (iii) all regional or local faulting;
 - (iv) an isopach map of the CO₂ storage reservoir or reservoirs;
 - (v) an isopach map of the adjacent confining layer or layers;
 - (vi) a structure map of the top and base of the CO₂ storage reservoir or reservoirs;
 - (vii) the extent of the area of maximum volume and all structural spill points or stratigraphic anomalies controlling the containment of stored CO₂ or associated fluids. The base for this map shall be a structure map on top of the storage reservoir;
 - (viii) structural and stratigraphic cross sections that depict the geologic conditions at the proposed CO₂ storage facility;
 - (ix) a detailed plan that outlines timely and permanent monitoring of soil, usable water, and the first porous zone immediately above the CO₂ reservoir's confining layer; and
 - (x) a saline fluid flow map of the storage reservoir showing local and regional fluid flow direction; and
- (H) an evaluation of all potential migration pathways that could lead to any potential loss of containment;
- (6) a closure plan, which shall include the following:
 - (A) Pressure in the injection zone before injection began and the anticipated pressure in the injection zone at the time of closure;
 - (B) the predicted time when pressure in the storage reservoir will decrease to a point at which the storage reservoir's static fluid level will be below the base of the lowermost usable water formation;
 - (C) the predicted position of the leading edge of CO₂ plume at closure; and
 - (D) monitoring of the CO₂ plume and the lowest usable water zone;
- (7) an area of review evaluation, which shall be certified by a licensed geologist or licensed engineer and shall include the following:
 - (A) A review of the data of public record and all available records for all wells that penetrate the CO₂ storage reservoir and those wells that penetrate the CO₂ storage reservoir within one-fourth mile of the boundary of the CO₂ storage facility. This review shall determine if all the abandoned wells have been plugged in a manner that prevents the movement of CO₂ or associated fluids from the CO₂ storage

reservoir and if all unplugged wells that penetrate the CO₂ storage reservoir have adequate cement to isolate the storage interval from other reservoirs in the well and from behind the casing; and

- (B) identification of any wells that appear from a review of public records to be unplugged or improperly plugged or any unplugged or improperly plugged wells of which the applicant has actual knowledge;
- (8) the actual maximum injection rate per day for the injection of CO₂ certified by a licensed engineer or licensed geologist;
- (9) a report characterizing the maximum storage facility operating pressure as a function of the fracture gradient of the storage reservoir. The fracture gradient of the storage reservoir shall be determined by a step rate test or calculated by other methods approved by the director and certified by a licensed engineer or licensed geologist. The operating pressure of a CO₂ storage facility shall not be greater than 75 percent of the fracture gradient for the storage reservoir as measured in PSIG;
- (10) the calculated maximum surface and bottom hole injection pressure of the CO₂ and water to be injected;
- (11) the results of multiple water quality tests of fluid recovered from the CO₂ storage reservoir or reservoirs. The amount of chlorides and total dissolved solids of the fluid in milligrams per liter shall be reported. Water analysis shall be performed by a Kansas certified laboratory. No CO₂ storage shall be permitted in a usable water formation;
- (12) a site map showing the boundaries of the CO₂ storage facility, the location and well number of all proposed CO₂ storage wells, including all observation wells, the location of cathodic protection boreholes or ground bed systems, and the location of all pertinent surface facilities within the boundary of the storage facility and within one-fourth mile of the outside of the proposed storage facility boundary. The applicant shall verify this site map;
- (13) a statement confirming that the applicant holds the necessary property and mineral rights for construction and operation of the CO₂ storage facility;
- (14) a storage facility safety plan. This plan shall include the following:
 - (A) Emergency response procedures and provisions to provide security against unauthorized entry;
 - (B) details for the safety procedures concerning residential, commercial, and public land use in the proximity of the storage facility;
 - (C) details for notifying all residents, commercial businesses, and areas of public use that could be impacted if an emergency occurs;
 - (D) emergency response procedures and contingency plans for CO₂ storage well leaks;
 - (E) emergency response procedures and contingency plans for a loss of containment from the CO₂ storage facility;
 - (F) specific contractors and equipment vendors capable of providing necessary services and equipment to respond to CO₂ storage well leaks or loss of containment from the CO₂ storage facility;
 - (G) a review of the safety plan with county emergency management, to determine how emergencies will be prevented, prepared for, and responded to;
 - (H) a schedule for updating county emergency management agencies; and

- (l) a monitoring plan to ensure containment of the CO₂ within the CO₂ storage facility boundaries. This shall include monitoring wells to monitor for CO₂ migration vertically and horizontally;
- (15) a demonstration of financial responsibility to ensure proper operation and closure of the CO₂ storage facility. The form and amount of financial responsibility shall be approved by the director. Adjustments to the financial responsibility may be required by the director;
- (16) any other relevant information that the conservation division requires; and
- (17) payment of the application fee required by K.A.R. 82-3-1119.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1102. NOTICE OF APPLICATION FOR PERMIT AND PROTEST.

- (a) Each applicant for a permit to operate a CO₂ storage facility shall give notice on or before the date the application is filed with the conservation division by mailing or delivering a copy of the application to the following:
 - (1) Each operator or mineral lessee of record within one-half mile of the boundary of the storage facility;
 - (2) each owner of record of the minerals in unleased acreage within one-half mile of the boundary of the storage facility; and
 - (3) each landowner on whose land the storage facility will be located.
- (b) The applicant shall publish notice of the application once each week for two consecutive weeks in the official county newspaper of each county in which the lands affected by the application are located, at least once in the Kansas Register, and at least once in the Wichita Eagle newspaper.
- (c) The applicant shall give any additional notice that the director deems necessary to ensure due process.
- (d) The application shall be held in abeyance for 30 days from the date of last publication or delivery of notice, whichever is later. If, during that 30-day period, a protest is filed according to K.A.R. 82-3-135b or if the director deems that a hearing is necessary to protect the health, safety, welfare, or property of residents or the water or soil resources of the state, a hearing on the application shall be held.
- (e) The applicant shall publish notice of the hearing in the same manner as that required by subsection (b).

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1103. APPLICATION REQUIRED TO AMEND PERMIT.

- (a) The operator of a CO₂ storage facility shall file an application with the conservation division, on a form furnished by the conservation division, for an amendment to that permit if at least one of the following conditions is met:
 - (1) A material change in condition has occurred in the operation of the CO₂ storage facility or in the ability of the storage facility to operate without causing pollution.
 - (2) The areal extent of the CO₂ storage facility is expanded.

- (3) The CO₂ storage reservoir pressure is increased above the maximum permitted pressure.
- (4) An additional CO₂ storage well is added, or an existing well is converted to a CO₂ storage well.
- (b) Notice of the amendment application and protest period shall be the same as provided in K.A.R. 82-3-1102.
- (c) If an application for an amendment is administratively denied, the operator shall have a right to a hearing upon written request.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1104. TRANSFER OF A CO₂ STORAGE FACILITY PERMIT.

- (a) The authority to operate a CO₂ storage facility under a permit from the conservation division shall not be transferred from one operator to another without the approval of the director. The transferring operator shall notify the conservation division, on a form prescribed by the conservation division, of the intent to transfer the permit at least 30 days before the proposed transfer.
- (b) The notification shall contain the following information:
 - (1) The name and address of the transferring operator and that operator's license number;
 - (2) the permit number;
 - (3) a list of all CO₂ storage wells on the storage facility authorized under the permit being transferred;
 - (4) the CO₂ storage reservoir or reservoirs covered by the permit;
 - (5) the proposed effective date of transfer;
 - (6) the signature of the transferring operator and the date signed;
 - (7) the name and address of the transferee operator and that operator's license number; and
 - (8) the signature of the transferee operator and the date signed.
- (c) The transferee shall provide proof of financial responsibility in a form and an amount approved by the director before the transfer of the permit.
- (d) A copy of the approved transfer shall be sent to the transferring operator and transferee operator.
- (e) Within 90 days of transfer approval, the transferee operator shall change the identification signs specified in K.A.R. 82-3-1107(g) to show the transferee operator information.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1105. MODIFICATION, SUSPENSION, OR CANCELLATION OF PERMIT.

- (a) A permit may be modified, suspended, or canceled after notice and opportunity for hearing if either of the following conditions is met:
 - (1) A material change in condition has occurred in the operation of the CO₂ storage facility.

- (2) Material deviations from the information originally furnished to the conservation division occur that affect the safe operation of the storage facility or the ability of the storage facility to operate without causing a threat to public health and safety or to usable water.
- (b) All operations at a CO₂ storage facility shall cease upon suspension or cancellation of the permit for that storage facility.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1106. WELL CONSTRUCTION REQUIREMENTS.

- (a) As part of the application to install and operate a CO₂ storage facility, the applicant shall submit well construction information for proposed well completions for existing wells and wells to be drilled or reentered and used for CO₂ storage wells.
- (b) Information on existing wells and wells to be drilled or reentered shall include the following:
 - (1) A plan specifying the drilling, completion, or conversion procedures for the proposed CO₂ storage well;
 - (2) a well bore schematic showing the name, description, construction, and depth of each well drilled or proposed to be drilled as a CO₂ storage well;
 - (3) a description of the casing, tubing, and packer in the CO₂ storage well or the proposed casing for new wells, including a full description of cement already in place or as proposed;
 - (4) the proposed method of testing the wells to demonstrate mechanical integrity of the casing, tubing, and packer before use; and
 - (5) for existing wells and wells to be reentered, all available geophysical logs through the storage reservoir and cased-hole logs including gamma ray, neutron curves, cement bond log, and temperature log. For wells to be drilled, the information shall include a complete open-hole wireline log measuring rock formation parameters of spontaneous potential, resistivity, gamma ray, and neutron density through the storage reservoir and cased-hole logs, including gamma ray, neutron curves, cement bond log, and temperature log. Each log shall be annotated to identify the estimated location of the base of the deepest usable water formation, showing the stratigraphic position and thickness of all confining strata above the storage reservoir and the stratigraphic position and thickness of the storage reservoir. An alternative log may be used if the director determines that the alternative log is substantially equivalent to one of the logs specified. To obtain approval for use of an alternative log, the applicant shall submit the following to the director:
 - (A) A description of the log and the theory of operation;
 - (B) a description of the field conditions under which the log can be used;
 - (C) the procedure for interpreting the log; and
 - (D) an interpretation of the log upon completion of the logging event.
- (c) Each CO₂ storage well shall meet the applicable casing and cementing requirements of K.A.R. 82-3-104, K.A.R. 82-3-105, and K.A.R. 82-3-106. However, all casing strings that are set in the well bore shall be cemented with a sufficient volume of cement to fill the annular space to a point 500 feet above the top of the CO₂ storage reservoir or to the surface, whichever is less.
- (d) Each CO₂ storage well shall be completed with a tubing and packer configuration.
- (e) All surface, intermediate, and production casing and all tubing strings shall meet the standards specified in either of the following, which are hereby adopted by reference:

- (1) "Bulletin on performance properties of casing, tubing, and drill pipe," API bulletin 5C2, as published by the American petroleum institute in October 1999; or
 - (2) "specification for casing and tubing (U.S. customary units)," API specification 5CT, sixth edition, as published by the American petroleum institute in October 1998, except the publications adopted on page 1 of section 2.1, and the errata published in May 1999.
- (f) Liners set within casing shall have cement circulated from the bottom of the liner to the top of the liner. If cement does not circulate, the annulus between the liner and casing shall be equipped in a way that the annulus can be monitored and tested for mechanical integrity.
 - (g) All surface, intermediate, and production casing and all tubing strings shall be new casing or reconditioned casing of equivalent quality that has been pressure-tested in accordance with the requirements of K.A.R. 82-3-1112(d)(1). For new pipe, the pressure test conducted at the manufacturing mill or fabrication plant may be used to fulfill this requirement.
 - (h) Emplacement of cement in setting intermediate casing, production casing, or any liners shall be verified by a cement bond log, cement evaluation log, or other evaluation method approved by the conservation division.
 - (i) All newly drilled wells shall demonstrate internal and external mechanical integrity before use for CO₂ injection, as required in K.A.R. 82-3-1112.
 - (j) The applicant shall submit a tabular summary containing the following information for each proposed CO₂ storage well:
 - (1) Location;
 - (2) completion date;
 - (3) well depth;
 - (4) casing; and
 - (5) cementing and completion information.
 - (k) Each CO₂ injection or withdrawal well located within 330 feet of an inhabited residence, commercial establishment, church, school, or small, well-defined outside area shall be equipped with a down-hole safety shutoff.
 - (l) Approval of the design of the proposed well may be obtained before actual construction of the well.
 - (m) Upon completion of each well, the applicant shall submit to the conservation division a copy of the well completion report, on a form furnished by the conservation division.
 - (n) All packers, packer elements, and any similar equipment critical to the containment of CO₂ shall be of a quality to withstand exposure to CO₂.
 - (o) For tubing completions, the packer shall be set at a depth so that the packer will be opposite a cemented interval of the long-string casing and shall be set no more than 50 feet above the uppermost perforation or open hole of the CO₂ storage reservoir.

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82-3-1107. STORAGE FACILITY REQUIREMENTS.

- (a) All wellhead components, including the casinghead and tubing head, valves, and fittings, shall be made of material having operating pressure ratings sufficient to exceed the maximum injection pressure computed at the wellhead and to withstand the corrosive nature of CO₂.
- (b) The ratings shall be clearly identified on valves and fittings.

- (c) The wellhead master valve on each CO₂ storage well shall be fully opening and shall be sized to the diameter of the casing or tubing string to which the valve is attached.
- (d) Each flow line connected to the wellhead shall be equipped with a manually operated positive shutoff valve located on the wellhead.
- (e) Each wellhead shall be protected with safety devices to prevent pressures in excess of the maximum allowable operating pressure from being exerted on the storage reservoir and to prevent the backflow of any stored CO₂ if a flow line ruptures.
- (f) The storage facility shall have a continuously operating supervisory control and data acquisition (SCADA) system approved by the director to monitor operations for each individual CO₂ storage well. The SCADA system shall be connected by a communication link with the local control room or any remote control center for service and maintenance crews. If an emergency occurs, the equipment shall be capable of automatically closing all inlets and outlets to the CO₂ storage facility. Each sensor or indicator shall be calibrated annually, and the documentation shall be kept for five years. Each of the following instruments shall be connected to an alarm:
 - (1) Flow indicator; and
 - (2) pressure indicator on the lines of the wellhead.
- (g) The operator shall identify each CO₂ storage well and associated compressor site by posting a sign at the wellhead or compressor site. The sign shall be durable and shall be large enough to be legible under normal daytime conditions at a distance of 50 feet. The sign shall include all of the following information:
 - (1) The name and license number of the operator;
 - (2) the name of the storage facility and either the CO₂ storage well number or the compressor site name or number;
 - (3) the location of the CO₂ storage well or compressor site by quarter section, section, township, range, and county;
 - (4) the emergency contact phone number or numbers for the operator of the storage facility; and
 - (5) identification of the well as a CO₂ storage well.
- (h) A leak detector shall be placed at each of the following locations:
 - (1) Any CO₂ storage well located within 330 feet of an inhabited residence, commercial establishment, church, school, or small, well-defined outside area;
 - (2) each enclosed compressor site; and
 - (3) any building housing a CO₂ pipe connection.
- (i) The required leak detectors shall be integrated with automated warning systems. The inspection and testing of these leak detectors shall meet the requirements of K.A.R. 82-3-1111.
- (j) The installation of monitor wells may be required by the director to determine the preinjection baseline parameters of soil and water.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1108. STORAGE FACILITY MONITORING AND REPORTING.

- (a) During the first year of CO₂ storage operations, the operator shall file monthly pressure, injection, and withdrawal reports on forms provided by the conservation division. Each monthly report shall be due on or before the 10th of the month for the previous month and shall contain the following information:
 - (1) Maximum wellhead pressure reading for the month;
 - (2) minimum wellhead pressure reading for the month;
 - (3) average wellhead pressure reading for the month;
 - (4) total amount of CO₂ injected each week;
 - (5) total amount of CO₂ withdrawn each week; and
 - (6) cumulative total of CO₂ in the storage facility.

- (b) (1) During the second and each subsequent year of CO₂ storage operations, the operator shall file quarterly pressure, injection, and withdrawal reports on forms provided by the conservation division. The quarterly reports shall be submitted according to the following schedule:
 - (A) For the period covering January 1 through March 31, on or before the following April 30;
 - (B) for the period covering April 1 through June 30, on or before the following July 31;
 - (C) for the period covering July 1 through September 30, on or before the following October 31; and
 - (D) for the period covering October 1 through December 31, on or before the following January 31.

- (2) Each quarterly report shall contain the following information:
 - (A) Maximum wellhead pressure reading for each month;
 - (B) minimum wellhead pressure reading for each month;
 - (C) average wellhead pressure reading for each month;
 - (D) total amount of CO₂ injected each month;
 - (E) total amount of CO₂ withdrawn each month; and
 - (F) cumulative total of CO₂ in the storage facility.

- (c) The CO₂ injectate shall be sampled monthly and tested at a Kansas certified laboratory for the percentage of CO₂. The report shall be filed with the conservation division on or before the 28th day of the following month. The CO₂ shall be of sufficient purity and quality not to compromise the safety and efficiency of the reservoir to effectively contain the CO₂.

- (d) The total volume of CO₂ injected into or withdrawn from a storage facility shall be measured through a meter of sufficient capacity and approved by the director. The original field record consisting of magnetic tapes, digital electronic data, meter charts, or records of CO₂ injected or withdrawn shall be retained for at least five years. This information shall be made available to the conservation division upon request.

- (e) The operator shall submit a detailed map, which shall be prepared by a licensed engineer or a licensed geologist, showing the areal extent of the CO₂ plume on December 31 of each year to the conservation division by the following January 31 of each year. The operator shall include a narrative description of how the areal extent of the CO₂ plume was determined.

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82-3-1109. ANNUAL REVIEW OF SAFETY PLAN; SAFETY PLAN UPDATE.

- (a) Each operator of a CO₂ storage facility shall conduct an annual review of the safety plan required by K.A.R. 82-3-1101(c)(14) with its field staff and an agent of the conservation division.
- (b) The annual review shall, at a minimum, include the following:
 - (1) Emergency response procedures;
 - (2) security against unauthorized entry;
 - (3) procedures to be followed if an emergency occurs, affecting the residential, commercial, and public land use within the CO₂ storage facility and within one-half mile of the storage facility;
 - (4) contingency plans for CO₂ storage well leak and loss of containment;
 - (5) the names of specific contractors and equipment vendors capable of providing necessary services and equipment to respond to an emergency or CO₂ storage well leak or loss of containment;
 - (6) availability of the safety plan at the CO₂ storage facility and the nearest operational office of the storage facility operator;
 - (7) safety training drills that occurred during the year, including a list of attendees and date on which each training drill was conducted;
 - (8) safety meetings that occurred during the year, including a list of attendees and the date on which each safety meeting was conducted; and
 - (9) a review of the safety plan to ensure that the plan is current.
- (c) The operator shall notify the conservation division at least 10 days before the annual review so that a representative of the conservation division can be present.
- (d) The operator shall submit a written report summarizing the annual review to the conservation division within 30 days following the review.
- (e) An extension of time to conduct the annual review may be granted by the director, upon a showing of good cause by the operator.
- (f) Subsequent reviews of the safety plan may be required by the director if an emergency or a safety-related incident occurs.
- (g) The safety plan shall be updated as changes in safety features at the storage facility occur or as the director may require for the protection of public health and safety. An updated copy of the safety plan shall be maintained with the conservation division and either at the storage facility or at the nearest operational office.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1110. SAFETY INSPECTION.

- (a) Each operator of a CO₂ storage facility shall perform an annual safety inspection of the storage field to ensure that all safety equipment and monitoring equipment are in working order.
- (b) The operator shall notify the conservation division at least 10 days before each inspection so that a representative of the conservation division can be present to witness the inspection.

- (c) An extension of time to conduct the annual safety inspection may be granted by the director upon a showing of good cause by the operator.
- (d) The safety inspection shall demonstrate to the satisfaction of the conservation division's agent that all of the following conditions are met:
 - (1) All CO₂ storage well manual valves are in normal operating condition.
 - (2) All surface automatic shut-in safety valves are in normal operating condition.
 - (3) Wellheads and all related equipment are connected and functioning.
 - (4) All valves, annuli, and blow-downs open and close with reasonable ease.
 - (5) The cathodic protection systems are functioning.
 - (6) The warning signs are in compliance with these regulations.
 - (7) All safety fences, barriers, and security equipment are adequate.
- (e) The operator shall file a written report consisting of the inspection procedures used and the results of the safety inspection with the conservation division within 30 days following the inspection.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1111. LEAK DETECTOR INSPECTIONS AND TESTING.

- (a) Each leak detector required by K.A.R. 82-3-1107 shall be tested once each calendar year and, if defective, shall be repaired or replaced within 10 days.
- (b) Each repaired or replaced detector shall be retested if required by the director.
- (c) An extension of time for repair or replacement of a leak detector may be granted by the director upon a showing of good cause by the operator of the CO₂ storage facility.
- (d) The operator shall maintain a record of each inspection, including the inspection results, for at least five years and shall make each record available to the conservation division upon request.

(Authorized by K.S.A. 2008 Supp. 55-1637 and 55-1640; implementing K.S.A. 2008 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1112. MECHANICAL INTEGRITY TESTING.

- (a) Each CO₂ storage well shall be completed, equipped, operated, and maintained in a manner that prevents pollution of usable water and confines the CO₂ in the tubing or casing and in the formations approved for storage.
- (b) A CO₂ storage well shall be considered to have mechanical integrity if the well demonstrates both internal and external integrity.
- (c) Internal integrity shall be demonstrated by a successful pressure test. The operator shall perform a successful pressure test on each CO₂ storage well before placing the storage well in operation and at least once every two years thereafter.
- (d) The pressure test shall be conducted under the supervision of an employee of the operator of the CO₂ storage facility. The date of the test shall be mutually agreed to by the CO₂ storage facility operator and the conservation division. The test shall be conducted as follows:
 - (1) A minimum fluid pressure of 300 psig shall be applied to the tubing casing annulus at the surface for a period of 30 minutes. Internal mechanical integrity shall be demonstrated if the applied pressure does not decrease by more than 10 percent.
 - (2) The test results shall be verified by the CO₂ storage facility's representative.

- (e) External integrity shall be demonstrated by cased hole logs. A minimum of a gamma ray, neutron, and temperature logs shall be run from 50 feet above the point of injection continuously to the surface. The use of an alternative log may be approved by the director upon written request.
- (f) Each CO₂ storage well shall demonstrate external integrity at least once every four years.
- (g) If a CO₂ storage well fails to demonstrate mechanical integrity, the operator of the well shall, upon discovery, isolate each leak in a manner that contains CO₂ and associated fluids in the storage well or storage reservoir and demonstrates that the well does not pose a threat to public health and safety and usable water. The operator shall perform one of the following within 90 days:
 - (1) Repair and retest the storage well to demonstrate mechanical integrity; or
 - (2) plug the storage well according to K.A.R. 82-3-1118.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1113. REPORT OF LEAK, POTENTIAL LEAK, OR LOSS OF CONTAINMENT.

- (a) Each operator of a CO₂ storage facility shall report each leak, each potential leak, and any pressure changes or other monitoring data that indicate a loss of containment of injected CO₂ or associated fluids. The report shall be made orally to the appropriate conservation division district office and to the conservation division central office by the next business day following discovery. The oral report shall be confirmed in writing to the conservation division central office within three business days following the oral report.
- (b) The operator shall submit a written summary of the cause or causes of each leak or loss of containment or the data indicating a potential leak or potential loss of containment to the conservation division central office within 10 days following the written report required in subsection (a). The summary shall also evaluate whether the situation poses a threat to public health and safety, usable water, or property.
- (c) Within 30 days following the summary report required by subsection (b), the operator of the CO₂ storage facility shall submit an action plan to repair the leak or regain containment for the conservation division's review and approval. The action plan shall describe any corrective action, monitoring, or operational procedures that have been or will be taken.
- (d) The installation of observation or monitoring wells may be required by the director to gain additional information about the leak or loss of containment.
- (e) Additional reports may be required by the director until the leak or loss of containment is remediated.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1114. TEMPORARY ABANDONMENT OF STORAGE WELLS.

- (a) Within 90 days after a CO₂ storage well ceases operation, the operator of that well shall perform one of the following:
 - (1) Plug the well in accordance with K.A.R. 82-3-1118; or
 - (2) file an application with the conservation division requesting temporary abandonment, on a form provided by the conservation division.
- (b) One of the following actions shall be taken by the director:
 - (1) Approval of temporary abandonment of the storage well for one year; or

- (2) denial of temporary abandonment if the storage well poses a threat to public health and safety or usable water.
- (c) Applications for one-year extensions of temporary abandonment may be granted by the director for a maximum of 10 years. Each application for extension of temporary abandonment shall be filed before the expiration of the previous one-year temporary abandonment period.
- (d) Before a temporary abandonment or any extension is granted, a demonstration of the well's internal mechanical integrity may be required by the director by means of a pressure test according to K.A.R. 82-3-1112(d)(1).
- (e) If a temporary abandonment application or any extension application is denied and the storage well is not placed back in service, the storage well shall be deemed permanently abandoned and shall be plugged in accordance with K.A.R. 82-3-1118.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1115. TEMPORARY ABANDONMENT OF A STORAGE FACILITY.

- (a) Any operator of a CO₂ storage facility may temporarily abandon the storage facility upon submitting written notice to the conservation division. The notice shall be submitted to the conservation division at least 90 days before the temporary abandonment. The notice shall include the following:
 - (1) The date on which the storage facility is to be temporarily abandoned;
 - (2) the projected temporary abandonment period;
 - (3) the monitoring procedures to be utilized at the facility during the temporary abandonment period;
 - (4) the temporary abandonment applications for each CO₂ storage well filed according to K.A.R. 82-3-1114, except any CO₂ storage wells for which temporary abandonment has already been approved; and
 - (5) any other relevant information required by the conservation division.
- (b) One of the following actions shall be taken by the director:
 - (1) Approval of temporary abandonment of the storage facility for one year; or
 - (2) denial of temporary abandonment if the storage facility poses a threat to public health and safety or usable water.
- (c) Applications for one-year extensions of temporary abandonment may be granted by the director for a maximum of 10 years. Each application for extension of temporary abandonment shall be filed before the expiration of the previous one-year temporary abandonment period.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1116. APPLICATION FOR DECOMMISSIONING AND ABANDONMENT OF STORAGE FACILITY.

Any operator of a CO₂ storage facility may permanently decommission and abandon the storage facility upon application to, and approval from, the conservation division. The application shall be submitted at least 90 days before the beginning of decommissioning activities and shall contain a detailed decommissioning plan that includes the following:

- (a) The anticipated date on which the storage facility will cease injection and withdrawal;
- (b) the anticipated storage reservoir pressure after injection and withdrawal cease;
- (c) a schedule for abandoning the storage facility, including when and how all equipment and buildings will be abandoned and when the CO₂ storage wells will be plugged;
- (d) the name and address of persons responsible for any equipment and buildings to be left in place;
- (e) an updated closure plan as required by K.A.R. 82-3-1101;
- (f) the method of monitoring to demonstrate the containment, pressure, and position of the CO₂ plume during the closure period; and
- (g) any other relevant information that the director may require to ensure the protection of public health and safety and usable water, considering the unique conditions of the storage facility.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1117. POSTCLOSURE DETERMINATION.

- (a) Each CO₂ storage facility operator seeking a postclosure determination shall submit an application to the conservation division.
- (b) The CO₂ storage facility operator shall demonstrate that both of the following conditions are met before postclosure status may be granted:
 - (1) The CO₂ plume has stabilized, is contained within the storage reservoir, and is not a threat to public health and safety and usable water.
 - (2) The CO₂ storage reservoir pressure is stable.
- (c) If the application is denied, the closure period activities shall continue as directed by the director.
- (d) Upon written approval of postclosure status, the operator shall plug the remaining monitor wells in accordance with K.A.R. 82-3-1118. After the remaining monitor wells are plugged, the CO₂ storage facility permit shall be revoked.

(Authorized by and implementing K.S.A. 2008 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1118. PLUGGING METHODS AND PROCEDURES, PLUGGING REPORT, AND PLUGGING FEE FOR CO₂ STORAGE WELLS.

- (a) Each CO₂ storage well shall be plugged in accordance with a plugging plan submitted by the operator and approved by the director. Before commencing any plugging operations, the operator shall perform the following:
 - (1) Provide a written plugging plan to the appropriate conservation division district office and the conservation division central office at least 30 days before the planned commencement of plugging operations;
 - (2) demonstrate that each well to be plugged has internal and external mechanical integrity to ensure the long string casing and cement left in the subsurface after plugging have integrity; and
 - (3) complete one of the following operations:

- (A) Set a mechanical bridge plug or other control device approved by the director immediately above the CO₂ storage reservoir or storage reservoirs; or
- (B) place a cement plug across and above the CO₂ storage reservoir or storage reservoirs by a method approved by the appropriate conservation division district office.

(b) After each storage well is plugged, the operator shall meet the following requirements:

- (1) File a plugging report in accordance with K.A.R. 82-3-117; and
- (2) pay a plugging fee in accordance with K.A.R. 82-3-118.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1119. FEES FOR CO₂ STORAGE FACILITIES AND CO₂ STORAGE WELLS.

- (a) For a storage facility permit application filed according to K.A.R. 82-3-1101, each applicant shall submit a fee of \$4,500. In addition, for each CO₂ storage well included in the permit application, the applicant shall submit a fee of \$100.
- (b) For any application to amend a storage facility permit filed according to K.A.R. 82-3-1103, each applicant shall submit a fee of \$250.
- (c) The operator shall pay an annual fee of \$1,000 for each active or inactive unplugged CO₂ storage well located within the boundary of the storage facility.
 - (1) The total annual well fee shall be based on the number of the operator's CO₂ storage wells in existence on the first day of November each year.
 - (2) The operator shall remit the total annual well fee in a single check to the conservation division, on or before the last day of January each year.
- (d) The operator shall quarterly pay to the conservation division a fee of five cents per ton of CO₂ injected. The funds shall be held in the carbon dioxide injection well and underground storage fund to be used for the purposes specified in K.S.A. 55-1638(b), and amendments thereto.
- (e) All fees shall be nonrefundable.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1637; effective Feb. 26, 2010.)

82-3-1120. PENALTIES.

Monetary penalties in accordance with K.S.A. 55-1639 and amendments thereto may be assessed by the commission against any CO₂ storage facility operator violating any of the provisions of K.A.R. 82-3-1100 through K.A.R. 82-3-1119.

(Authorized by and implementing K.S.A. 2007 Supp. 55-1639; effective Feb. 26, 2010.)