

STATE OF ALASKA
ALASKA OIL AND GAS CONSERVATION COMMISSION
333 West 7th Avenue, Suite 100
Anchorage Alaska 99501

Re: THE APPLICATION OF Cook Inlet Natural Gas Storage Alaska, LLC for an amendment to Storage Injection Order No. 9 to increase the maximum allowable reservoir pressure.) Docket SIO-14-001
) Storage Injection Order No. 9A
)
) Cannery Loop Field
) Cannery Loop Unit
) Sterling C Gas Storage Pool
)
) June 4, 2014

IT APPEARING THAT:

1. By application dated March 25, 2014, Cook Inlet Natural Gas Storage Alaska, LLC (CINGSA) requested amendment of Rule 7 of Storage Injection Order No. 9 (SIO 9) to authorize an increase in the maximum allowable reservoir pressure for the Sterling C Gas Storage Pool in the Cannery Loop Unit to 2,200 psi from 1,700 psi.
2. On March 28, 2014, pursuant to 20 AAC 25.540, the Alaska Oil and Gas Conservation Commission (AOGCC) published in the Anchorage Daily News notice of opportunity for public hearing on May 6, 2014.
3. On April 11, 2014, Kenai Landing, Inc. (KLI) submitted comments and objections to CINGSA's application.
4. On April 18, 2014, CINGSA submitted an addendum to remove extraneous figures and update the remaining figures in order to include March 2014 gas storage data.
5. On April 23, 2014, Homer Electric Association, Inc. submitted comments that supported CINGSA's application.
6. On April 25, 2014, Chugach Electric Association, Inc. submitted comments that supported CINGSA's application.
7. The AOGCC held a public hearing on May 6, 2014, at 333 West 7th Avenue, Suite 100, Anchorage, Alaska 99501. Testimony was presented by CINGSA and KLI. CINGSA also submitted written exhibits. KLI submitted two lists of questions that it wished the AOGCC to ask CINGSA.
8. On May 8, 2014, CINGSA submitted additional information to respond to AOGCC questions propounded during the hearing and a request for information from an AOGCC staff member.
9. On May 14, 2014, KLI submitted comments related to the May 8, 2014 submittal by CINGSA.

FINDINGS:

1. Rule 7 of SIO 9 established a maximum allowable reservoir pressure of 1,700 psi for the Sterling C Gas Storage Pool within the Cannery Loop Unit.
2. During drilling of Cannery Loop Unit No. S-1 (CLU S-1), CINGSA encountered a pocket of gas in the Sterling C1c sand that was at or near initial reservoir pressure of approximately 2,200 psi. Later analysis determined that this pocket contained 14.5 to 18.5 BCF of gas and that approximately 5 BCF of this gas cross-flowed into reservoir sands that were open to the well.
3. The cross-flow of gas from the Sterling C1c sand in the CLU S-1 well to other reservoir sands elevated the average reservoir pressure above what storage operations alone would have achieved, thereby decreasing storage capacity at the 1,700 psi reservoir pressure limit prescribed by Rule 7 of SIO 9.
4. Leak-off tests¹ for the five gas storage wells within the Cannery Loop Unit ranged from 3,041 psi to 3,983 psi. Leak-off tests for three additional wells that penetrated the storage pool, but were not completed in it, ranged from 3,362 psi to 3,427 psi. The leak-off test average for all eight wells is 3,507 psi.
5. The maximum allowable pressure for the surface equipment of the gas storage wells is 2,180 psi, which limits the maximum downhole pressure during injection operations² to approximately 2,450 psi.
6. The lowest leak-off test result for any well that has penetrated the gas storage pool is 3,041 psi, a value that is more than 800 psi above the proposed maximum allowable reservoir pressure of 2,200 psi and nearly 600 psi higher than the maximum downhole injection pressure of 2,450 psi.
7. KLI's representatives testified that KLI does not object to CINGSA's proposal so long as native gas is not produced.

CONCLUSIONS:

Based upon the evidence and testimony presented, the AOGCC concludes as follows:

1. The working gas storage capacity of the Sterling C Gas Pool within the Cannery Loop Unit is substantially less than the original design capacity due to encountering a large pocket of gas at native pressure.
2. The lowest leak-off test result for any well that has penetrated the gas storage pool (3,041 psi) indicates that CINGSA's proposed increase in maximum allowable reservoir pressure would not affect containment by initiating fractures. Injected gas will be confined to the Sterling C Gas Storage Pool.

NOW THEREFORE IT IS ORDERED that Rule 7 of SIO 9 is superseded as set forth below. All other provisions of SIO 9 remain in effect. The following rules, in addition to statewide requirements under 20 AAC 25, apply to the underground storage of hydrocarbons by injection operations in the proposed Sterling C Gas Storage Pool:

¹ Leak-off tests measure the pressure necessary to initiate fractures within a formation.

² Also termed "sand-face" pressure

Seward Meridian Township 05N, Range 11W

SW1/4-SW1/4 of Section 4
W1/2-SE1/4-SW1/4 of Section 4
S3/4-NW1/4-SW1/4 of Section 4
S1/2-SE1/4 of Section 5
S3/4-NE1/4-SE1/4 of Section 5
S1/2-NW1/4-SE1/4 of Section 5
S1/2-NE1/4-NW1/4-SE1/4 of Section 5
E1/2-SE1/4-SW1/4 of Section 5
SE1/4-NE1/4-SW1/4 of Section 5
E1/2-E1/2-SE1/4 of Section 7
E1/2 of Section 8
SW1/4 of Section 8
S1/2-NW1/4 of Section 8
E1/2-NE1/4-NW1/4 of Section 8
SW1/4-NE1/4-NW1/4 of Section 8
SE1/4-NW1/4-NW1/4 of Section 8
W3/4-NW1/4 of Section 9
N2-NW1/4-SW1/4 of Section 9
SW1/4-NW1/4-SW1/4 of Section 9
NW1/4-SW1/4-SW1/4 of Section 9
N3/4-W1/2-NE1/4 of Section 17
N3/4-W1/2-E1/2-NE1/4 of Section 17
N3/4-E1/2-NW1/4 of Section 17
NW1/4-NW1/4 of Section 17
NE1/4-SW1/4-NW1/4 of Section 17
N1/2-NW1/4-SW1/4-NW1/4 of Section 17
NE1/4-NE1/4-NE1/4 of Section 18
NE1/4-SE1/4-NE1/4-NE1/4 of Section 18

RULE 1: STORAGE INJECTION (Source: SIO 9)

The AOGCC approves injection for storage of natural gas in the CLU within the interval identified in Rule 2 (below), which constitutes a gas storage pool named the Sterling C Gas Storage Pool.

RULE 2: POOL DEFINITION (Source: SIO 9)

The Sterling C Gas Storage Pool consists of the interval within the Affected Area that is common to, and correlating with, the measured depths from 6690' to 6945' in well CLU No. 8.

RULE 3: GAS DETECTION (Source: SIO 9)

CINGSA shall install, operate and maintain a gas detection and alarm system in all buildings located within 50 feet of the surface location of well KU 13-08, unless prohibited from doing so by either the owner or the lessee of the land upon which KU13-08 is located.

RULE 4: WELL REMEDIATION (Source: SIO 9)

CINGSA shall demonstrate that any wells in the pool meet all AOGCC requirements for hydrocarbon production wells, or that the wells have been suspended or abandoned in accordance with applicable requirements.

RULE 5: DEMONSTRATION OF MECHANICAL INTEGRITY (Source: SIO 9)

The mechanical integrity of proposed storage injection wells and existing pool wells must be demonstrated before injection begins, and before returning any well to service following a workover affecting mechanical integrity. An AOGCC-witnessed mechanical integrity test must be performed after injection is commenced for the first time in any well, to be scheduled when injection conditions (temperature, pressure, rate, etc.) have stabilized. Subsequent tests must be performed on each storage injection well at least once every four years thereafter. The AOGCC shall be notified at least 24 hours in advance of a test. Unless an alternate means is approved by the AOGCC, mechanical integrity must be demonstrated by a tubing/casing annulus pressure test using a surface pressure of 1,500 psi or 0.25 psi/ft multiplied by the vertical depth of the packer, whichever is greater. Stabilizing pressure that does not change more than 10 percent during a 30-minute period is required for a valid test. Results of all mechanical integrity tests must be provided to the AOGCC.

RULE 6: WELL INTEGRITY FAILURE AND CONFINEMENT (Source: SIO 9)

The operator shall maintain a continuous data acquisition system to record flow rates and pressures on all active wells in the field. Field personnel must perform daily visual inspections and maintenance of all active wells and production equipment. Whenever any pressure communication, leakage or lack of injection zone isolation is indicated by injection rates, operating pressure observations, tests, surveys, logs, or other evidence, the operator shall notify the AOGCC by the next business day and submit a plan of corrective action on a Form 10-403 for AOGCC approval. The operator shall immediately shut in the well if continued operation would be unsafe or would threaten contamination of freshwater, or if so directed by the AOGCC.

RULE 7: MAXIMUM RESERVOIR PRESSURE (Revised this order)

The reservoir pressure for this project shall be limited to a maximum of 2,200 psi.

RULE 8: PERFORMANCE REPORTING (Source SIO 9, Revised: SIO 9.001)

The Operator shall report disposition of production and injection as required by 20 AAC 25.228, 20 AAC 25.230, and 20 AAC 25.235. An annual report evaluating the performance of the storage injection operation must be provided to the AOGCC no later than May 15. The report shall include material balance calculations of the gas production and injection volumes and a summary of well performance data to provide assurance of continued reservoir confinement of the gas storage volumes. Additional data collection and analysis will be based on a review of the operating performance and could include temperature surveys, pressure surveys, and production logs.

RULE 9: OTHER CONDITIONS (Source: SIO 9)

- a. It is a condition of this authorization that the operator complies with all applicable AOGCC regulations.

- b. The AOGCC may suspend, revoke, or modify this authorization if injected fluids fail to be confined within the designated injection strata, or for any other violation of the law.
- c. As provided in 20 AAC 25.252(j), if storage operations are not begun within 24 months after the date of this Order, the injection approval shall expire unless an application for extension has been approved by the AOGCC.

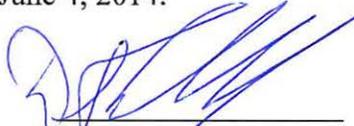
RULE 10: ADMINISTRATIVE ACTIONS (Source: SIO 9)

Unless notice and public hearing are otherwise required, the AOGCC may administratively waive or amend any rule stated above as long as the change does not promote waste or jeopardize correlative rights, is based on sound engineering and geoscience principles, and will not result in fluid movement outside of the authorized injection zone.

DONE at Anchorage, Alaska and dated June 4, 2014.



Cathy P. Foerster
Chair, Commissioner


Daniel T. Seamont, Jr.
Commissioner

RECONSIDERATION AND APPEAL NOTICE

As provided in AS 31.05.080(a), within 20 days after written notice of the entry of this order or decision, or such further time as the AOGCC grants for good cause shown, a person affected by it may file with the AOGCC an application for reconsideration of the matter determined by it. If the notice was mailed, then the period of time shall be 23 days. An application for reconsideration must set out the respect in which the order or decision is believed to be erroneous.

The AOGCC shall grant or refuse the application for reconsideration in whole or in part within 10 days after it is filed. Failure to act on it within 10-days is a denial of reconsideration. If the AOGCC denies reconsideration, upon denial, this order or decision and the denial of reconsideration are FINAL and may be appealed to superior court. The appeal MUST be filed within 33 days after the date on which the AOGCC mails, OR 30 days if the AOGCC otherwise distributes, the order or decision denying reconsideration, UNLESS the denial is by inaction, in which case the appeal MUST be filed within 40 days after the date on which the application for reconsideration was filed.

If the AOGCC grants an application for reconsideration, this order or decision does not become final. Rather, the order or decision on reconsideration will be the FINAL order or decision of the AOGCC, and it may be appealed to superior court. That appeal MUST be filed within 33 days after the date on which the AOGCC mails, OR 30 days if the AOGCC otherwise distributes, the order or decision on reconsideration.

In computing a period of time above, the date of the event or default after which the designated period begins to run is not included in the period; the last day of the period is included, unless it falls on a weekend or state holiday, in which event the period runs until 5:00 p.m. on the next day that does not fall on a weekend or state holiday.