

# STATE OF ALASKA

SEAN PARNELL, GOVERNOR

## ALASKA OIL AND GAS CONSERVATION COMMISSION

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### ADMINISTRATIVE APPROVAL AIO 28.002 Nanuq Oil Pool ADMINISTRATIVE APPROVAL AIO 30.003 Fiord Oil Pool

Chris Wilson  
Supervisor, Western North Slope Base  
ConocoPhillips Alaska, Inc.  
P. O. Box 100360  
Anchorage, Alaska 99501

Dear Mr. Wilson:

By letter dated May 21, 2009, and received by the Alaska Oil & Gas Conservation Commission (Commission) on May 26, 2009, ConocoPhillips Alaska, Inc. (CPAI), on behalf of the working interest owners in the Colville River Unit, requested the Commission remove the miscibility requirement for gas injection and authorize additional fluids for in injection in the Nanuq and Fiord Oil Pools (Application). **CPAI's request related to gas injection is GRANTED, with the requirement that the gas injected must be enriched gas. CPAI's request to authorize other fluids is also GRANTED with the stipulations listed below.**

In the Application, CPAI states that it "expects recovery from the Colville River Field (CRF) will be greater if the miscibility requirement is removed because the total gas volumes available could then be used more efficiently in the field to recover oil." By eliminating the miscibility requirement in the subject Area Injection orders, CPAI will be able to blend a larger volume of enriched gas and thus would have a smaller volume of lean gas to handle. Currently, lean gas is injected into certain wells in the Alpine Oil Pool in order to allow for "black start" capability for the field. Lean gas is also injected into very mature injection patterns where no additional benefits to oil recovery would be obtained by continued injection of enriched gas. Reducing the amount of lean gas would reduce the amount of gas injected in patterns contributing little benefit to ultimate recovery and allow a greater volume of enriched gas to be injected in the areas of the field where it will provide additional benefits. Information presented by CPAI demonstrates that ultimate recovery in the CRF will not be harmed by injecting enriched gas in the Nanuq and Fiord Oil Pools that is not fully miscible, provided the total volume of enriching components remains the same.

CPAI's application also requests approval of additional fluids for injection in the subject pools. CPAI requests authorization to allow the injection of commingled produced water from the other CRF oil pools in the Nanuq Oil Pool. The Application contains no evidence to demonstrate that the proposed fluids would be compatible with the rock and fluid properties in the pools. However, a water injectivity compatibility study on record with the Commission evaluated the effect of injecting 75 pore-volumes of synthetic Alpine produce water (brine) and synthetic

Beaufort Sea brine into core samples from the Fiord, Nanuq, and Nanuq-Kuparuk reservoirs. CPAI's researcher concluded that "...either brine could be injected without injectivity issues."<sup>1</sup>

Laboratory analysis provided in support of the current application shows that the commingled CRF produced water has a greater chloride composition than Nanuq formation water. Laboratory analysis also shows that the barium concentration in the Nanuq formation water is significantly higher than for the commingled CRF produced water. Additionally, the sulfate concentration in the commingled CRF produced water is significantly higher than in the Nanuq formation water, which creates the possibility of barium sulfate scale deposition in the Nanuq reservoir when commingled produced water is injected. During a phone conversation on July 28, 2009, CPAI stated that the commingled CRF produced water would be treated with scale inhibitor to reduce the chances of scale deposition in the Nanuq reservoir.

CPAI also requests authorization to inject sump fluid, hydrotest fluids, rinsate generated from washing mud hauling trucks, excess well work fluids, and treated camp effluent in both the Nanuq and Fiord Oil Pools. Likewise, CPAI has provided no information demonstrating that such fluids would be compatible with the subject pools. However, the volumes of these types of fluids are expected to be very small and the injection of small amounts of such fluids has been authorized by the Commission elsewhere in the CRF.<sup>2</sup>

Although CPAI will take steps to reduce the possibility of fluid incompatibility between the requested additional fluids and native formation water, it is prudent for the Commission to require additional monitoring of injection to ensure that the Nanuq and Fiord reservoirs will not be damaged.

The Commission finds that injecting enriched gas in the Nanuq and Fiord Oil Pools instead of miscible gas, will not promote waste or jeopardize correlative rights, is based on sound engineering and geoscience principles, and will not result in an increased risk of fluid movement into freshwater. Additionally, the Commission finds further expansion of the list of authorized injection fluids to include commingled produced water for the Nanuq Oil Pool and sump fluid, hydrotest fluids (excluding fluids derived from tests of transportation pipelines), rinsate generated from washing mud hauling trucks, excess well work fluids, treated camp effluent and mixtures involving such fluids for both the Nanuq and Fiord Oil Pools will not promote waste or jeopardize correlative rights, is based on sound engineering and geoscience principles, and will not result in an increased risk of fluid movement into freshwater, provided the following conditions are met.

- 1) Commingled produced water shall be treated with scale inhibitors to reduce the possibility of scale deposition in the formation.

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<sup>1</sup> Hedges, J.H., 2008, Colville [sic] River Field, Alaska: Water Injection Compatibility; ConocoPhillips, Inc., Bartlesville Technical Center, Hed-03-2007, p.1; document provided in support of AIO 30.002 by ConocoPhillips, Inc. on January 3, 2008.

<sup>2</sup> Alpine Oil Pool under AIO 18B.002; Nanuq-Kuparuk Oil Pool under AIO 27, Rule 4d; Qannik Oil Pool under AIO 35.001.

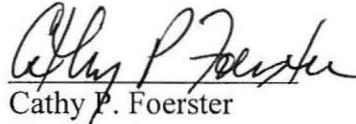
- 2) CPAI shall monitor injection rates and pressures when injecting commingled produced water into the Nanuq Oil Pool or when injecting sump fluid, hydrotest fluid, rinsate generated from washing mud hauling trucks, excess well work fluids, and treated camp effluent and mixtures involving such fluids into either the Fiord or Nanuq Oil Pools.
- 3) If the monitoring done under Condition 2 indicates the possibility of loss of injectivity or formation damage, CPAI shall cease injection of such fluids immediately and notify the Commission. CPAI shall not recommence injection of these fluids until authorized by the Commission.

The injection of lean gas into the Nanuq and Fiord Oil Pools will require separate authorization from the Commission.

DONE at Anchorage, Alaska, and dated September 23, 2009.



Daniel T. Seamount, Jr.  
Chair



Cathy P. Foerster  
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 Commission grants for good cause shown, a person affected by it may file with the Commission 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 Commission 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 Commission 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 Commission mails, **OR 30** days if the Commission 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 Commission 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 Commission, and it may be appealed to superior court. That appeal **MUST** be filed within **33** days after the date on which the Commission mails, **OR 30** days if the Commission otherwise distributes, the order or decision on reconsideration. As provided in AS 31.05.080(b), "[t]he questions reviewed on appeal are limited to the questions presented to the Commission by the application for 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.