

ADMINISTRATIVE APPROVAL NO. AIO 26.001

Mr. Gil Beuhler
Greater Prudhoe Bay West Manager
BP Exploration (Alaska) Inc.
P. O. Box 196612
Anchorage, AK 99519-6612

Dear Mr. Beuhler:

By letter dated December 8, 2005, you requested that Rule 4(a) of Area Injection Order 26 be eliminated. This rule limits injection pressures to 0.67 psi/ft. BP Exploration (Alaska), Inc. ("BPXA") has stated that water injection volumes are severely constrained with this pressure limitation, negatively impacting voidage replacement. The Alaska Oil and Gas Conservation Commission ("Commission") finds that administrative amendment to eliminate the injection pressure restriction is appropriate for the Orion Oil Pool. It is BPXA's responsibility to ensure the injected fluids stay within the approved injection interval. Accordingly, Rule 4 of Area Injection Order 26 is amended to read as follows:

Rule 4 Authorized Injection Pressure for Enhanced Recovery

- a. Injection pressure must be maintained so that injected fluids do not fracture the confining zone or migrate out of the approved injection stratum.
- b. If fluids are found to be fracturing the confining zone or migrating out of the approved injection stratum, the Operator must immediately shut in the injector(s). Injection may not be restarted unless approved by the Commission.

Discussion:

The Commission originally ordered this rule to ensure that Orion injected water does not fracture or migrate out of zone, and based its decision upon BPXA's estimate of a 0.66-0.67 psi/ft fracture pressure for the confining mudstone using data from stress tests and dipole sonic log. The Commission noted that injection tests within the Schrader were planned to determine if higher injection pressures would result in water migrating out of zone and specifically indicated that dependent upon the results of these tests, the Commission may waive this restriction.

Several tests have been conducted that support BPXA's conclusion that increased injection pressures will not result in migration out of zone.

A zonal isolation test was completed in Orion well L-210 in April 2005. Sand-face pressure gauges were installed adjacent to discrete zones both above and below an isolated injection interval in order to record pressure response and reveal whether injection was breaching the confining barriers. The two perforated zones were separated by around 28 feet TVD of unperforated OA interval comprised of silty mudstone. Injection rates of up to 4200 BWPD with an injection gradient of up to .82 psi/ft were achieved while injecting into the lower zone. No pressure response in the adjacent zone was seen; hence, the water did not breach out of zone.

BPXA performed step-rate water injection tests in June 2003 in Polaris Oil Pool Wells W-212i and S-215i. These tests showed significant improvement in injection rate with increased injection pressure. Temperature logs run in July 2003 showed the water to be confined to the intended intervals. These tests were performed at an injection gradient of 0.75-0.80 psi/ft, well above the expected confining zone fracture pressure gradient of 0.67 psi/ft. Based upon this information, the Commission approved removal of the injection pressure limitation in the Polaris Oil Pool.

A pulse test in Milne Point Schrader Oil Pool MPS-26 also indicated full zonal isolation. The well had been injecting at about 0.8 psi/ft for two years prior to the test. The conclusions from these tests are

- a. The shale barrier between sands is not transmissible;
- b. Packers and completion cement integrity allow for good mechanical isolation and independent zonal injection control; and
- c. Fracture height is confined to the individual injection sand interval.

Aquifer Exemption Order #1, dated July 11, 1986 exempts all portions of aquifers beneath the Western Operating Area of the Prudhoe Bay Unit, including the area designated for the proposed waterflood pilot project

As stated in Rule 10 of AIO 26, unless notice and public hearing are otherwise required, the Commission may administratively waive the requirements of any rule of AIO 26 or administratively amend any rule 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 an increased risk of fluid movement into freshwater.

As provided in AS 31.05.080(a), within 20 days after written notice of this 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 rehearing. A request for rehearing is considered timely if it is received by 4:30 PM on the 23rd day following the date of this letter, or the next working day if the 23rd day falls on a holiday or weekend. A person

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may not appeal a Commission decision to Superior Court unless rehearing has been requested.

DONE at Anchorage, Alaska and dated December 13, 2005.

John K. Norman
Chairman

Daniel T. Seamount, Jr.
Commissioner

Cathy P. Foerster
Commissioner