



## Hilcorp Alaska, LLC

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August 16, 2016

Cathy Foerster, Chair  
Alaska Oil and Gas Conservation Commission  
333 West 7<sup>th</sup> Avenue, Suite 100  
Anchorage, Alaska 99501

**RECEIVED**

**AUG 17 2016**

**AOGCC**

RE: Application to Amend Conservation Order 44 (Middle Ground Shoal Field)

Dear Commissioner Foerster:

Hilcorp Alaska, LLC ("Hilcorp"), as Operator of the Middle Ground Shoal Field, hereby requests the Alaska Oil and Gas Conservation Commission ("AOGCC") take action to amend Conservation Order 44 ("CO 44").

The Middle Ground Shoal field has the unique distinction of being the first offshore development in both Cook Inlet and Alaska. Following discovery in 1963, production peaked in 1968 at 43 mbopd. To date, a cumulative 215 mmstbo has been produced field-wide.

Hilcorp acquired the Baker and Dillon Platforms in 2012, but both platforms are currently shut-in. In 2015, Hilcorp acquired two active platforms (A and C) from XTO. Current production from the field is approximately 1900 bopd.

As the sole operator and working interest owner of the Dillon, A, C, and Baker Platforms, Hilcorp is pursuing unitization of the entire Middle Ground Shoal field with the State of Alaska, Department of Natural Resources and is actively evaluating various opportunities to return currently shut-in leases to production.

The proposed amendments to CO 44 are necessary to extend field life, increase ultimately recovery and minimize waste.

### 1.0 Regulatory History of Conservation Order 44

Conservation Order 44 was issued on July 19, 1967. On September 7, 1967, AOGCC issued Conservation Order 53 to expand the affected area of the field. On October 12, 1967, AOGCC issued Conservation Order 54 to correct and finalize the affected area governed by CO 44.

Subsequently, AOGCC issued numerous administrative orders under CO 44, the majority of which approved conversion of producing wells to injectors (or vice versa), authorized well-specific downhole commingling (or injection), or approved drilling, testing and production from wells at tighter intervals than otherwise required by applicable well spacing restrictions. A summary of such administrative order is detailed in Exhibit C.

## **2.0 Proposed Order**

### ***Modification of the Affected Area***

A map of the Affected Area of CO 44 (as amended by Conservation Orders 53 and 54) is provided as **Exhibit A**. This map also illustrates the boundary of Area Injection Orders Nos. 7, 8 and 9.

Hilcorp has filed an application with the Department of Natural Resources to unitize the entire field. As such, Hilcorp respectfully requests the AOGCC to adopt the (pending) boundary of the Middle Ground Shoal Unit as the affected area of CO 44. **See Exhibit B**.

Hilcorp is the sole operator and owner of the entire Middle Ground Shoal Unit, including operations associated with each of the four platforms (Baker, A, C, and Dillon). The State of Alaska is the sole landowner. Utilizing the proposed Middle Ground Shoal Unit boundary is an appropriate method of protecting the associated correlative rights of all affected parties while promoting efficient development of this legacy field.

### ***Rule 1: Well Spacing***

Hilcorp proposes to repeal Rule 1 (“spacing pattern”) in its entirety and replace it with the following language:

There shall be no well spacing restrictions within the Affected Area, except:

- No gas well shall be drilled or completed less than 1,500 feet from the exterior boundary of the Affected Area unless the owner and landowner is the same on both sides of the line.
- No oil well shall be drilled or completed less than 500 feet from the exterior boundary of the Affected Area unless the owner and the landowner is the same on both sides of the line.
- On written request by the Operator, the AOGCC may administratively consider and approve modifications to well spacing when justified.

### ***Rule 2: Pool Designation***

Hilcorp proposes to repeal Rule 2 (“Pool Designation”) in its entirety and replace it with the following language:

- The Middle Ground Shoal Oil Pool shall comprise the oil-bearing intervals common to and correlating with the interval between the measured depth of 5419 feet and 9198 feet in the MGS State 17595-4 (BA-04) well.

- The Middle Ground Shoal Gas Pool shall comprise the gas bearing intervals common to and correlating with the interval between the measured depth of 1459 feet and 7016 feet in the MGS State 18746-1 (common name) well.

This gas pool includes and is comprised of the following three intervals:

- Upper Gas Interval 1459' to 5126' MD (COAL 31 marker).<sup>1</sup>
- Middle Gas Interval: 5126' (COAL 31 marker) to 6437 MD (COAL 41 marker).<sup>2</sup>
- Lower Gas Interval: 6437' (COAL 41 marker) to 7016' MD (Top A marker, coincides with top of the Middle Ground Oil Pool).<sup>3</sup>

### ***Rule 3: Permissible Commingling***

Hilcorp proposes to repeal Rule 3 (“Permissible Commingling”) in its entirety.

At this late stage of the field’s development, consolidation of the field’s original seven oil pools (A through G) and three subsequent commingling groups (A, BCD, EFG) into a single oil pool is necessary to maximize ultimate recovery and therefore prevent waste.

Over the last 50 years, approximately 80% of the field’s recoverable oil reserves have been produced. The field’s regulatory history demonstrates a clear trend towards consolidation of multiple oil pools to promote and enhance ultimate recovery. Full consolidation of field’s oil-bearing formations into a single oil pool will maximize field life, reduce administrative burdens and efficiently promote ultimate recovery.

For similar reasons, Hilcorp requests the AOGCC recognize a single gas pool for the entire Middle Ground Shoal Field. Doing so will promote and enhance ultimate recovery from previously produced intervals (5126’ to 7016’MD in the MGS State 18746-1 well) while promoting efficient exploration and development of the field’s potential gas-bearing zones above and below established production intervals.

### ***Rule 4: Fluid Injection***

Hilcorp proposes to revise Rule 4 to be consistent with the proposed single oil. Doing so will allow injection to be commingled within a single well bore. For reservoir management purposes, and in accordance with good engineering practices, Hilcorp will continue to track and manage injection volumes into historic oil pool designations.

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<sup>1</sup> To date, no production of this interval has occurred, other than unquantified volumes of gas vented during the MGS State 17595-1 blowout well in 1962.

<sup>2</sup> This interval contains known gas with a cumulative production of approximately 16 BSCF and is >60% depleted.

<sup>3</sup> To date, no gas production from this interval has occurred.

***Rule 5: Lease line well***

Hilcorp proposes to repeal Rule 5 in its entirety. This rule is a relic of the field's segmented development history and ownership. Today, Hilcorp owns and operates all leases and associated facilities throughout the entire field. Operating the field as an integrated unit will extend field life and increase ultimate recovery.

***Rule 6: Administrative Approvals***

No proposed changes to Rule 6 are requested at this time.

***Rule 7: Casing and Cementing Requirements***

Hilcorp proposes to repeal Rule 7 in its entirety and replace it with the following language:

- Oil wells shall be completed in accordance with the provisions of 20 AAC 25.240(b).
- Due to significant loss zones previously encountered in the intermediate casing of some gas wells, alternative methods (cement bond log or water flow log) will be considered by the AOGCC on a case-by-case basis as an alternative means to validate zonal isolation.

***Rule 8 (Bottom-hole Pressure Surveys) and Rule 9 (Gas-Oil Ratio Tests)***

Due to field maturity and availability of both current and historic data (e.g., 10-413 and 10-405 submissions) Hilcorp proposes to repeal both Rule 8 (Bottom Hole Pressure Surveys) and Rule 9 (Gas-Oil Ratio Tests) in their entirety.

Should you have any technical questions, please contact Mr. Radu Girbacea at 777-8324 ([rgirbacea@hilcorp.com](mailto:rgirbacea@hilcorp.com)) or James Young, Reservoir Engineer, at 777-8404 ([jyoung@hilcorp.com](mailto:jyoung@hilcorp.com)). At AOGCC's request, we would please to provide a technical briefing.

Sincerely,



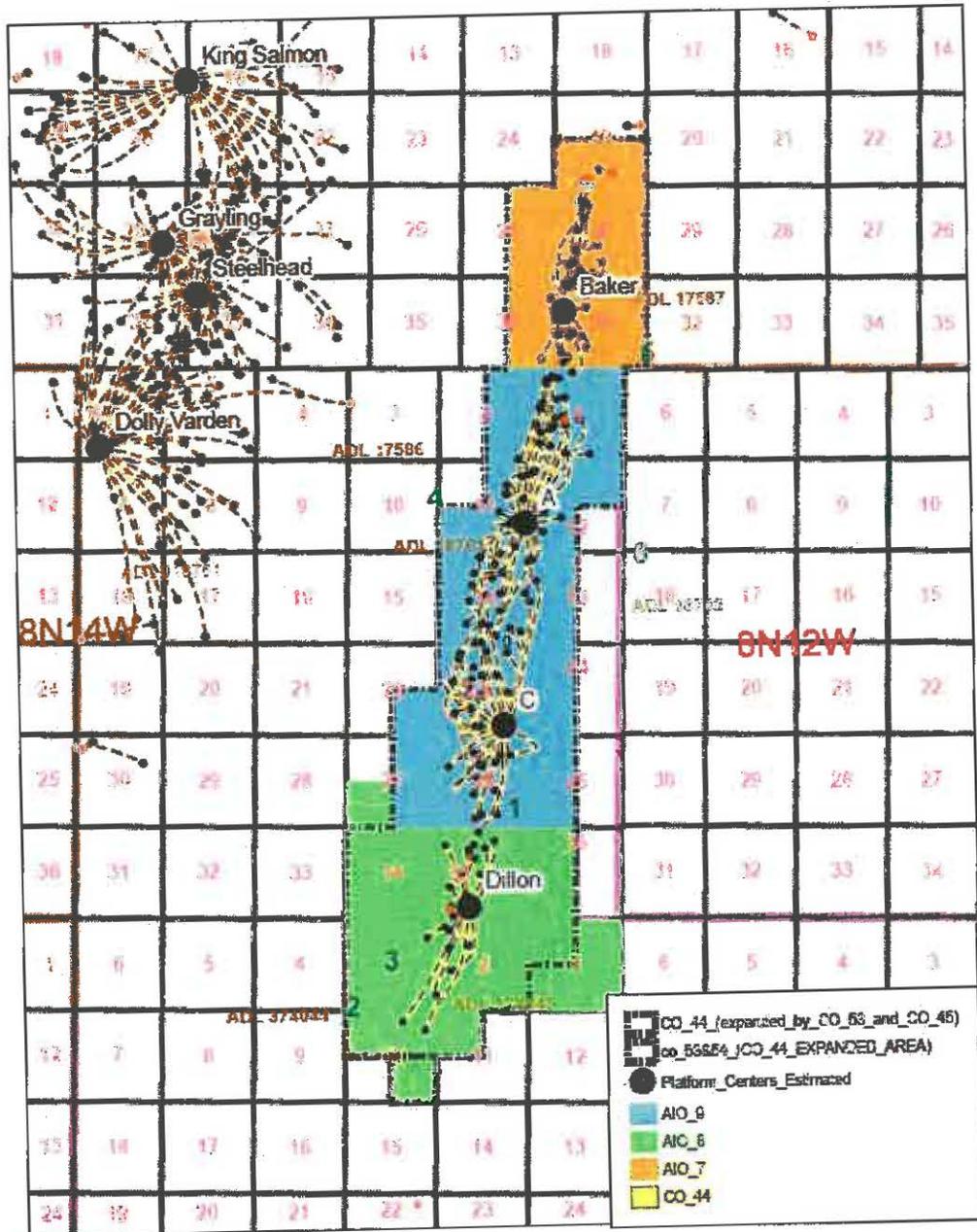
David W. Duffy, Landman  
Hilcorp Alaska, LLC

Enclosures:

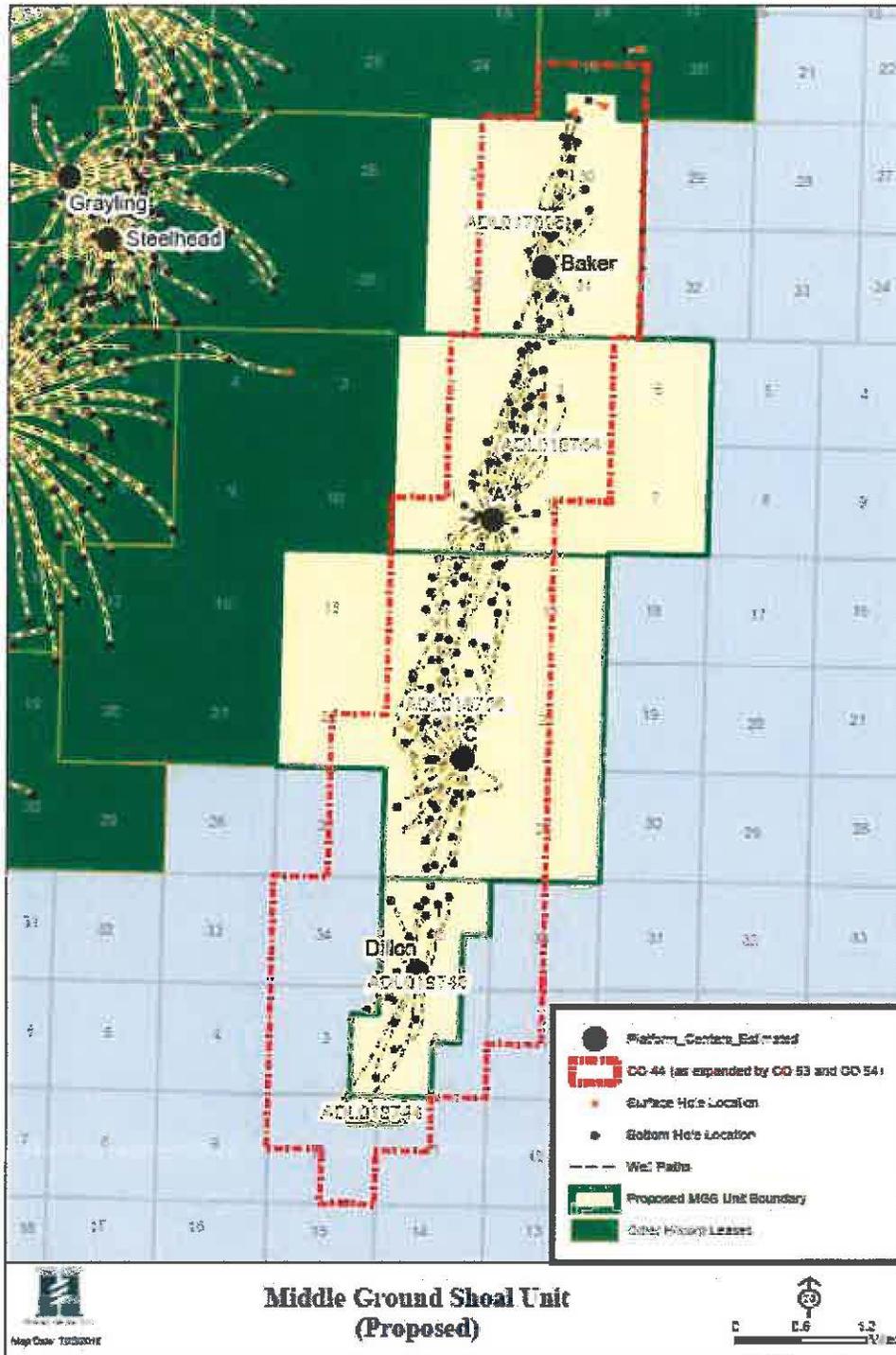
- Exhibit A: Map of Current CO 44, 53 and 54 (with AIOs 7,8 and 9)
- Exhibit B: Proposed Affected Area (to match MGS Unit Boundary)
- Exhibit C: Regulatory History of CO 44

CC: DNR

**Exhibit A:  
 Current Affected Areas  
 CO 44, 53 and 54  
 with AIOs 7, 8 and 9**



**Exhibit B: Proposed Affected Area of Middle Ground Shoal Field / Unit**



### **Exhibit C** **Annotated History of CO 44**

- Conservation Order 44 was issued on July 19, 1967, and thereby expanded and modified the Middle Ground Shoal Field's original pool rules established under Conservation Order 31.
- September 7, 1967: AOGCC issued Conservation Order 53, expanding and the affected area of Conservation Order 44.
- October 12, 1967: AOGCC issued Conservation Order 54, modifying the affected area of Conservation Order 53 and establishing the total affected area governed by CO 44.
- October 19, 1967: OGCC issued AA 44.1, authorizing the conversion of well A-AA-11 from producer to injection status.
- January 3, 1968: AOGCC issued Conservation Order 56, authorizing the commingling of fluids from A with those from the combined BCD with those from either the BCD pools or the EFG pools.
- March 27, 1968: AOGCC issued Conservation Order 62, granting a spacing exception to the commingling provisions of CO 44 and No. 53 for the MGS 17595 No. 4 well to permit the commingling of fluids from the A pool with fluids from EFG pools, subject to certain conditions.
- September 3, 1968: AOGCC issued Conservation Order 66, granting a spacing exception otherwise required by Rule 1(b) of Conservation Order No. 53 and therefore allowing South MGS Unit well No. 11 to be drilled.
- October 22, 1968: AOGCC issued AA 44.2 authorizing comingling of fluids for injection into the A and BCD pools.
- December 31, 1968: AOGCC issued AA 44.3 authorizing conversion of wells A-12-12, A-33-14 and A-11-13 from producing to injection status.
- March 24, 1969: AOGCC issued AA 44.4 authorizing conversion MGS 17595 well Nos. 9, 10, 12, 13 and 14 to injection status.
- April 23, 1969: AOGCC issued AA 44.5 authorizing conversion of MGS Well Nos. 11 and 12 to injection status.
- May 1, 1969: AOGCC issued AA 44.6 approving the granting of an exception to the comingling provision of CO 44 and CO 53 to permit comingling of production from the BCD pools with production from EFG pools.

- May 16, 1969: AOGCC issued AA 44.7 authorizing conversion of A-13-12 from producing to injection status.
- October 15, 1969: AOGCC issued AA 44.8 authorizing the conversion of producing well A-11-1 from producing to injection status.
- December 2, 1969: AOGCC issued AA 44.9 authorizing commingling of production from both the BCD and EFG pools in the MGS 17595 No. 7.
- April 6, 1970: AOGCC issued Conservation Order No. 89, cancelling Conservation Order 62 (permitting commingling of production from the A pool with the EFG pools in the MGS Well No. 4) and allowing commingling of production from the same pools under different requirements.
- July 8, 1970: AOGCC issued AA 44.10 authorizing conversion of MGS Well No. 2 from producer to injection status in the F and G pools.
- January 29, 1971: AOGCC issued AA 44.11 authorizing re-injection of produced water into field water injection wells.
- July 14, 1971: AOGCC issued AA 44.12 authorizing conversion of well A-32-11 from producer to water injection status.
- March 15, 1971: AOGCC issued Conservation Order No. 99, allowing semiannual production tests for the MGS 17595 Nos. 4 and 7 by measuring the proportionate amount of fluid being produced from the commingled A and EFG pools by means of spinner survey.
- March 21, 1973: AOGCC issued AA 44.13 authorizing conversion of MGS 17595 No. 4 from producer to water injection status.
- March 21, 1973: AOGCC issued AA 44.14 authorizing commingling of production from the A pool with the BCD pools in the wellbore of MGS 17595 Well No. 6.
- March 21, 1973: AOGCC issued AA 44.15 authorizing use of spinner surveys for semi-annual production tests in the MGS 17595 Well No. 6.
- May 3, 1973: AOGCC issued a spacing exception under AA 44.16 to authorize drilling of well C-24-14 (injector).
- May 3, 1973: AOGCC issued a spacing exception under AA 44.17 to authorize drilling of well C-44-14 (injector).

- December 21, 1973: AOGCC issued a spacing exception under AA 44.18 to authorize the drilling of well A-24-01 (injector).
- October 25, 1974, AOGCC issued AA 44.19 authorizing the commingling of production from the BCD and EFG oil pools within the wellbore of MGS 17595 well No. 7.
- April 9, 1975: AOGCC issued AA 44.20 authorizing the commingling of production from the BCD and EFG oil pools within the wellbore of MGS 17595 No. 5.
- July 15, 1975: AOGCC issued AA 44.21 authorizing the re-drilling of well C-24-14-RD to improve the drainage efficiency of the water flood project and increase total oil recovery from the field.
- August 20, 1975: AOGCC issued a spacing exception under AA 44.22 to authorize the drilling of the South MGS Unit No. 13.
- October 22, 1976: AOGCC issued a spacing exception under AA 44.23 to authorize the re-drilling of MGS 17595 No. 9.
- November 10, 1976: AOGCC issued a spacing exception under AA 44.24 to authorize the re-drilling of well A-34-14-RD.
- March 24, 1977: AOGCC issued a spacing exception under AA 44.25 to authorize drilling of MGS 17595 No. 16.
- June 2, 1977: AOGCC issued a spacing exception under AA 44.26 to authorize re-entry into the surface casing of a water source well for recompletion as an oil producer.
- July 8, 1977: AOGCC issued a spacing exception under AA 44.27 to authorize the drilling MGS 17595 No. 15.
- October 7, 1977: AOGCC issued a spacing exception under AA 44.28 to authorize the drilling of well A-12-1.
- November 8, 1977: AOGCC issued a spacing exception under AA. 44.29 to authorize the re-drilling of 17595 No. 8.
- December 13, 1977: AOGCC issued a spacing exception under AA 44.30 to authorize the drilling of well C-44-14-RD.
- March 6, 1978: AOGCC issued a spacing exception under AA 44.31 to authorize the re-drilling of well C-42-23 RD.

- June 19, 1978: AOGCC issued a spacing exception under AA 44.32 to authorize the re-drilling of MGS 17595 No. 8.
- September 10, 1979: AOGCC issued a spacing exception under AA 44.33 to authorize the re-drilling of well C-24-26.
- February 28, 1980: AOGC issued Conservation Order 163, thereby exempting the well A-14-01 well from the requirements of Title 11, AAC 22.240 for the productive life of the well, and allowing this well to serve as a gas supply well for the field.
- September 1, 1981: AOGCC issued Conservation Order No. 176, thereby exempting drilling rigs from specific requirements of 20 AAC 25.035(b)(1) which require the equivalent of a six-inch line with at least two lines venting in different directions. A system with a minimum four-inch diverter flowline to a degasser and vented by a minimum four-inch line at the derrickman's position or the crown was approved.
- January 10, 1983: AOGCC issued a spacing exception under AA 44.34 to authorizing the drilling of MGS 17595 No. 25.
- July 11, 1983: AOGCC issued a spacing exception under AA 44.35 authorizing the drilling of well A-12A-1.
- July 20, 1983: AOGCC issued a spacing exception under AA 44.36 authorizing the drilling of MGS 17595 No. 27.
- January 17, 1984: AOGCC issued a spacing exception under AA 44.37 authorizing drilling of MGS 17595 No. 23.
- July 31, 1984: AOGCC issued a spacing exception under AA 44.38 authorizing the re-drilling well 7595 No. 27 well.
- October 19, 1984: AOGCC issued a spacing exception under AA 44.39 authorizing the drilling of well A-34-11.
- October 30, 1987: AOGCC issued AA 44.40 authorizing commingling of production from the BCD and oil pools in the wellbore of MGS 17595 No. 27.
- August 23, 1988: AOGCC issued a spacing exception under AA 44.41 authorizing the re-drilling of well C-13-23.
- January 29, 1990: AOGCC issued a spacing exception under AA 44.42 authorizing the drilling of well C-12-23.
- May 22, 1990: AOGCC issued a spacing exception under AA 44.43 authorizing drilling of MGS 18756 No. C-22A-26.

- August 1, 1990: AOGCC issued a spacing exception under AA 44.44 authorizing the drilling of well C-13A-23.
- January 8, 1991: AOGCC issued a spacing exception under AA 44.45, authorizing the drilling of MGS 18756 No. C-11-23.
- On March 29, 1991: AOGCC issued a spacing exception under AA 44.46 authorizing the drilling of MGS 18756 No. C-21A-23.
- November 30, 1982: AOGCC issued AA 44.7 authorizing commingling of production from the A and BCD Oil Pools in the MGS 17595 Well No. 27.
- June 15, 1993: AOGCC AA 44.8 () spacing exception authorizing the drilling, completion and production of the MGS No. A32-11R.
- August 16, 1993, AOGCC issued a spacing exception under AA 44.9 authorizing the drilling of MGS No. A-13A-01.
- August 18, 1993: AOGCC issued a spacing exception under AA 44.50 authorizing the drilling of the MGS No. 29.
- November 22, 1993: AOGCC issued a spacing exception under AA 44.51 authorizing the drilling of MGS No. A33-11LS.
- February 23, 1994: AOGCC issued AA 44.52 authorizing the commingling of production from the A and BCD pools in the MGS 17595 No. 28.
- March 14, 1994: AOGCC issued AA 44.53 authorizing the commingling of production from the A, BCD and EFG pools in the MGS 17595 No. 28.
- March 17, 1994: AOGCC issued a spacing exception under AA 44.54 authorizing the drilling of MGS No. A31-14LW.
- April 7, 1994: AOGCC issued a spacing exception under AA 44.55 authorizing the drilling of the MGS Dillion No. 17.
- April 29, 1994: AOGCC issued Conservation Order No. 335 to waive the requirements of 20 AAC 25.265(a)(2) for a period of six month to produce the MGS 19595 No. 28.
- May 4, 1994: AOGCC issued a spacing exception under AA 44.56 authorizing the drilling of MGS A-22-14LS.

- On June 22, 1994: AOGCC issued a spacing exception under AA 44.57 authorizing the drilling of the MGS A-41-11LN.
- August 4, 1994: AOGC issued a spacing exception under AA 44.58 authorizing the drilling of well MGS A-13-01LN.
- September 14, 1994: AOGCC issued a spacing exception under AA 44.59 authorizing the drilling of well A-12-01LN.
- September 14, 1994: AOGCC issued a spacing exception under AA 44.60 spacing authorizing the drilling of well A14-01LN.
- April 27, 1995: AOGCC issued a spacing exception under AA 44.61 authorizing the drilling of well A-43-1-1LW.
- June 19, 1995: AOGCC issued a spacing exception under AA 44.62 authorizing the drilling of well A-34-11LS.
- March 6, 1996: AOGCC issued Conservation Order No. 378, and associated Erratum dated March 26, 1996, granted a spacing exception to 20 AAC 25.25.055(a)(4) to allow the drilling of the Baker No. 32 well.
- August 15, 1996: AOGCC issued AA 44.63 authorizing the commingling of production from the A, BCD and EFG pools in well 17595 No.15RD.
- June 2, 1998: AOGCC issued Conservation Order No. 236 to repeal Rule 7 of CO 44, and replace it with the following language regarding surface casing construction:

Surface casing must be set and cemented to a depth of at least 1600 feet TVD if no intermediate casing string will be set. If an intermediate casing string is set between 4000 feet TVD and the shallowest abnormally pressured waterflood zone, surface casing must be set and cemented to a depth of at least 1000 feet TVD. In either case, sufficient cement must be used to circulate to the surface.
- June 29, 2000: AOGCC issued a spacing exception under AA 44.64 authorizing the drilling of well A34-11LS2.
- January 3, 2001: AOGCC issued a spacing exception under AA 44.65 authorizing the side track drilling of well A24B-01LN.
- February 6, 2001: AOGCC issued a spacing exception under AA 44.66 authorizing the side track drilling of well A12-12LW.

- June 21, 2001: AOGCC issued a spacing exemption under AA 44.67 (June 21, 2001) spacing exception authorizing the side track drilling of well A34-14LW.
  - September 5, 2001: AOGCC issued AA 44.68 authorizing the commingling of production from the BCD and EFG pools in well A11-01.
  - November 19, 2001: AOGCC issued a spacing exception under AA 44.69 authorizing the side track drilling of well A-34-14LW.
  - March 5, 2002: AOGCC issued a spacing exception under AA 44.70 authorizing the side track drilling of well C-32-23LW.
  - April 12, 2002: AOGCC issued a spacing exception under AA 44.71 authorizing the side track drilling of well C-24A-23LN.
  - January 10, 2003: AOGCC issued a spacing exception under AA 44.72 authorizing the side track drilling of well C-24A-23LN2.
  - October 14, 2004: AOGCC issued AA 44.73 issued a spacing exception under AA 44.73 authorizing the drilling of well C-22A-26N.
-