

Kansas Administrative Regulations

Department of Health and Environment

Article 45.—Underground Hydrocarbon Storage Wells and Associated Brine Ponds

28-45-2a. Definitions.

As used in this article of the department's regulations, each of the following terms shall have the meaning specified in this regulation:

(a) "Active well" means a storage well that is in service. An active well is considered to be in active status.

(b) "Annular space" means the void area surrounding one cylindrical object placed inside another, including the void area between a casing and a borehole.

(c) "Applicant" means the operator and the owner requesting a facility permit or a permit modification as specified in this article of the department's regulations. If the operator and the owner are not the same person, the operator and the owner shall jointly apply for a permit or a permit modification.

(d) "Bedded salt" means a salt formation in which the original structure of alternating salt and nonsalt beds is largely preserved.

(e) "Blanket pad material" means a fluid less dense than water and incapable of dissolving salt that is used during solution mining to protect the cavern roof from the injected water and to prevent dissolving the salt of the roof and around the casing seat.

(f) "Borehole" means an uncased hole drilled into the ground at any angle between vertical and horizontal in which casing is installed to form a well.

(g) "Brine" means a solution of water and dissolved solids, generally sodium chloride, measuring 3,000 parts per million or greater total dissolved solids.

(h) "Brine pond" means the excavated or diked structure used for the surface containment of brine used in the creation, maintenance, and operation of a storage well and cavern.

(i) "Brine string" means the uncemented casing that is hung from the wellhead through which highly saline water flows into or out of a storage cavern during product withdrawal or injection operations.

(j) "Casing" means steel pipe cemented in place inside the borehole to support the sides of the borehole and to act as a barrier to prevent subsurface migration of fluids into or out of the borehole.

(k) "Casing evaluation" means an assessment of the production casing in a well using one or more geophysical logs or tools and engineering calculations to determine the ability of the well to be safely operated at the maximum allowable operating pressure.

(l) "Casing seat" means the location or position of the bottom or lowermost position of a casing.

(m) "Cathodic protection borehole" means a type of borehole that penetrates the water table of an aquifer and is constructed for the intended purpose of installing equipment to prevent the electrolytic corrosion of metallic equipment or facilities.

(n) "Cavern roof" means the uppermost part of a cavern located just below the borehole of the cavern. The shape of the salt cavern roof can be flat or domed.

(o) "Cavern system" means the storage well, storage cavern, borehole, casing, and wellhead.

(p) "Cement bond log" means a downhole geophysical evaluation survey used to determine the quality and quantity of cement bonding between the casing and rock formations.

(q) "Cemented liner" means the casing installed within the production casing.

(r) "Cementing" means the operation in which a cement slurry is pumped down through the inside of a casing, out the bottom, and upward into the annular space.

(s) "Class V injection well" means a type of well used to inject nonhazardous fluids underground and is regulated by the department.

(t) "Core" means a cylindrical sample of geologic formation, usually reservoir rock, taken during or after drilling a well.

(u) "Creep" means the property of salt to flow slowly and deform permanently under the influence of shear stress.

(v) "Department" means Kansas department of health and environment.

(w) "Effective casing seat" means the lowest point of the production casing that is bonded to the bedded salt.

(x) "Elevation survey" means the periodic recording of the height of a fixed reference point, or benchmark, used to determine the rate of subsidence.

(y) "Emergency shutdown valve" means a valve or system of valves that meets criteria specified in K.A.R. 28-45-13 and, when activated, initiates a shutdown of a process as specified in K.A.R. 28-45-13.

(z) "Facility permit" and "permit" mean an authorization, license, or equivalent control document issued to the owner and the operator by the secretary to construct and operate a storage facility.

(aa) "Formation" means a body of rock that is distinctive and continuous enough to be mapped.

(bb) "Fresh water" means water containing not more than 1,000 milligrams per liter of total dissolved solids.

(cc) "Impermeable synthetic membrane liner" means a commercially manufactured membrane liner composed of synthetic materials commonly identified as being plastic or plastic polymer materials or other synthetic materials.

(dd) "Intermediate casing" means a pipe placed into the borehole inside the surface casing and cemented in place.

(ee) "Liner" means any designated barrier in the form of in situ, layered, membrane, or blanket materials utilized or installed to reduce the potential for a significant hydrologic connection between brine that is controlled or retained by a brine pond and waters of the state.

(ff) "Log" and "logs" mean a recording of a variety of subsurface properties that is made by lowering detectors into a well or cavern.

(gg) "Maximum allowable operating pressure" means the maximum pressure authorized by the department and measured at the product side of the wellhead.

(hh) "Mechanical integrity" means the quality or condition of a cavern system in being structurally sound with competent pressure seals by application of technical,

operational, and organizational solutions that reduce the risk of uncontrolled release of product or brine.

(ii) "Mechanical integrity test" means a procedure verifying that a storage well and a cavern are capable of storing product within design limitations with no significant loss of liquid.

(jj) "Monitoring status" means a temporary status for a storage well that has been removed from service by withdrawing the product and filling the cavern with saturated brine.

(kk) "Monitoring well" means a type of well used to observe or collect groundwater parameters and hydrogeologic data.

(ll) "Operator" means "company or operator," as defined in K.S.A. 55-1,117 and amendments thereto, and is recognized by the secretary as being responsible for the physical operation of a storage facility.

(mm) "Owner" means the person owning all or part of any storage facility.

(nn) "Packer" means a device that can be used to isolate the cavern from the surface.

(oo) "Permanent monitoring status," when used regarding a storage well, means that the storage well is not plugged but has been permanently removed from service and is subject to long-term observation.

(pp) "Permitted well" means any type of well authorized or permitted by the secretary.

(qq) "Permittee" means the operator and the owner issued a permit by the secretary.

(rr) "Person" means any individual, company, corporation, institution, association, partnership, municipality, township, and local, state, or federal agency.

(ss) "Plugged," when used to describe a storage well, means that the storage well has been permanently removed from service under K.A.R. 28-45-21.

(tt) "Porosity storage" has the meaning specified for "underground porosity storage" in K.S.A. 55-1,117, and amendments thereto.

(uu) "Pressure gradient" means the pressure at a given depth divided by the depth.

(vv) "Process control system" means an automated surveillance system in which the monitoring and control operations are accomplished at a central or remote location.

(ww) "Product" means any hydrocarbon, including crude oil, and derivatives from crude oil, or oil and gas, that meets the following conditions:

(1)(A) Is liquid under standard conditions of temperature and pressure; or

(B) is liquified under the temperatures and pressures at which the hydrocarbon is stored; and

(2) is stored under conditions that necessitate the use of displacement fluids to withdraw the hydrocarbon from storage.

(xx) "Production casing" means a pipe placed into the borehole inside the surface or intermediate casing and cemented into place.

(yy) "Professional engineer" means an individual who is qualified to engage in the practice of engineering and is licensed by the state board of technical professions to practice engineering in Kansas pursuant to K.S.A. 74-7001 et seq., and amendments thereto.

(zz) "Professional geologist" means an individual who is qualified to engage in the practice of geology and is licensed by the state board of technical professions to practice geology in Kansas pursuant to K.S.A. 74-7001 et seq., and amendments thereto.

(aaa) "Professional surveyor" means an individual who is qualified to engage in the practice of surveying and is licensed by the state board of technical professions to practice surveying in Kansas pursuant to K.S.A. 74-7001 et seq., and amendments thereto.

(bbb) "Salt roof thickness" means the thickness of the bedded salt measured from the top of salt to the effective casing seat.

(ccc) "Saturated brine" means saline water with a chloride concentration that is equal to or greater than 95 percent.

(ddd) "Shear stress" means the force tending to cause deformation of a material by slippage along a plane or planes parallel to the imposed stress.

(eee) "Solution mining" means the process of injecting fresh water from the surface through a well to the subsurface to dissolve salt or other soluble rock or mineral. The fluid is returned to the surface as brine.

(fff) "Sonar survey" means using an acoustic wave tool to measure the internal dimensions of a cavern.

(ggg) "Storage cavern" and "cavern" mean the underground cavity developed by solution mining and used to store product.

(hhh) "Storage facility" and "facility" mean the acreage associated with the storage of product in bedded salt, including the cavern system and each brine pond.

(iii) "Storage well" means a type of well used for the injection or withdrawal of product into or out of a storage cavern.

(jjj) "Subsidence" means ground movement resulting from natural phenomena.

(kkk) "Surface casing" means casing placed into the borehole and cemented into place for the purpose of well control and to protect groundwater from damage during drilling and storage operations.

(lll) "Top salt" means the shallowest vertical depth at which bedded salt is identified.

(mmm) "Underground communication" means the movement of fluid by a number of methods, including through porous or permeable rock, man-made conduits in the salt, annular movement, or casing leaks.

(nnn) "Underground injection control well" means a type of well used to inject fluids underground that is regulated by the department.

(ooo) "Usable water formation" means an aquifer or any portion of the aquifer that meets any of the following criteria:

- (1) Supplies any public water system;
- (2) contains a supply of groundwater that is sufficient to supply a public water system and currently supplies drinking water for human consumption; or
- (3) contains less than 10,000 mg/L total dissolved solids and is not an exempted aquifer.

(ppp) "Variance" means the secretary's written approval authorizing an alternative action to the requirements of this article of the department's regulations or the standards adopted by this article of the department's regulations and incorporated into the permit.

(qqq) "Water well" means a type of well intended to be used for the location, diversion, artificial recharge, or acquisition of groundwater.

(rrr) "Web thickness" means the closest distance between two storage caverns based on the most recent sonar survey for each cavern.

(sss) "Well" means a bored, drilled, or driven shaft with a depth greater than the largest surface dimension.

(ttt) "Wellhead" means an assemblage of base plates, spools, crosses, valves, and other equipment placed on the surface casing or intermediate casing to control flow.

(uuu) "Workover" means the process of performing maintenance or remedial treatments on a storage well. A workover typically involves removing or replacing some or all of the brine string.

(Authorized by K.S.A. 65-171d; implementing K.S.A. 2022 Supp. 55-1,117 and K.S.A. 65-171d; effective, T-28-4-1-03, April 1, 2003; effective Aug. 8, 2003; amended Aug. 9, 2024.)

***** Authenticated Kansas Administrative Regulation *****