

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

Re: THE APPLICATION OF Buccaneer Alaska ) Docket Number: AEO-11-01  
Operations LLC for an Aquifer Exemption ) Aquifer Exemption Order No. 15  
Order for the Kenai Loop Field in Townships )  
5 and 6 North, Range 11 West, Seward ) Sterling and Beluga Formations  
Meridian, in conformance with 20 AAC ) Kenai Loop Field  
25.440. ) Kenai Peninsula Borough, Alaska  
)  
) October 22, 2012

**IT APPEARING THAT:**

1. By application received March 16, 2012, Buccaneer Alaska Operations LLC (Buccaneer), operator of the Kenai Loop field, requested an order from the Alaska Oil and Gas Conservation Commission (AOGCC) exempting aquifers in the Sterling and Beluga Formations, within the Kenai Loop Field, Kenai Peninsula Borough, Alaska.
2. In accordance with 20 AAC 25.540, notice of opportunity for a public hearing was published in the Alaska Journal of Commerce on April 15, 2012. In addition, on April 10, 2012 the AOGCC published that notice of opportunity for public hearing on the State of Alaska Online Public Notices website, on the AOGCC's website, electronically transmitted the notice to all persons on the AOGCC's email distribution list, and mailed printed copies of the notice to all persons on the AOGCC's mailing distribution list. The tentatively scheduled hearing date was May 17, 2012, but the hearing was subsequently rescheduled to May 22, 2012.
3. The AOGCC has authority to issue an aquifer exemption. 20 AAC 25.440.
4. The AOGCC held the May 22, 2012 hearing despite not receiving any comments, protests or requests for a public hearing. Buccaneer provided testimony, and the hearing record was left open to allow Buccaneer to respond to questions from the AOGCC.
5. The AOGCC requested clarification of certain items on May 31, 2012. Buccaneer provided responses on June 5, 2012 and July 5, 2012.
6. The information submitted by Buccaneer and public well history records for the Kenai Loop #3 well are the basis for this order.

**FINDINGS:**

1. Operator: Buccaneer operates the Kenai Loop Field, which is located within the limits of the City of Kenai, Kenai Peninsula Borough, Alaska.
2. Extent of Proposed Aquifer Exemption area: The exemption area proposed in Buccaneer's Request for Freshwater Exemption lies within the Kenai Loop Field, and is described as:

T5N, R11W, S4: NW $\frac{1}{4}$  NW $\frac{1}{4}$ , NE $\frac{1}{4}$  NW $\frac{1}{4}$ , NW $\frac{1}{4}$  NE $\frac{1}{4}$ , Seward Meridian (SM);

T5N, R11W, S5: NE $\frac{1}{4}$  NE $\frac{1}{4}$ , SM;

T6N, R11W, S28: SW $\frac{1}{4}$  SW $\frac{1}{4}$ , SE $\frac{1}{4}$  SW $\frac{1}{4}$ , SW $\frac{1}{4}$  SE $\frac{1}{4}$ , SM;

T6N, R11W, S29: SE $\frac{1}{4}$  SE $\frac{1}{4}$ , SM;

T6N, R11W, S32: NE $\frac{1}{4}$ , SE $\frac{1}{4}$ , SM; and

T6N, R11W, S33: All, SM.

3. Affected Strata: Buccaneer's request for freshwater aquifer exemption is for those portions of the Sterling and Beluga Formations that are stratigraphically equivalent to the interval from 3980' to 7539' measured depth (MD) in well Kenai Loop #3. These measured depths are equivalent to 3961' and 7191' true vertical depth (TVD).<sup>1</sup>
4. Geology: The proposed exempted aquifers are Tertiary-aged, fluvial-derived reservoir and non-reservoir deposits assigned to the Kenai Group. This group is subdivided into (in descending order) the Sterling, Beluga, Tyonek, Hemlock, and West Foreland Formations. These formations account for most of the commercial oil and gas production in the Cook Inlet Basin.  
  
The proposed exempted aquifers lie in the lower portion of the Sterling Formation and the upper portion of the Beluga Formation between 3980' (3961' TVD) and 7539' MD (7191' TVD). Upper confinement for this proposed exempted interval consists of several laterally continuous tuffaceous claystone and siltstone layers and thin coal seams that lie between 3065' MD / TVD and 3980' MD (3961' TVD). Lower confinement will be provided by numerous, laterally continuous tuffaceous claystone, siltstone and shale layers that are common between 7539' MD (7191' TVD) and 8554' MD (8193' TVD).
5. Groundwater Hydrology: The State of Alaska has records for 22 shallow water wells within the proposed exemption area. The deepest of these was drilled 360' below ground surface by the City of Kenai near the airport. The other wells range in depth from 12' to 140' below ground surface, with most (75%) being shallower than 60' below ground surface. Alaska's Division of Mining, Land and Water has location information for 15 of these shallow water wells.<sup>2</sup> One well lies 700' from the proposed exempted interval in Kenai Loop #3.<sup>3</sup> The other 14 wells are situated at least 1700' from the proposed exempted interval in Kenai Loop #3.<sup>4</sup>
6. Formation Water Salinity: Based on well log calculations, Buccaneer concludes that the total dissolved solids (TDS) concentration of formation waters within proposed exempted interval inside the proposed exemption area are greater than 3,000 mg/l. AOGCC verified

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<sup>1</sup> All depth-related footages presented herein for the proposed exempted interval and the associated confining intervals refer to the Kenai Loop #3 well.

<sup>2</sup> Sources: Mr. R. Ireland of the Division of Mining, Land and Water and the Alaska Department of Natural Resources' (DNR) Well Log Tracking System database, which is available on the Internet at <http://dnratwmlwims02.dnr.state.ak.us/welts/>

<sup>3</sup> Sources: Division of Mining, Land and Water website at <http://www.navmaps.alaska.gov/AlaskaLandStatus/> and DNR Land Administration System Case File No. ADL 42528

<sup>4</sup> Source: Division of Mining, Land and Water website cited above

Buccaneer's conclusion by calculating formation-water TDS concentrations within the proposed exempted interval using well log calculation techniques that are compatible with EPA Guidance Document "Survey of Methods to Determine Total Dissolved Solids Concentrations" (EPA LOE Contract No. 68-03-3416, Work Assignment No. 1-0-13, KEDA Project No. 30-956, September 1988, Revised September 1989). A formation water sample obtained during testing of the Kenai Loop #3 well was analyzed onsite, and total chlorides in that sample measured about 6,000 mg/l.

7. Suitability of Sediments as Drinking Water Aquifers: Pursuant to 20 AAC 25.440 (a) (1), the subject aquifer exemption requested by Buccaneer is supported by the following:
  - a. the Kenai Loop area encompasses plentiful surface and groundwater to a depth of about 360' below ground surface;
  - b. aquifers within the proposed exempted interval are sufficiently deep that recovery of drinking water is economically impractical; and
  - c. well log calculations supported by water sample analysis indicate that formation water TDS concentrations in the proposed exempted interval within the proposed exemption area are greater than 3,000 mg/l.

#### **CONCLUSIONS:**

1. Those portions of freshwater aquifers occurring in the Sterling and Beluga Formations within the proposed exemption area do not currently serve as sources of drinking water. All known and foreseeable ground water consumption from the Kenai Loop vicinity is consistent with plentiful surface water and groundwater resources occurring above a depth of about 360' below ground surface.
2. Those portions of freshwater aquifers occurring in the proposed exempted interval within the proposed exemption area contain TDS concentrations greater than 3,000 mg/l, and they are situated at locations and depths that make recovery of these waters for drinking water purposes economically impractical.
3. The aquifers occurring in the proposed exempted interval within the proposed exemption area cannot reasonably be expected to serve as underground sources of drinking water.
4. The aquifers occurring in the proposed exempted interval within the proposed exemption area qualify as exempt freshwater aquifers under 20 AAC 25.440(a)(1)(A), 20 AAC 25.440 (a)(1)(B), and 20 AAC 25.440(a)(2).

**NOW, THEREFORE, IT IS ORDERED THAT** aquifers occurring in the Sterling and Beluga Formations within the exemption area described below that are stratigraphically equivalent to the interval between the measured depths of 3980' to 7539' in well Kenai Loop #3 are exempt for the purposes of Class II waste disposal operations as provided by 20 AAC 25.440:

T5N, R11W, S4: NW $\frac{1}{4}$  NW $\frac{1}{4}$ , NE $\frac{1}{4}$  NW $\frac{1}{4}$ , NW $\frac{1}{4}$  NE $\frac{1}{4}$ , Seward Meridian (SM);

T5N, R11W, S5: NE $\frac{1}{4}$  NE $\frac{1}{4}$ , SM;

T6N, R11W, S28: SW $\frac{1}{4}$  SW $\frac{1}{4}$ , SE $\frac{1}{4}$  SW $\frac{1}{4}$ , SW $\frac{1}{4}$  SE $\frac{1}{4}$ , SM;

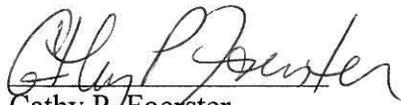
T6N, R11W, S29: SE¼ SE¼, SM;

T6N, R11W, S32: NE¼, SE¼, SM; and

T6N, R11W, S33: All, SM.

**Note that this Order does not authorize the injection of any fluids or gas within the exemption area. Disposal Injection Order No. 38 governs injection operations within the exemption area.**

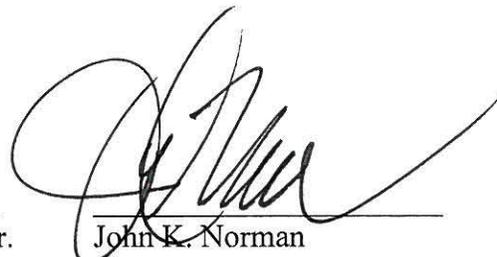
**DONE** at Anchorage, Alaska, and dated October 22, 2012.



Cathy P. Foerster  
Chair, Commissioner



Daniel T. Seamount, Jr.  
Commissioner



John K. Norman  
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. As provided in AS 31.05.080(b), "[t]he questions reviewed on appeal are limited to the questions presented to the AOGCC 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.

