

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

Re: THE APPLICATION OF) Storage Injection Order No. 7A
MARATHON OIL COMPANY)
("Marathon") for an order to amend) Kenai Gas Field
Rule 1 of Storage Injection Order No.) Sterling Gas Pool 6
7 to allow for additional gas storage)
injectors, and)
COMMISSION PROPOSAL to correct) May 4, 2007
typographical errors concerning the)
approved storage area, and to amend)
the rules to provide a mechanism for)
the application for and approval of)
additional wells for the purpose of gas)
storage.)

IT APPEARING THAT:

1. By application dated February 19, 2007, Marathon Oil Company ("Marathon") as operator of the Kenai Gas Field, requested the following: (1) that the Alaska Oil and Gas Conservation Commission ("Commission") amend Rule 1 of Storage Injection Order No. 7 ("SIO 7") to allow for additional gas storage injection wells within Sterling Gas Pool 6 of the Kenai Gas Field; and (2) that such additional injection wells be added to SIO 7 by filing a Sundry or Permit to drill.
2. Notice of opportunity for public comment and a hearing was published in the Anchorage Daily News on February 26, 2007 and was re-noticed in the Anchorage Daily News on March 16, 2007 in accordance with 20 AAC 25.540.
3. By letter dated March 9, 2007, Marathon provided an affidavit attesting to its efforts to contact all surface owners with rights overlying the Sterling Gas Pool 6 of the Kenai Gas Field. On March 16, 2007, Marathon provided an affidavit attesting to its additional efforts to contact all such surface owners.
4. Four public comments, one being a written request for a public hearing, were received.
5. A public hearing was held in the Commission's offices at 333 West 7th Avenue, Anchorage, Alaska, at 9:00 AM on April 24, 2007.

FINDINGS:

1. Operator:
Marathon is the sole operator of the Kenai Gas Field, and there are no other operators within one-quarter mile of the boundaries of Sterling Gas Pool 6, of the Kenai Gas Field.
2. Injection Strata:
Sterling Gas Pool 6 is defined in Conservation Order 510 as the accumulation of gas common to and correlative with the measured depth ("MD") interval of 5,250 feet to 5,520 feet in well Kenai Unit ("KU") 21-6
3. Injection Wells:
SIO 7 authorized natural gas storage injection into Sterling Gas Pool 6 at well KU 31-07X. Marathon proposes to convert production well Kenai Unit ("KU") 23X-06 to allow storage injection and production. Marathon anticipates that additional storage wells may be necessary.
4. Notification of Operators and Surface Owners:
Marathon has provided two affidavits showing that it attempted to contact all surface owners within one-quarter mile of the Sterling Gas Pool 6's boundaries, as defined below. The surface owners are the Alaska Department of Natural Resources, Salamatof Native Association, Inc., and numerous private individuals.
5. Description of Operation:
As authorized in SIO 7, Marathon injects natural gas from the Kenai Gas Field and Cannery Loop Unit into Sterling Gas Pool 6 at well KU 31-07X. The operation involves alternating between injection and production, providing gas to meet peak requirements during seasonal high demand periods. SIO 7, Rule 4 provides that the reservoir pressure at Sterling Gas Pool 6 cannot exceed 300 pounds per square inch ("psi").
6. Pool Information:
A description of Sterling Gas Pool 6 is provided in SIO 7, Finding 6.
7. Typographical errors:
Because of a typographical error in the SIO 7 description of the affected area, the township range values were not properly differentiated.

8. Type of Fluid and Source:
Dry natural gas from the Kenai Gas Field and from the Cannery Loop Unit is planned for storage injection.
9. Underground Sources of Drinking Water:
Under 40 CFR 147.102(b)(1)(iii), EPA has exempted Kenai Gas Field aquifers below 1,300 feet true vertical depth (“TVD”).
10. Mechanical Condition of Adjacent Wells:
Marathon reported on gas storage performance at Sterling Gas Pool 6 by letter dated March 2, 2007, in accordance with SIO 7, Rule 5. The total volume of gas injected into Pool 6 between May 8, 2006 (when injection began) and January 31, 2007 was 1,529.155 million standard cubic feet (“mcf”), and the gas produced (including storage and native gas) during this period was 3,067,680 mcf. The approximate reservoir pressure change during the storage and production phases was 23 psi. The maximum reservoir pressure during the injection cycle was 172 psi, which was well below the maximum SIO 7, Rule 4 allowable pressure of 300 psi.
11. Public Comments:
A public request was made for a hearing. The requester submitted comments to the Commission by letter dated March 16, 2007. A total of four individuals provided oral comments by telephone.

Three of the four commenters were contacted by Marathon and the Commission and their concerns were wholly resolved. One of the commenters who called the Commission opposed Marathon’s application to the injection and storage of gas but did not provide written comments or oral testimony.

CONCLUSIONS:

1. The gas storage project meets the requirements of 20 AAC 25.252.
2. All aquifers below 1,300 TVD feet have been exempted by the EPA under 40 CFR 147.102(b)(1)(iii).
3. The gas storage project will be conducted in permeable strata and involves injection at pressures well below the parting pressure of Sterling Gas Pool 6. Proposed injection pressures are not reasonably likely to propagate fractures through the confining interval. Injected fluids will be confined within the appropriate receiving interval by impermeable lithology, cement isolation of the wellbore and appropriate operating conditions.
4. Information provided by Marathon, including logs, cement records and ongoing surveillance data, evidences that Sterling Gas Pool 6 is vertically isolated and

behaves in a predictable, tank-like manner. The SIO 7 rules are adequate to ensure the mechanical integrity and isolation of Sterling Gas Pool 6.

5. An order permitting the underground injection of fluids on an area basis, rather than for each injection well individually, would provide for the efficient administration and surveillance of underground fluid injection operations. 20 AAC 25.460 authorizes the Commission to issue orders governing underground injection operations on an area basis. The gas storage project meets all the requirements of 20 AAC 25.460, and the Commission has considered the cumulative effects of operating additional injection wells.
6. The addition of gas injection wells cycling gas within Sterling Gas Pool 6 for the purpose of storage and production will not impact confinement and will not cause waste, jeopardize correlative rights, endanger freshwater, or impair the ultimate recovery of the resource.
7. The public comments regarding Marathon's request have been addressed.
8. All storage injectors must be constructed in accordance with the requirements of 20 AAC 25.030. In accordance with 20 AAC 252 and 25.412, Marathon must demonstrate that Sterling Gas Pool 6 is isolated to the approved interval.
9. On March 16, 2006, Marathon provided a report on the mechanical condition of each well that penetrates Sterling Gas Pool 6. Marathon found no evidence of pressure communication between the Sterling Gas Pool 6 strata and other strata, but cement bond logs do not exist for all Sterling Gas Pool 6 penetrations. Marathon has been unable to provide well records such as cement bond logs and cement top verifications for some wells that are used to determine isolation of the injection zone in all wells penetrating the confining layer. Accordingly, SIO 7, Rule 3 requires well monitoring of Sterling Gas Pool 6.

Marathon has met all the requirements of SIO 7, Rule 3 mandating a Gas Storage Project Monitoring Program including the installation and operation of an automatic data acquisition system to record the flow rates and pressures of all active wells in the Kenai Gas Field. Data are collected and analyzed continuously at Marathon's Kenai Gas Field office. Operations personnel daily visit all production pads to visually inspect and maintain wells and production equipment.

10. Based on the information Marathon provided, including 46 years of natural gas production history, Sterling Pool 6 appears to be performing as expected, *i.e.*, with tank-like behavior and is vertically isolated from other strata.

NOW, THEREFORE, IT IS ORDERED:

The underground injection of natural gas for storage is authorized in Sterling Gas Pool 6 in the Kenai Gas Field within the affected area, subject to the following rules.

Affected Area: (Seward Meridian)

Township, Range	Section	Portion
T4N, R11W	4	W 1/2 SW 1/4, SW 1/4 NW 1/4
	5, 6, 7, and 8	All
	9	W 1/2 NW 1/4, NW 1/4 SW 1/4
	17	NE 1/4 NE 1/4, W 1/2 NE 1/4, NW 1/4, N 1/2 SW 1/4, SW 1/4 SW 1/4
	18	All
T4N, R12W	1	E 1/2, E 1/2 W 1/2
	12	E 1/2, E 1/2 W 1/2
	13	NE 1/4, E 1/2 NW 1/4, N 1/2, SE 1/4
T5N, R11W	28	W 1/2 SW 1/4
	29	All
	30	E 1/2 NE 1/4, SW 1/4 NE 1/4, SE 1/4, SE 1/4 SW 1/4
	31	E 1/2, SW 1/4, E 1/2 NW 1/4
	32	All
	33	W 1/2 NW 1/4, SE 1/4 NW 1/4, and SW 1/4

RULE 1: STORAGE INJECTION

The underground injection of natural gas for storage is authorized in Sterling Gas Pool 6 within the affected area and into strata that are common to, and correlate with, the interval between the measured depths of 5,250 feet and 5,520 feet in well KU 21-6.

RULE 2: FLUID INJECTION WELLS

The underground injection of fluids must be through a well permitted for drilling as a service well for injection in conformance with 20 AAC 25.005 or permitted for conversion to a service well for injection in conformance with 20 AAC 25.280 and 20 AAC 25.412(e).

RULE 3: DEMONSTRATION OF MECHANICAL INTEGRITY

The mechanical integrity of all gas storage injectors must be demonstrated before injection begins, and before returning a well to service following a workover affecting mechanical integrity. A Commission-witnessed mechanical integrity test must be performed after injection is commenced for the first time in a well. That test must be scheduled when injection conditions *e.g.*, temperature, pressure, flow rate have stabilized. Subsequent tests must be performed at least once every four years. The Commission shall be notified orally and in writing at least 24 hours in advance of any test. Unless another means is approved by the Commission, mechanical integrity must be demonstrated by a tubing/casing annulus pressure test using a surface pressure of 1,500 psi, or by a gradient of 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 in writing to the Commission within 30 days after the test is completed. Results must be readily available for Commission inspection.

RULE 4: WELL INTEGRITY FAILURE AND CONFINEMENT

The operator shall maintain a continuous data acquisition system to record the flow rates and pressures on all active wells in the Kenai Gas 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 changes in injection rates, operating pressure observations, tests, surveys, logs, or other evidence, the operator shall notify the Commission by the next business day and submit a corrective action plan on a Form 10-403 for Commission approval. The operator shall immediately shut in the well if continued operation would be unsafe cause waste or threaten contamination of freshwater, or if so directed by the Commission. The operator shall submit to the Commission a monthly report on daily tubing and casing annuli pressures and injection rates for all wells within the affected area.

RULE 5: Notification of Improper Injection

Injection of fluids other than natural gas without proper authorization is considered improper injection. Upon discovery of such an event, the operator must immediately notify the Commission, provide details of the operation, and propose actions to prevent recurrence. Additionally, notification requirements of any other State or Federal agency remain the operator's responsibility.

RULE 6: MAXIMUM RESERVOIR PRESSURE

The reservoir pressure for the project shall be limited to 300 psi.

RULE 7: PERFORMANCE REPORTING

An annual report evaluating the performance of the storage injection operation must be provided to the Commission no later than March 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 reservoir confinement of the gas storage volumes. Additional data collection and analysis requirements may be imposed by the Commission based on a review of the operating performance. Such data collection requirements could include temperature surveys, pressure surveys, and production logs.

RULE 8: OTHER CONDITIONS

- a. The operator must comply with all applicable provisions of AS 31.05, Commission regulations, and orders, stipulations, and terms of any permits issued by the Commission.
- b. The Commission may suspend, revoke, or modify this authorization if injected gas is not confined to the designated injection strata

RULE 9: ADMINISTRATIVE ACTIONS

Unless notice and public hearing are otherwise required, the Commission 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 the movement of gas outside of the authorized injection zone. The Commission may approve drilling or the conversion of existing wells for the purpose of gas storage by approving permits or sundrys, without notice and public hearing, as long as the requirements of this order are met.

DONE at Anchorage, Alaska, and dated May 4, 2007.



A handwritten signature in black ink, appearing to read "D. T. Seamount, Jr.", written over a horizontal line.

Daniel T. Seamount, Jr., Commissioner
Alaska Oil and Gas Conservation Commission

A handwritten signature in black ink, appearing to read "Cathy Foerster", written over a horizontal line.

Cathy Foerster, Commissioner
Alaska Oil and Gas Conservation Commission

AS 31.05.080 provides that within 20 days after receipt of written notice of the entry of an order, a person affected by it must file with the Commission an application for rehearing. A request for rehearing must be received by 4:30 PM on the 23rd day following the date of the order, or next working day if a holiday or weekend, to be timely filed. The Commission shall grant or refuse the application in whole or in part within 10 days. The Commission can refuse an application by not acting on it within the 10-day period. An affected person has 30 days from the date the Commission refuses the application or mails (or otherwise distributes) an order upon rehearing, both being the final order of the Commission, to appeal the decision to Superior Court. Where a request for rehearing is denied by non-action of the Commission, the 30-day period for appeal to Superior Court runs from the date on which the request is deemed denied (i.e., 10th day after the application for rehearing was filed).