Kansas Administrative Regulations

Kansas Corporation Commission

Article 3.—Production and Conservation of Oil and Gas

82-3-1214. Long-term monitoring, measurement, and testing for cavern storage facilities and cavern storage wells.

(a) Each operator shall perform long-term monitoring, measurement, and testing on any cavern storage facility and cavern storage well pursuant to a long-term monitoring, measurement, and testing plan signed by a licensed professional engineer, a licensed professional geologist, and a licensed professional land surveyor. The operator shall submit a long-term monitoring, measurement, and testing plan that includes the information required by, and demonstrates compliance with, subsections (b) through (n) and includes the information specified in this subsection.

(1) Each operator shall determine the thickness of the salt roof for each cavern storage well with a gamma ray and density log.

(2) Each operator shall demonstrate that each cavern storage well has internal mechanical integrity by performing a nitrogen-brine interface test, liquid-brine interface test, hydraulic casing test, or storage well and cavern pressure test. If the well is constructed with tubing and a packer, the operator may demonstrate internal mechanical integrity by performing a pressure test of the production tubing and production casing annulus.

(3) Each operator shall demonstrate that all cavern storage wells and all caverns have external mechanical integrity by performing a nitrogen-brine interface test, liquid-brine interface test, or storage well and cavern pressure test.

(4) The operator shall evaluate the cement outside the production casing with a cement evaluation log verifying that the cement is adequately bonded, including any innermost casing or liner that extends the entire length of the production casing.

(5) Each operator shall meet the long-term monitoring, measurement, and testing requirements in paragraphs (a)(1), (a)(2), (a)(3), and (a)(4) according to the following:

(A) At least once each five years;

(B) before first fill operations commence;

(C) after first fill operations have been completed;

(D) after any workover involving production casing cemented in the bedded salt formation or the innermost casing or liner that extends the entire length of the production casing;

(E) after converting the storage well to plugging monitoring status;

(F) before commencing plugging operations, if the most recent tests or logs were not performed within the previous five years; and

(G) whenever required by the director, if the director determines that it is necessary to protect public safety, usable water, or soil.

(6) Each operator shall monitor the cavern's storage capacity and geometry with a sonar survey according to the following:

(A) Before first fill operations commence;

(B) after any storage well is converted to plugging-monitoring status;

(C) before plugging the storage well, if the sonar survey was not performed within the previous five years; and

(D) whenever required by the director, if the director determines that it is necessary to protect public safety, usable water, or soil.

(7) Each operator shall evaluate the production casing set and cemented in the bedded salt formation or the innermost casing or liner that extends the entire length of the production casing with a magnetic flux log if the conservation division determines that it is necessary to protect public safety, usable water, or soil.

(8) Each operator shall demonstrate every two years that surface ground subsidence is not occurring at the storage facility by performing a land survey at each storage well until the storage facility is abandoned.

(b) Each operator performing a nitrogen-brine mechanical integrity test to demonstrate internal or external mechanical integrity shall ensure that the test is witnessed by a licensed professional engineer and shall use a pressure for the nitrogen-brine test pressure that is equal to the maximum allowable operating pressure.

(1) The cavern storage well shall be considered to have internal mechanical integrity if the calculated nitrogen leak rate is less than 100 barrels of nitrogen per year.

(2) The cavern storage well and cavern shall be considered to have external mechanical integrity if the calculated nitrogen leak rate is less than 1,000 barrels of nitrogen per year.

(c)(1) Each operator performing a liquid-brine mechanical integrity test to demonstrate internal or external mechanical integrity shall ensure that the test is witnessed by a licensed professional engineer and shall meet the following requirements:

(A) Use a type of liquid that allows verification of mechanical integrity without harming the cavern storage well or cavern storage facility; and

(B) use a pressure for the liquid test pressure that is equal to the maximum allowable operating pressure.

(2) The cavern storage well shall be considered to have internal mechanical integrity if the calculated liquid leak rate is less than 10 barrels of liquid per year.

(3) The cavern storage well shall be considered to have external mechanical integrity if the calculated liquid leak rate is less than 100 barrels of liquid per year.

(d) Each operator performing a storage well and cavern pressure test shall test the well at the maximum allowable operating pressure. The operator shall first monitor the conditions at the wellhead until the pressure variations at the wellhead can reasonably be shown to correlate with ambient temperature changes. Then the operator shall monitor the surface shut-in pressure for at least 24 hours. The well shall be considered to have internal and external mechanical integrity if the pressure does not vary by more than three percent, with adjustments made to the pressure for changes in temperature.

(e) Each operator performing a hydraulic casing test shall meet the following requirements:

(1) The operator shall set a retrievable bridge plug or packer in the storage well within 25 feet of the top of the cavern.

(2) The operator shall test the storage well at the maximum allowable operating pressure. The operator shall test the well for at least 30 minutes, and the well shall be considered to have internal mechanical integrity if the pressure does not decrease by more than 10 percent.

(f) Any operator may perform a pressure test of the production tubing and production casing annulus if the well is constructed with tubing and a packer. The operator performing a pressure test of the production tubing and production casing annulus shall use a minimum fluid pressure of 300 psig 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.

(g) Any operator may use an alternative method for the long-term monitoring, measurement, and testing activity if approved by the director. The alternative method shall be approved by the director if this method will allow the conservation division to verify mechanical integrity according to the following information submitted by the operator:

(1) A description of the alternate method and the theory for its operation;

(2) a description of the conditions at the cavern storage well that are necessary for the use of the alternate method;

(3) specifications of the logging tool, survey, or test, including the tool dimensions, maximum temperature and pressure rating, recommended logging speed, approximate image resolution, and casing or hole size range;

(4) the procedure for interpreting the results of the alternate method; and

(5) an interpretation of the results after the alternate method has been used.

(h) No operator shall inject air into or withdraw air from a cavern storage well that fails to demonstrate mechanical integrity through the performance of any test or log in subsections (a) through (g) until the well has been repaired, if necessary, and successfully retested.

(i) Each operator shall submit the long-term monitoring, measurement, and testing plan at least 60 days before commencing any long-term monitoring, measurement, and testing activity. Each operator shall ensure that an employee witnesses any activity. The operator shall schedule the activity to facilitate witnessing by a conservation division agent.

(j) Each operator shall submit a summary, including all supporting documents, of the long-term monitoring, measurement, or testing activity to the conservation division within 30 days after completion.

(k) On or before April 1 of each year, each operator shall submit a report and all supporting documents to the conservation division, on a form provided by the conservation division, listing any activity in subsection (a) performed during the previous calendar year at any storage well.

(l) Each operator shall monitor, measure, sample, and report water quality at any shallow monitoring well and deep monitoring well in a manner that allows the director to determine whether groundwater has been affected by any spill or loss of containment.

(m) Each operator shall monitor, measure, and sample at any leak detector in a manner that allows the director to determine that leaks are not occurring.

(n) Each operator shall ensure that a professional land surveyor performs a land survey for each cavern storage well every two years, pursuant to the following requirements:

(1) The operator shall report to the conservation division the method used in performing the elevation survey.

(2) The operator shall report to the conservation division the criteria used to establish any monument, benchmark, and wellhead survey point.

(3) The operator shall monitor subsidence by performing level measurements with an accuracy of .01 foot. The operator shall report changes in excess of .1 foot to the conservation division within 24 hours of actual knowledge.

(4) The operator shall not change any benchmark without approval by the director. If a benchmark is changed, the operator shall report the elevation change from the previous benchmark to the conservation division.

(5) The operator shall report the elevation to the conservation division before and after any wellhead work that results in a change in the survey point at the wellhead.

(6) The operator shall submit the survey reports, including certified and stamped field notes, to the conservation division within 90 days after completion of the survey. (Authorized by and implementing K.S.A. 2011 Supp. 66-1274; effective Dec. 21, 2012.)