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

Re: THE APPLICATION OF the North Slope Borough for disposal of Class II oil field wastes by underground injection in a portion of the Barrow Sandstone that is not capable of viable production in well South Barrow No. 13, Section 14, T22N, R18W, Umiat Meridian	**Disposal Injection Order No. 36** **Docket No. DIO-10-01** **Barrow Sandstone, Kingak Formation** **South Barrow No. 13 Well** **South Barrow Gas Field** **North Slope Borough, Alaska** **July 26, 2010**

IT APPEARING THAT:

1. On March 1, 2010, the North Slope Borough (NSB) requested that the Alaska Oil and Gas Conservation Commission (AOGCC or Commission) authorize underground disposal of Class II oil field waste fluids into a depleted portion of the Barrow Sandstone through the South Barrow No. 13 (SB 13) wellbore, located in the South Barrow Gas Field.
2. In accordance with 20 AAC 25.540, notice of opportunity for a public hearing was published in the ANCHORAGE DAILY NEWS on March 29, 2010, on the State of Alaska Online Notices on March 26, 2010, in the Arctic Sounder on April 1, 2010 and on the Commission's Web site on March 29, 2010. The scheduled hearing date was May 18, 2010.
3. The Commission received no comments, protests or requests for a public hearing.
4. The public hearing was held on May 18, 2010.
5. On June 17, 2010, the Commission requested additional information from the NSB. The NSB responded on July 6, 2010.
6. Information submitted by the NSB and public well history records are the basis for this order.

FINDINGS:

1. Location of Well and Adjacent Wells (20 AAC 25.252(c)(1))

   SB 13 was drilled and completed to a total measured depth of 2534' during December 1976 and January 1977.[1] This slanted well reached a maximum deviation of 14.5° from vertical. The surface location of the well is 552' from the south section line (FSL) and 807' from the west section line (FWL) of Section 14, Township 22N, Range 18W, Umiat Meridian (UM). The bottom-hole location is 528' FSL and 441' FWL, Section 14, Township 22N, Range 18W, UM. The plat included with the NSB's application indicates that there are no wells

[1] All depths presented herein are measured depths within the SB 13 wellbore unless otherwise specified.

within a ¼-mile radius of SB 13. The nearest well is South Barrow NSB-01, which lies about 1350' to the northwest.

2. Notification of Operators/Surface Owners (20 AAC 25.252(c)(2) and 20 AAC 25.252(c)(3))

   The NSB is the only operator within a ¼-mile radius of the proposed disposal well. Ukpeagvik Inupiat Corporation (UIC) is the only surface owner within a ¼-mile radius of SB 13. NSB and UIC were both provided a copy of the application for disposal on or about February 24, 2010 according to the "Affidavit of Notice to Surface Owners and Operators" provided by NSB.

3. Geological Information on Disposal and Confining Intervals (20 AAC 25.252(c)(4))

   The proposed disposal interval is the Barrow Sandstone, which is an informal member of the Kingak Formation. The Barrow Sandstone, which was deposited in a marine environment, consists of silty, very fine-to fine grained, moderately sorted sandstone that contains pyrite, siderite, glauconite, and calcite and is commonly interbedded with siltstone and shale. In SB 13, the existing perforations in the proposed injection interval are from 2315' to 2346' and 2356' to 2368'. In the South Barrow Gas Field, porosity for the Barrow Sandstone ranges from 8 to 32 percent, averages 22 percent, and has a median value of 25 percent. Permeability for the Barrow Sandstone ranges from 0 to 300 millidarcies, averages 48 millidarcies, and has a median value of 27 millidarcies.

   Approximately 60' of shale and siltstone of the Kingak Formation immediately overlying the Barrow Sandstone will provide upper confinement for injected fluids. Interpreted cross sections indicate this upper confining layer is laterally continuous across the South Barrow Gas Field. A structure map at the top of the Barrow Sandstone provided by the NSB[2] indicates the presence of a small, down-to-the-south, normal fault immediately north of SB 13. However, vertical displacement along this fault in the vicinity of SB 13 appears to be about 20', so the 60-foot thick shale and siltstone confining interval will remain an effective top seal. Lower confinement will be provided by underlying Argillite basement rock.

4. Evaluation of Confining Intervals (20 AAC 25.252(c)(9))

   A separate fracture stimulation model has not been prepared. The confining interval is judged to be adequate to prevent propagation of fractures through the overlying Kingak shale and siltstone confining layers based on the limited nature of the anticipated total disposal volume (between 30 to 50 thousand barrels of waste) and evidence indicating no problems were encountered during production well fracture stimulations or while conducting disposal operations in well South Barrow No. 5, as authorized by DIO 5,.

5. Standard Laboratory Water Analysis of the Formation (20 AAC 25.252(c)(10)); Aquifer Exemption (20 AAC 25.252(c)(11))

   Laboratory-measured total dissolved solids (TDS) concentrations were provided for a water sample from the Barrow Sandstone in the nearby South Barrow No. 7 well. This sample measured 16,157 milligrams per liter. An aquifer exemption is not necessary.

[2] Revised Attachment 1F, submitted May 20, 2010

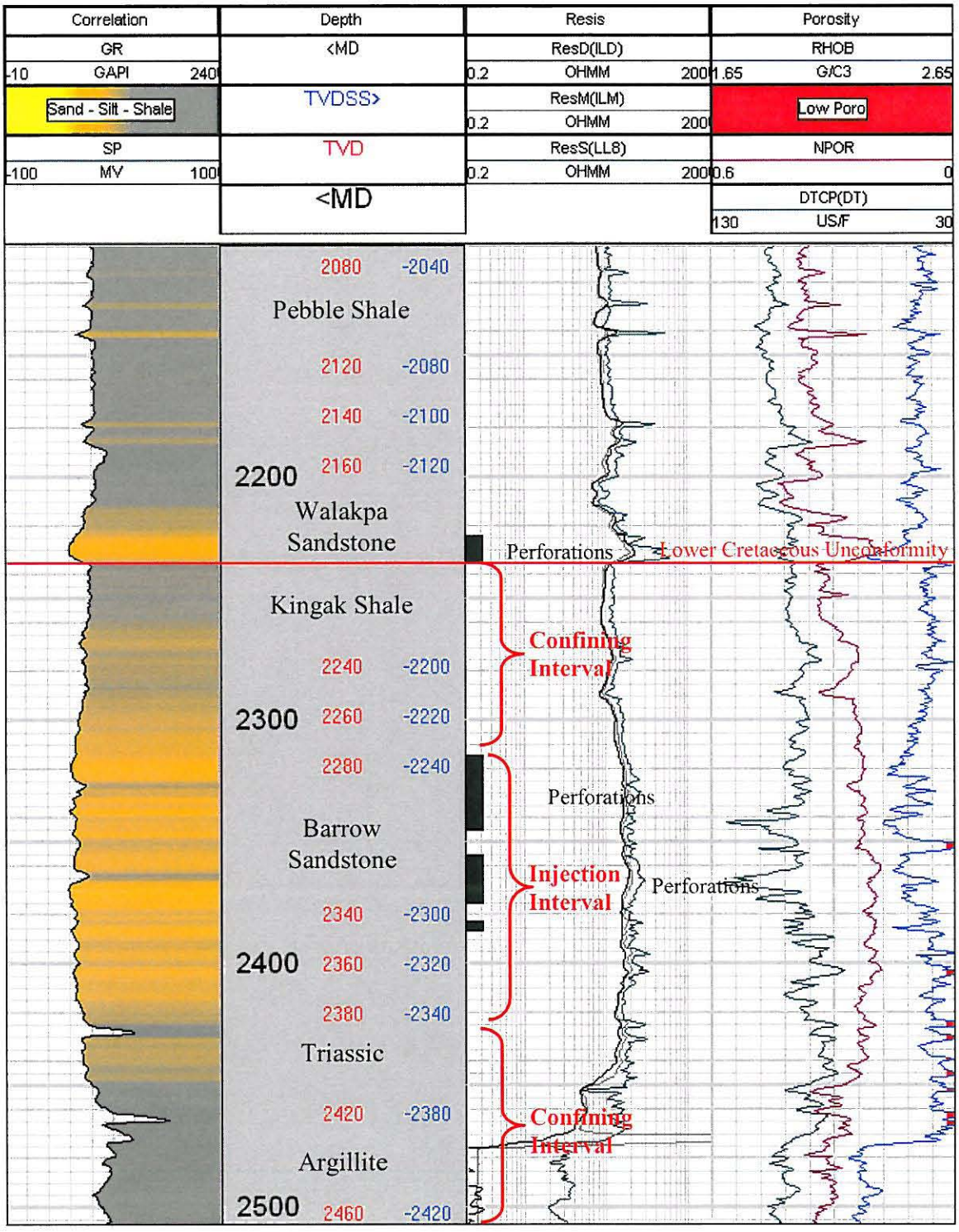

Figure 1. South Barrow 13 Well Log Displaying Injection and Confining Intervals
(Horizontal gridlines represent five-foot increments of measured depth)

6. Well Logs (20 AAC 25.252(c)(5))

   Log data from SB 13 are on file with the Commission.

7. Demonstration of Mechanical Integrity and Disposal Interval Isolation (20 AAC 25.252(c)(6))

   SB 13 was completed as a gas production well in January 1977. The well is deviated slightly to the west to a depth of 2534'; 20-inch conductor casing is set at 40' (40' true vertical depth, or TVD), 10-3/4-inch surface casing set at 1200' (1191' TVD), and 7-inch production casing set at 2500' (2458' TVD). The well is equipped with 2-7/8" tubing hung to 2394' (2314' TVD). The well is not equipped with a packer in accordance with Conservation Order 233.

   Both casing strings were cemented to surface.

   A cement bond log was run on the 7" production casing and is available in the Commission files. A review of the log indicates that the casing is satisfactorily cemented.

   Cumulative production from SB 13 was nearly 857 million cubic feet and the well produced gas continuously from September 1988 to July 2006. Prior to shut-in in mid 2006, the well rate declined to about 150 thousand cubic feet per day (mcf/d).

   In its July 6, 2010 response to Commission questions, the NSB indicated that SB 13 is a high-maintenance, poor performer that is subject to hydrate formation. Its limited production capacity no longer justifies the operational and maintenance efforts required to keep the well online. In addition, SB 13 is not connected to the limited road infrastructure, so ground access is only available during the winter season.

   The NSB requests a waiver to the mechanical integrity test requirements of 20 AAC 25.252 (d) and 20 AAC 25.412 (e) as allowed by 20 AAC 25.450 (a). The standard mechanical integrity test is not possible due to the absence of a packer. The NSB instead proposes daily monitoring of tubing and annulus pressures during the limited-duration injection operations, which are expected to occur during a single winter season.

8. Disposal Fluid Type, Composition, Source, Volume, and Compatibility with Disposal Zone (20 AAC 25.252(c)(7))

   SB 13 will be one of two disposal wells planned to support the NSB's 2011 – 2012 well work program. The NSB intends to use SB 13 to dispose of drilling, production, completion, and workover wastes originating from exploration and development well activities in the East Barrow, South Barrow and Walakpa gas fields on the North Slope. The NSB projects the waste disposal volume to be between 30 and 50 thousand barrels. The NSB estimates the daily injection volume will average 1000 barrels per day, with injection rates between 2 and 7 barrels per minute.

   Information provided by the NSB demonstrates the fluids to be disposed are compatible with the disposal zone.

9. Estimated Injection Pressures (20 AAC 25.252(c)(8))

   The NSB estimates that the surface injection pressure will vary between 400 and 800 psig. The maximum pressure encountered while stimulating SB 13 was 1300 psi. The injection pump has a 3000 psig working pressure and is equipped with a 2400 psig pressure safety relief valve.

10. Mechanical Condition of Wells Penetrating the Disposal Zone Within ¼-Mile of SB 13 (20 AAC 25.252(c)(12))

    There are no wells within a ¼-mile radius of SB 13.

11. Underground Injection Control Variances (20 AAC 25.450)

    Regulation 20 AAC 25.450(a) allows the Commission to authorize less stringent requirements for casing and cementing, tubing and packer mechanical integrity, operation and monitoring, provided that the reduction in requirements will not result in an increased risk of movement of fluids into freshwater.

CONCLUSIONS:

1. The requirements and conditions for approval of an underground disposal application in 20 AAC 25.252 are met.
2. Disposal injection of Class II wastes into the Barrow Sandstone in the SB 13 well will not cause waste.
3. The proposed Barrow Sandstone disposal interval is sufficiently porous, permeable, and thick to receive the proposed volume of injected wastes. Overlying and underlying strata will be effective, waste-confining barriers.
4. Fluid compatibility is not an issue for the proposed, limited disposal operations within SB 13.
5. All water within the Barrow Sandstone exceeds 10,000 milligrams per liter TDS. Therefore, there is no possibility of contamination of freshwater.
6. Despite the absence of fresh water, it is appropriate to demonstrate that the SB 13 wellbore has mechanical integrity and that injected fluids will be confined to the intended receiving zone.
7. Supplemental mechanical integrity demonstrations and the surveillance of injection operations—including temperature surveys, monitoring of injection performance (*i.e.*, pressures and rates), and analyses of the data for indications of anomalous events—establish sufficient mechanical integrity to demonstrate that fluids will not move behind casing beyond the approved disposal zone.

NOW, THEREFORE, IT IS ORDERED THAT disposal injection is authorized into the Barrow Sandstone within SB 13 subject to each of the following requirements:

RULE 1: Injection Strata for Disposal

The underground disposal of Class II well oil field waste fluids is permitted into the Barrow Sandstone within SB 13 between the measured depths of 2300 feet and the total depth of the

well. . The Commission may immediately suspend, revoke, or modify this authorization if injected fluids fail to be confined by the upper or lower confining zones.

RULE 2: Fluids

This authorization is limited to Class II oil field waste fluids generated during drilling, production or workover operations including plugging. This authorization **DOES NOT** include domestic waste water.

RULE 3: Demonstration of Mechanical Integrity

The operator shall run a baseline temperature log and perform a baseline step-rate test at the planned waste disposal pumping rates prior to initial waste injection. A subsequent temperature log must be run after the step-rate test to confirm confinement of the injected fluids. The operator shall submit this information and their assessment of the information to the Commission prior to commencement of disposal injection operations.

RULE 4: Injection Rate and Pressure

No waste disposal is permitted until the Commission determines the maximum pumping rate and pressure. Maximum pumping rate and pressure will be subsequently authorized according to the information determined in Rule 3. Once allowable rate and pressure are determined, surface pressures and rates must be monitored continuously during injection for any indications of anomalous conditions. Results of daily wellhead pressure observations in SB 13 must be documented and available to the Commission upon request. The conduct of subsequent temperature surveys or other surveillance logging (e.g., water flow, acoustic) will be based on the results of the initial and follow-up temperature surveys and injection performance monitoring data.

RULE 5: Well Integrity Failure and Confinement

If pressure communication, leakage or lack of injection zone isolation is indicated in any way – by injection rate, operating pressure observation, test, survey, log, or any other evidence - the operator shall immediately notify the Commission and submit a plan of corrective action on Form 10-403 for Commission approval. The operator shall immediately shut in the well if continued operation would be unsafe, inconsistent with sound geoscience or engineering principles, result in waste or threaten contamination of freshwater, or if so directed by the Commission. A monthly report of daily tubing and casing annuli pressures and injection rates must be provided to the Commission for SB 13 indicating any well integrity failure or lack of injection zone isolation.

RULE 6: Surveillance

A report evaluating the performance of the disposal operation must be submitted to the Commission by July 1 of each year. The report shall include data sufficient to characterize the disposal operation, including, among other information, the following: injection and annuli pressures (daily average, maximum and minimum); fluid volumes injected (disposal and clean fluid sweeps); injection rates; an assessment of fracture geometry; a description of any anomalous injection results; and a calculated zone of influence for the injection fluids.

Wellhead pressures shall be monitored daily. Pressure records shall be made available for inspection upon Commission request.

RULE 7: Notification of Improper Class II Injection

The operator must immediately notify the Commission if it learns of any improper Class II injection. Complying with the notification requirements of any other local, state or federal agency remains the operator's responsibility.

RULE 8: Administrative Action

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 fluid movement outside of the authorized injection zone.

RULE 9: Compliance

Operations must be conducted in accordance with the requirements of this order, AS 31.05, and (unless specifically superseded by Commission order) 20 AAC 25. Noncompliance may result in the suspension, revocation, or modification of this authorization.

ENTERED at Anchorage, Alaska, and dated July 26, 2010.

ALASKA OIL AND GAS CONSERVATION COMMISSION

Daniel T. Seamount, Jr., Chair, Commissioner

John K. Norman, Commissioner

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.