REQUIREMENTS FOR UNDERGROUND GAS STORAGE PROJECTS

TEXT OF PROPOSED REGULATIONS

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CHAPTER 4. DEVELOPMENT, REGULATION, AND CONSERVATION OF OIL AND GAS RESOURCES

Subchapter 1. Onshore Well Regulations

Article 3. Requirements

1724.9. Underground Gas Storage Projects

~~The data required by the Division prior to approval of a gas storage project include all applicable items listed in Section 1724.7(a) through (e), and the following, where applicable:~~

(a) For all underground gas storage projects, the operator shall provide the data required under Section 1724.7, as applicable, and the operator shall comply with the requirements of Section 1724.10, as applicable. In addition to the data required under Section 1724.7, the operator of an underground gas storage project shall provide the Division with the following:

(1) ~~(a)~~ Characteristics, fluid chemistry, petrophysical properties, mechanical properties, and maps of the cap rock, ~~such as~~ including areal extent, ~~average~~ isopach thickness, structure contour, formation fracture gradient, primary and secondary permeability, lithology and lithologic variation, ~~and~~ threshold pressure, and locations and characteristics of faults and fractures.

(2) ~~(b)~~ Oil and gas reserves of storage zones prior to start of injection, including calculations.

(3) ~~(c)~~ List of proposed surface and subsurface safety devices, tests, and precautions to be taken to ensure safety of the project.

(4) ~~(d)~~ Proposed waste water disposal method.

(b) The Project Approval Letter for an underground gas storage project shall state the maximum and minimum reservoir pressure and include data and calculations supporting the bases for the pressure limits. The pressure limits shall account for the following:

(1) The pressure required to inject intended gas volumes, particularly at total inventory, shall not exceed the design pressure limits of the reservoir, wells, wellheads, piping or associated facilities.

(2) The minimum reservoir pressure shall not be designed less than historic minimum operated pressure unless reservoir geo-mechanical competency can be demonstrated to the Division's satisfaction.

(c) In addition to the mechanical integrity testing requirements under 1724.10(j), when a well that is part of an underground gas storage project is not being used for production the operator shall monitor for presence of annular gas by measuring and recording annular pressure and annular gas flow at least once a day. The operator shall evaluate any anomalous annular gas occurrence and report it to the Division. The operator shall begin complying with this requirement within one month of the effective date of this section.

(d) Where installed, the operator of an underground gas storage project shall function test all surface and subsurface safety valve systems within three months of the effective date of this section, and at least every six months after that. The tests shall be conducted in accordance with manufacturer's recommendations to confirm operational integrity and mitigate any integrity isolation findings. The appropriate district office shall be notified at least 48 hours before performing testing so that Division staff may witness the operations, and documentation of the testing shall be maintained and available for Division review. A closed storage well safety valve system shall be manually re-opened at the site of the valve after an inspection and not opened from a remote location. Within 90 days of finding that a surface or subsurface safety valve is inoperable, the operator shall either repair or remove the safety valve or temporarily plug the well. A longer timeframe for addressing an inoperable surface or subsurface safety valve may be approved by the Division.

(e) Within 21 days of the effective date of this section, the operator of an underground gas storage project shall submit an inspection and leak detection protocol to the Division for review and approval. The protocol shall include inspection of the wellhead assembly and attached pipelines for each of the wells used in an underground gas storage project, and the surrounding area within a 100' radius of the wellhead of each of the wells used in an underground gas storage project. The inspection protocol shall provide for inspection at least once a day, employing effective gas leak detection technology such as infrared imaging. The operator's selection and usage of gas leak detection technology shall take into consideration detection limits, remote detection of difficult to access locations, response time, reproducibility, accuracy, data transfer capabilities, distance from source, background lighting conditions, geography, and meteorology. The Division will consult with the California Air Resources Board when reviewing an inspection and leak detection protocol submitted under this subdivision.

(f) Within three months of the effective date of this section, and annually thereafter, the operator of an underground gas storage project shall test the operation of the master valve and wellhead pipeline isolation valve for proper function and verify ability to isolate the well. The operator shall submit documentation of the results of testing done under this subdivision within 10 days of completing the testing, but shall immediately notify the Division if testing indicates a lack of function.

(g) Within six months of the effective date of this section, the operator of an underground gas storage project shall submit a Risk Management Plan to the Division for review and approval. The Risk Management Plan shall identify potential threats and hazards to well and reservoir integrity; assess risks based on potential severity and estimated likelihood of occurrence of each threat; identify the preventive and monitoring processes employed to mitigate the risk associated with each threat; and specify a process for periodic review and reassessment of the risk assessment processes. The Risk Management Plan shall specify a schedule for submission of risk assessment results to the Division. All Risk Management Plans shall include at least the following risk assessment and prevention protocols:

(1) Ongoing verification and demonstration of the mechanical integrity of each well used in the underground gas storage project and each well that intersects the reservoir used for gas storage. The protocols for verifying and demonstrating well integrity shall not be limited to compliance with the mechanical integrity testing requirements under Section 1724.10(j), and shall include consideration of the age, construction, and operation of each well.

(2) Corrosion monitoring and evaluation including the following:

(A) Evaluation of tubular integrity and identification of defects caused by corrosion or other chemical or mechanical damage;

(B) Corrosion potential of wellbore produced fluids and solids, including the impact of operating pressure on the corrosion potential of wellbore fluids and analysis of partial pressures;

(C) Corrosion potential of annular and packer fluid;
(D) Corrosion potential of current flows associated with cathodic protection systems;
(E) Corrosion potential of all formation fluids, including fluids in formations above the storage zone;
(F) Corrosion potential of uncemented casing annuli; and
(G) Corrosion potential of pipelines and other production facilities attendant to the underground gas storage project.

(3) Protocols for evaluation of wells and attendant production facilities that include monitoring of casing pressure changes at the wellhead, analysis of facility flow erosion, hydrate potential, individual facility component capacity and fluid disposal capability at intended gas and liquid rates and pressures, and analysis of the specific impacts that the intended operating pressure range could have on the corrosive potential of fluids in the system.

(4) Ongoing verification and demonstration of the integrity of the reservoir including demonstration that reservoir integrity will not be adversely impacted by operating conditions.

(5) Identification of potential threats and hazards associated with operation of the underground gas storage project including the following:
(A) Evaluation of likelihood of events and consequences related to the events;
(B) Determination of risk ranking to develop preventive and mitigating measures to monitor or reduce risk;
(C) Documentation of risk evaluation and description of the basis for selection of preventive and mitigating measures;
(D) Provision for data feedback and validation; and
(E) Regular, periodic risk assessment reviews to update information and evaluate risk management effectiveness.

(6) Prioritization of risk mitigation efforts based on potential severity and estimated likelihood of occurrence of each threat.

AUTHORITY:
Note: Authority cited: Sections 3013 and 3106, Public Resources Code. Reference: Section 3106, 3220 and 3403.5 Public Resources Code.