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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

ALASKA OUTER CONTINENTAL SHELF AIR QUALITY CONTROL MINOR PERMIT APPROVAL TO CONSTRUCT

Permit Number: R10OCS-AK-07-02

The United States Environmental Protection Agency (EPA) under the authority of Clean Air Act (Act) Section 328 [42 U.S.C. 7627] and Code of Federal Regulations Title 40, Part 55 [40 CFR Part 55] issues Air Quality Control Minor Permit No. R10OCS-AK-07-02 to the permittee identified below:

Permittee:	Shell Offshore, Inc. 3601 C Street, Suite 1334 Anchorage, AK 99503
Owner:	Same as Operator
Operator:	Frontier Drilling USA, Inc. 1000 Louisiana, Suite 1210 Houston, TX 77002
OCS Source:	Frontier Discoverer Drilling Unit (Discoverer)
Project:	Portable Exploratory Drilling Operation
Location:	Any drill site within a Beaufort Sea outer continental shelf (OCS) lease block authorized by the United States Minerals Management Service (MMS) within 25 miles of the State of Alaska's seaward boundary
Source Contact:	Susan Childs Shell Offshore, Inc. 3601 C Street, Suite 1334 Anchorage, AK 99503 Phone: 907-770-3700 E-mail: Susan.Childs@shell.com
Fee Contact:	Same as source contact

Pursuant to 42 U.S.C. §7627(a)(1), the permittee shall comply with the terms and conditions of this permit. Failure to comply with the terms and conditions of the permit shall be considered a violation of Section 111(e) of the Act, 42 U.S.C. §7410 et seq.

for Richard Albright
Director, Office of Air, Waste and Toxic

6/12/07
Date

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Abbreviations/Acronyms

AAC .....Alaska Administrative Code
Act.....Federal Clean Air Act
ADEC.....Alaska Department of Environmental Conservation
AS .....Alaska Statutes
ASTM .....American Society of Testing and Materials
CFR .....Code of Federal Regulations
Discoverer.....Frontier Discoverer Drilling Unit
EPA .....United States Environmental Protection Agency
MMS .....United States Mineral Management Service
NA .....Not Applicable
NAICS .....North American Industry Classification System
OCS .....Outer Continental Shelf
ORL.....Owner Requested Limit
PS .....Performance Specification
PTE .....Potential to Emit
RM .....Reference Method
SIC .....Standard Industrial Classification
SN .....Serial Number
TAR.....Technical Analysis Report
Unit ID .....Emission Unit Identification Number

Units and Measures

dscf.....dry standard cubic foot
gph.....gallons per hour
gr./dscf .....grains per dry standard cubic foot (1 pound = 7,000 grains)
hp.....brake horsepower or boiler horsepower[1]
kW.....kiloWatts
kW-e.....kiloWatts electric[2]
lbs.....pounds
mmBtu.....million British thermal units
ppm .....parts per million
ppmv .....parts per million by volume
tph .....tons per hour
tpy .....tons per year
wt% .....weight percent

Pollutants

CO .....Carbon Monoxide
HAPS .....Hazardous Air Pollutants
NO_X.....Oxides of Nitrogen
NO_2 .....Nitrogen Dioxide
NO.....Nitric Oxide
PM_{10} .....Particulate Matter with an aerodynamic diameter less than 10 microns
SO_2.....Sulfur Dioxide
VOC .....Volatile Organic Compound

[1] For boilers: One boiler horsepower = 33,472 Btu-fuel per horsepower-hour divided by the boiler's efficiency. For engines: Approximately 7,000 Btu-fuel per brake horsepower-hour is required for an average diesel internal combustion engine.

[2] kW-e refers to rated generator electrical output rather than engine output.

Section 1. Terms and Conditions

Authorizations/Emission Unit Inventory and Description

1. Minor Permit No. R10OCS-AK-07-02 authorizes the permittee to mobilize, operate, and demobilize the Discoverer at a drill site authorized by MMS in the Beaufort Sea OCS, in accordance with the terms and conditions of this permit.

1.1 The Permittee shall record the date and hour of both initial and final operation of the Discoverer at each drill site.

a. The initial operation of the Discoverer at each drill site is defined as when the setting of the Discoverer's last anchor to the seafloor is completed.

b. The final operation of the Discoverer at each drill site is defined when the Discoverer's last anchor is removed from the seafloor.

1.2 The permittee shall report to EPA via facsimile or e-mail the information recorded in Condition 1.1.

a. Submit the information required by Condition 1.1.a within 3 days of initial operation at a drill site.

b. Submit the information required by Condition 1.1.b within 3 days of final operation at a drill site.

2. Minor Permit No. R10OCS-AK-07-02 authorizes the permittee to utilize vessels in support of the Discoverer within 25 miles of a drill site in accordance with the terms and conditions of this permit as follows:

2.1 Conditions 5, 6, 7, 8, and 9 apply to emission units on support vessels operating at or within 25 miles of the drill site.

2.2 Conditions 10, 11, 12, 13, 14 and 15 apply to emissions units on support vessels when:

a. The vessel is physically attached to the Discoverer at a drill site, and

b. The emission unit is engaged in any activity not directly related to propulsion of a vessel.

2.3 The permittee may use an alternative support vessel not listed in Table 2 without a permit revision as follows:

a. Notify EPA of the alternative support vessel 45 days prior to operation within 25 miles of a drill site.

(i) The notification shall include a list of emissions units, ratings, emission factors, and a proposed methodology for monitoring vessel emissions.

b. Operate the alternative support vessel in accordance with:

(i) All terms and conditions of this permit, and

(ii) An EPA-approved methodology for monitoring vessel emissions, similar to those described under Condition 7.

2.4 The permittee shall not operate an alternative support vessel prior to receiving EPA approval of a methodology for monitoring vessel emissions.

3. The emissions units listed in Table 1 are collectively referred to as the Discoverer. The Unit ID will be used to identify an emissions unit. The Source Group will be used to identify a collection of emissions units utilizing the same emission factor to determine NO_X emissions.

Table 1 – Discoverer Emission Units

Unit ID	Source Group[3]	Unit Description	Make/Model	Rating	
FD-1	A1	Electrical Generator Engine	Caterpillar / D399	1,325	hp
FD-2	A1	Electrical Generator Engine	Caterpillar / D399	1,325	hp
FD-3	A1	Electrical Generator Engine	Caterpillar / D399	1,325	hp
FD-4	A1	Electrical Generator Engine	Caterpillar / D399	1,325	hp
FD-5	A1	Electrical Generator Engine	Caterpillar / D399	1,325	hp
FD-6	A1	Electrical Generator Engine	Caterpillar / D399	1,325	hp
FD-7[4]	A2	Propulsion Engine	Mitsubishi / 6UEC65	7,200	hp
FD-8	A3	Emergency Electrical Generator Engine	Caterpillar / 3304	131	hp
FD-9	A3	Air Compressor Engine	Leased / Tier 2 or 3	500	hp
FD-10	A3	Air Compressor Engine	Leased / Tier 2 or 3	500	hp
FD-11	A3	Air Compressor Engine	Leased / Tier 2 or 3	500	hp
FD-12	A3	HPP Engine		250	hp
FD-13	A3	HPP Engine		250	hp
FD-14	A3	Port Deck Crane Engine	Caterpillar / D343	365	hp
FD-15	A3	Starboard Deck Crane Engine	Caterpillar / D343	365	hp
FD-16	A3	Cementing Unit Engine	Detroit / 8V-71N	335	hp

[3] The Source Group for which an emissions unit is identified is used for the purpose of determining NO_X emissions pursuant to Condition 7.
[4] The propulsion engine is not employed when the Discoverer is attached to the seafloor. The propulsion engines are employed while the Discoverer is in transit. While in transit, the Discoverer is not subject to 40 CFR 55.

Table 1 – Discoverer Emission Units

Unit ID	Source Group	Unit Description	Make/Model	Rating	
FD-17	A3	Cementing Unit Engine	Detroit / 8V-71N	335	hp
FD-18	A3	Cementing Unit Engine	GM 3-71	147	hp
FD-19	A3	Logging Winch Engine	Detroit / 4-71N	128	hp
FD-20	A3	Logging Genset Engine	John Deere / 4024TF270	36	kW
FD-21	A4	Heat Boiler	Clayton / 200 Boiler HP	7.97	MMBtu/hr
FD-22	A4	Heat Boiler	Clayton / 200 Boiler HP	7.97	MMBtu/hr
FD-23	K	Incinerator	TeamTec / GS500C	276	lb/hr
FD-24	T	Fuel Tank	Unknown / Discoverer ID: 21P	538	cubic meters
FD-25	T	Fuel Tank	Unknown / Discoverer ID: 29P	267	cubic meters
FD-26	T	Fuel Tank	Unknown / Discoverer ID: 21S	267	cubic meters
FD-27	T	Fuel Tank	Unknown / Discoverer ID: 21S	179	cubic meters
FD-28	T	Fuel Tank	Unknown / Discoverer ID: 22S	150	cubic meters
FD-29	T	Fuel Tank	Unknown / Discoverer ID: 23S	150	cubic meters
FD-30	T	Fuel Tank	Unknown / Discoverer ID: 24S	135	cubic meters

4. The emissions units listed in Table 2 are collectively referred to as the Discoverer support vessels, and the Unit ID will be used to identify the emissions units.

4.1 Emissions from the vessels, when operating within 25 miles of the Kulluk, will be considered direct emissions from the Discoverer for the following purposes:

a. Determining assessable emissions, and

b. Determining regulatory applicability.

4.2 An emission unit on a vessel is an OCS source (a part of the Discoverer) and is subject to regulation under the following two conditions:

a. the vessel is physically attached to the Discoverer at a drill site, and

b. the emission unit is engaged in any activity not directly related to propulsion of a vessel.

Table 2 – Discoverer Support Vessels

Unit ID	Source Group[5]	Unit Description	Make/Model	Rating	
Kapitan Dranitsyn (icebreaker)					
KD-1	B1	Main Propulsion Engine	Wärtsilä / 9ZL	4,140	hp
KD-2	B1	Main Propulsion Engine	Wärtsilä / 9ZL	4,140	hp
KD-3	B1	Main Propulsion Engine	Wärtsilä / 9ZL	4,140	hp
KD-4	B1	Main Propulsion Engine	Wärtsilä / 9ZL	4,140	hp
KD-5	B1	Main Propulsion Engine	Wärtsilä / 9ZL	4,140	hp
KD-6	B1	Main Propulsion Engine	Wärtsilä / 9ZL	4,140	hp
KD-7	B2	Auxiliary Engine		1,050	hp
KD-8	B2	Auxiliary Engine		1,050	hp
KD-9	B2	Auxiliary Engine		1,050	hp
KD-10	B2	Auxiliary Engine		1,050	hp
KD-11	B2	Auxiliary Engine		1,050	hp
KD-12	B3	Compressor Engine		1,380	hp
KD-13	B3	Compressor Engine		1,380	hp
KD-14	B3	Emergency Electrical Generator Engine		438	hp

[5] The Source Group for which an emissions unit is identified is used for the purpose of determining NO_X emissions pursuant to Condition 7.

Table 2 – Discoverer Support Vessels

Unit ID	Source Group	Unit Description	Make/Model	Rating	
KD-15	B4	Heat Boiler		18	MMBtu/hr
KD-16	B4	Heat Boiler		18	MMBtu/hr
KD-17	K	Incinerator		70	Kg/hr
Fennica/Nordica (icebreaker)					
FN-1	C1	Main Propulsion Engine	Wärtsilä / 16V32	7,884	hp
FN-2	C1	Main Propulsion Engine	Wärtsilä / 16V32	7,884	hp
FN-3	C1	Main Propulsion Engine	Wärtsilä / 12V32	5,913	hp
FN-4	C1	Main Propulsion Engine	Wärtsilä / 12V32	5,913	hp
FN-5	C2	Auxiliary Engine		710	hp
FN-6	C2	Emergency Electrical Generator Engine		300	hp
FN-7	C3	Heat Boiler		4.44	MMBtu/hr
FN-8	C3	Heat Boiler		4.44	MMBtu/hr
FN-9	K	Incinerator		70	Kg/hr
Jim Kilabuk (resupply vessel)					
JK-1	D	Main Propulsion Engine	EMD / V20 645	3,600	hp
JK-2	D	Main Propulsion Engine	EMD / V20 645	3,600	hp
JK-3	D	Electrical Generator Engine	Caterpillar / D3406	292	hp
JK-4	D	Electrical Generator Engine	Caterpillar / D3406	292	hp
JK-5	D	HPP Engine	Caterpillar / D343	300	hp
JK-6	D	Bow Thruster Engine	Caterpillar / D343	300	hp
Point Barrow Tug (Main Oil Spill Response Vehicle)					
PBT-1	E	Main Propulsion Engine	Caterpillar 3512	1,050	hp
PBT-2	E	Main Propulsion Engine	Caterpillar 3512	1,050	hp
PBT-3	E	Electrical Generator Engine	Caterpillar 3304	150	hp

Table 2 – Discoverer Support Vessels

Unit ID	Source Type	Unit Description	Make/Model	Rating	
PBT-4	E	Electrical Generator Engine	Caterpillar 3304	150	hp
Kvichak 47-foot Oil Spill Response Work Boat					
OSR47K-1	E	Propulsion Engine	Lugger	700	hp
OSR47K-2	E	Propulsion Engine	Lugger	700	hp
OSR47K-3	E	Electrical Generator Engine		9	kW
Kvichak No. 3 34-foot Oil Spill Response Work Boat					
OSRK3-1	E	Propulsion Engine		300	hp
OSRK3-2	E	Propulsion Engine		300	hp
OSRK3-3	E	Electrical Generator Engine		12	hp
Kvichak No. 4 34-foot Oil Spill Response Work Boat					
OSRK4-1	E	Propulsion Engine		300	hp
OSRK4-2	E	Propulsion Engine		300	hp
OSRK4-3	E	Electrical Generator Engine		12	hp
Kvichak No. 5 34-foot Oil Spill Response Work Boat					
OSRK5-1	E	Propulsion Engine		300	hp
OSRK5-2	E	Propulsion Engine		300	hp
OSRK5-3	E	Electrical Generator Engine		12	hp
Kvichak No. 6 34-foot Oil Spill Response Work Boat					
OSRK6-1	E	Propulsion Engine		300	hp
OSRK6-2	E	Propulsion Engine		300	hp
OSRK6-3	E	Electrical Generator Engine		12	hp
Arctic Endeavor Barge (positioned by the Point Barrow Tug)					
AEB-1	E	Crane Engine		350	hp
AEB-2	E	Light Plant Engine		30	hp
AEB-3	E	Electrical Generator Engine		126	hp
AEB-4	E	Electrical Generator Engine		126	hp
AEB-5	E	HPP Engine		145	kW

Table 2 – Discoverer Support Vessels					
Unit ID	Source Group	Unit Description	Make/Model	Rating	
AEB-6	E	HPP Engine		145	kW
AEB-7	E	HPP Engine		80	kW
AEB-8	E	HPP Engine		80	kW
AEB-9	E	Anchor Engine	John Deere	50	hp
Affinity/Perseverance (Arctic tanker & oil spill response vessel)					
AP-1	E	Propulsion Engine	MAN B&W / 7S60MC	15,820	kW
AP-2	E	Electrical Generator Engine P	MAN B&W / 7L23	1,120	kW
AP-3	E	Electrical Generator Engine C	MAN B&W / 7L23	1,120	kW
AP-4	E	Electrical Generator Engine S	MAN B&W / 7L23	1,120	kW
AP-5	E	Emergency Electrical Generator Engine	Cummins / NT855	295	kW
AP-6	E	Framo Power Pack	Cummins / KTA19	477	kW
AP-7	E	Framo Power Pack	Cummins / KTA19	477	kW
AP-8	E	Framo Power Pack	Cummins / KTA19	477	kW
AP-9	E	Auxiliary Boiler	KangRim / MB07S01	85	MMBtu/hr
AP-10	E	Incinerator	TeamTec / OG 400	580	kW

Requirement to Pay Fees

5. **Assessable Emissions.** The permittee shall pay to EPA an annual emission fee no later than July 1 of each year. The fee is based on the Discoverer's assessable emissions at each drill site as determined by EPA under 18 AAC 50.410. The assessable emission fee rate is set out in 18 AAC 50.410(b) or as modified by EPA. The EPA will assess fees per ton of each air pollutant that the Discoverer emits or has the potential to emit in quantities greater than 10 tons per year at a drill site. The quantity for which fees will be assessed is the lesser of

   5.1 The Discoverer's assessable potential to emit (sum of assessable pollutants) of 323 tons per year; or

   5.2 The Discoverer's projected annual rate of emissions that will occur from July 1 to the following June 30, based upon actual annual emissions emitted during the most recent calendar year or another 12 month period approved in writing by EPA, when demonstrated by

      a. An enforceable test method described in 18 AAC 50.220;

      b. Material balance calculations;

      c. Emission factors from EPA's publication AP-42, Vol. I, adopted by reference in 18 AAC 50.035; or

      d. Other methods and calculations approved by EPA.

6. **Assessable Emission Estimates.** Emission fees will be assessed as follows:

   6.1 No later than March 31 of each year, the permittee may submit an estimate of the Discoverer's assessable emissions to EPA Region 10, Office of Air, Waste and Toxics (AWT-107), ATTN: OCS Air Permit Program, 1200 Sixth Avenue, Seattle, WA 98101; the submittal must include all of the assumptions and calculations used to estimate the assessable emissions in sufficient detail so EPA can verify the estimates; or

   6.2 If no estimate is received on or before March 31 of each year, emission fees for the next fiscal year will be based on the potential to emit set forth in condition 5.1.

Owner Requested Limits Rendering Prevention of Significant Deterioration (PSD) Review Unnecesary

7. **Nitrogen Oxides (NO_x) Emission Limitation.** The permittee shall not allow the sum of the emissions from the Discoverer and from support vessels operating at or within 25 miles of the drill site to exceed 245.0 tons of NO_X within any Rolling 52-week period while mobilizing, operating, and demobilizing the Discoverer within 25 miles of a drill site.

7.1 Emissions generated by the Discoverer and its support vessels shall be aggregated across multiple Discoverer drill sites only to the extent that:

a. The emissions were generated within the same 52-week period, and

b. The drill sites are located within 500 meters of one another.

(i) The perimeter of each Discoverer drill site is the hull of the Discoverer.

7.2 Emissions generated by the Discoverer and its support vessels shall be aggregated with emissions from another OCS source owned or operated by permittee and its support vessels only to the extent that:

a. The emissions were generated within the same 52-week period, and

b. The drill sites are located within 500 meters of one another.

(i) The perimeter of each Discoverer drill site is the hull of the Discoverer, and the perimeter of each OCS source drill site is the hull of the OCS source.

7.3 When the Discoverer and its support vessels are in transit to or from another drill site less than 25 miles away, attribute the emissions as follows:

a. Half of the transit emissions shall be attributed to one of the two drill sites, and

b. The other half of the transit emissions shall be attributed to the other drill site.

7.4 The permittee shall calculate and record the Rolling 52-week NO_X Emissions by adding the most recent Weekly NO_X Emissions to the preceding 51 Weekly NO_X Emissions.

a. The permittee shall calculate and record both the Weekly NO_X Emissions and the Rolling 52-week NO_X Emissions for activities within 25 miles of a drill site according to the following frequency:

(i) No later than 3 days after the end of the week if the Discoverer is at the drill site on the last day of the week.

(ii) No later than 3 days after the Discoverer has left the drill site if the Discoverer leaves the drill site before the last day of the week.

7.5 The permittee shall report to EPA Rolling 52-week NO_X Emissions as follows:

a. The permittee shall report to EPA a summary of Rolling 52-week NO_X Emissions annually to EPA. The report shall be submitted no later than December 31 for time period beginning December 1 (of the previous calendar year) and ending November 30.

b. The permittee shall report to EPA any exceedance of Condition 7 within 3 days of identification.

7.6 The permittee shall calculate and record Weekly NO_X Emissions pursuant to Condition 7.7, Condition 7.8, and Condition 7.9.

a. Condition 7.7 shall be used in those instances when the permittee is monitoring, or is attempting to monitor, a Source Group's collective fuel usage at least once every 7 days.

b. Condition 7.8 shall be used in those instances when the permittee is monitoring, or is attempting to monitor, each Source Unit's power output at least once every 15 minutes. This applies to all Source Units within a Source Group.

c. Condition 7.9 shall be used for each incinerator

d. Definitions.

(i) A Source Group is a group of emission units for which overall emissions are characterized by either:

(A) A single worst-case fuel-based emission factor, or

(B) A common set of load-dependent emission factors.

(ii) A Source Unit is an emission unit within a Source Group for which overall emissions are characterized by a common set of load-dependent emission factors.

7.7 The permittee shall calculate and record Weekly NO_X Emissions for each Source Group as follows:

$$\text{Weekly } NO_X \text{ Emissions (tons)} = \left[\sum_{i=SourceGroup} (F_i \times EF_i)_i \right] / 2000,$$

i = Source Group
F_i = fuel consumption for Source Group i in units of "gallons diesel fuel combusted per week"
EF_i = emission factor for Source Group i in units of "lb NO_X emitted per gallon diesel fuel combusted"

a. The permittee shall use Source Group-specific emission factors established pursuant to Condition 8.1.a. or 8.1.b.

b. The permittee shall monitor and record cumulative Source Group fuel usage at least once every 7 days.

(i) Each fuel flow meter used to satisfy the requirement of Condition 7.7.b. shall measure the fuel flow rate with accuracy equal to or better than 2 percent of the meter's upper range value.

(ii) Collect information from the manufacturer of each fuel flow meter so as to determine its accuracy. Submit this information to EPA 45 days prior to operation within 25 miles of a drill site.

(iii) Maintain the accuracy of each fuel flow meter in accordance with manufacturer's recommendations.

c. For each week that the permittee fails to determine cumulative Source Group fuel usage, the permittee shall determine emissions assuming the Source Group consumed diesel fuel as if operating at capacity for the week.

7.8 The permittee shall calculate and record Weekly NO_X Emissions for each Source Group as follows:

$$\text{Weekly } NO_X \text{ Emissions (tons)} = \left[\sum_{j=SourceUnit} \left[\sum_{n=readings} L_{j,n} \times EFE_{j,n} \right] \div m_j \right] / 2000,$$

j = Source Unit within Source Group
m_j = number of load readings observed for a given hour for Source Unit j
n = number of load readings observed during the week for Source Unit j
$L_{j,n}$ = power output in units of "kilowatts" measured for Source Unit j during a given time interval during which a load reading is observed
$EFE_{j,n}$ = load-dependent emission factor for Source Group i in units of "lb NO_X emitted per Kilowatt-hour of power output"

a. The permittee shall use Source Group-specific emission factors established pursuant to Condition 8.1.b.

b. The permittee shall monitor and record Source Unit load at least once every 15 minutes.

(i) For each hour that the permittee fails to determine Source Unit load at least once every 15 minutes, the permittee shall determine emissions utilizing the worst-case load-based emission (highest combined factor and load within range) established for the Source Group pursuant to Condition 8.1.b.

7.9 The permittee shall record Weekly NO_X Emissions for incinerators as 0.04 tons per week.

8. Source Group-Specific NO_X Emission Factors.

8.1 Selection of Fuel-Based Emission Factor or Load-Based Emission Factor.

a. The permittee shall calculate NO_X emissions by utilizing fuel-based emission factors for Source Groups A2, A3, A4, B3, B4, C2, C3, D, and E as provided in Table 3.

Table 3 – Discoverer Source Group Emission Factors

Source Group Description	Source Group	EF (lb NO_X / gal)
Discoverer propulsion engine	A2	0.455
Discoverer boilers	A4	0.028
Discoverer remaining sources	A3	0.654
Kapitan Dranitsyn other engines	B3	0.455
Kapitan Dranitsyn boiler	B4	0.020
Fennica/Nordica other engines	C2	0.455
Fennica/Nordica boilers	C3	0.020
Jim Kilabuk sources	D	0.654
Oil Spill Response Fleet sources	E	0.472

b. The permittee shall calculate NO_X emissions by utilizing either a fuel-based emission factor or a load-based emission factor for Source Groups A1, B1, B2, and C1 as follows:

(i) Until new emission factors are approved by EPA pursuant to Condition 8.2, the emission factors in Table 4 shall be utilized.

Table 4 – Discoverer Initial Source Group Emission Factors

Source Group Description	Source Group	EF (lb/gal)	EF (lb NO_X / kW-hr)
Discoverer electrical generator engines	A1	0.294	0.0219
Kapitan Dranitsyn propulsion engines	B1	0.455	0.0340
Kapitan Dranitsyn auxiliary engines	B2	0.455	0.0340
Fennica/Nordica propulsion engines	C1	0.375	0.0280

(ii) Upon EPA approval of a new emission factor, the new emission factor shall be utilized to calculate emissions beginning with the day upon which

stack testing was performed to develop the new emission factor, except that:

(A) New emission factors based upon stack testing conducted in 2007 shall be utilized to calculate all emissions generated during 2007.

8.2 Development and Approval of New Emission Factors for Source Groups A1, B1, B2, and C1.

a. Within 24 days of commencing operation at the first drill site, the permittee shall conduct stack testing as follows:

(i) Perform a stack test according to an EPA-approved stack test protocol on each class of engine within Source Groups B1, B2, and C1 at three or more load points representing the expected operating range of the engines: 35%, 57% and 80%.

(ii) Perform a stack test according to an EPA-approved stack test protocol on one of the three engines within Source Group A1 at three or more load points representing the expected operating range of the engines: 50%, 75% and 100%.

(iii) Before conducting any stack tests, the permittee shall submit a plan to EPA. The plan must include the methods and procedures to be used for sampling, testing, and quality assurance, and must specify how the emission unit will operate during the test and how the permittee will document that operation. The permittee shall submit a complete plan within at least 30 days before the scheduled date of any test unless EPA agrees in writing to some other time period. Retesting may be done without resubmitting the plan.

b. Within 15 days of completing the testing, the permittee shall submit to EPA a new emission factor for approval. A stack test report is to be submitted along with the permittee's request for a new emission factor.

(i) The proposed fuel-based emission factor shall be equivalent to the worst-case emissions as reflected in the stack test results. The units of the fuel-based emission factor are "lb NO_X / gal."

(ii) The proposed load-based emission factor shall be a linear regression curve of emission factor as a function of load. The units of the load-based emission factor are "lb NO_X / Kw-hr."

c. The new emission factor shall be considered approved within 15 days of its receipt at EPA unless:

(i) EPA disapproves the new emission factor, or

(ii) EPA requests additional information.

9. **Sulfur Dioxide (SO_2) Emission Limitation.** The permittee shall not combust any liquid fuel with sulfur content greater than 0.19 percent by weight in any emission unit on the Discoverer or a support vessel.[6]

a. Monitoring and Recordkeeping. Monitor and keep records as follows:

(i) Prior to mobilizing the Discoverer for the first time at the beginning of a drilling season, determine the sulfur content in each fuel oil storage tank on the Discoverer and all support vessels. The permittee shall obtain a representative sample of the fuel and analyze the sample for sulfur content using ASTM D-129, D-2622, or D-4294.

(ii) Thereafter, determine and record the sulfur content upon receiving each fuel shipment.

(A) Obtain a representative sample of the fuel delivered and analyze the sample for sulfur content using ASTM D-129, D-2622, or D-4294; or

(B) Obtain a single certification of sulfur content for each shipment of fuel from the fuel supplier based on an analysis of the fuel, providing that the certification indicates that the sulfur content has been determined by one of the ASTM methods listed above.

b. Within 3 days of identification, report to EPA any instance of a liquid fuel with sulfur content greater than 0.19 percent by weight being combusted in any emission unit on the Discoverer or a support vessel.

Standard for Incinerators

10. Visible Emissions. The permittee shall not cause or allow visibility through the exhaust effluent of an incinerator to be reduced by visible emissions, excluding condensed water vapor, by more than 20 percent averaged over any six consecutive minutes.

10.1 Performance Test. Within 24 days of initial operation of Unit FD-22, observe Unit FD-22 exhaust for visible emissions using Method 9. Observe its exhaust, following 40 C.F.R. 60, Appendix A-4, Method 9, for 6 minutes to obtain 24 consecutive 15-second opacity observations.

[6] Unit's FD-8, FD-12, FD-12, FD-13, FD-14, FD-15, FD-16, FD-17, FD-18, and FD-19 are further restricted to combusting only liquid fuel with a sulfur content less than 0.05 percent by weight pursuant to Condition 12.3.

a. If performance testing under Condition 10.1.a was accomplished previously at another drill site, no further performance testing is required for the remainder of that drilling season.

10.2 For each performance test conducted, record the following items:

a. the name of the stationary source, emissions unit and location, stationary source type, observer's name and affiliation, and the date on the Visible Emissions Field Data Sheet in Section 2.

b. the time, estimated distance to the emissions location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), plume background, and operating rate (load or fuel consumption rate) on the sheet at the time opacity observations are initiated and completed;

c. the presence or absence of an attached or detached plume and the approximate distance from the emissions outlet to the point in the plume at which the observations are made;

d. opacity observations to the nearest five percent at 15-second intervals on the Visible Emissions Observation Record in Section 2; and

e. the minimum number of observations required by the permit; each momentary observation recorded shall be deemed to represent the average opacity of emissions for a 15-second period.

10.3 For each performance test conducted, report the results to EPA within 30 days of completing the test.

Standard for Fuel-Burning Equipment

11. Visible Emissions. The permittee shall not cause or allow visible emissions, excluding condensed water vapor, emitted from stationary source-related fuel-burning equipment to reduce visibility through the exhaust effluent by any one of the following:

a. More than 20 percent averaged over any six consecutive minutes,

b. More than 20 percent for a total of more than three minutes in any one hour[7].

[7] For purposes of this permit, the "more than three minutes in any one hour" criterion in this condition will no longer be effective if the Air Quality Control (18 AAC 50) regulation package effective May 3, 2002, is approved by EPA into the Alaska Implementation Plan.

11.1 Performance Test. Within 24 days of initial operation of an emissions unit, observe its exhaust, following 40 C.F.R. 60, Appendix A-4, Method 9, for 6 minutes to obtain 24 consecutive 15-second opacity observations. This condition applies to Units FD-1 through FD-6 and FD-8 through FD-21.

a. If performance testing under Condition 11.1 was accomplished previously at another drill site for a particular emissions unit, no further monitoring is required for that emissions unit for the remainder of that drilling season.

11.2 For each performance test conducted, record the following items:

a. The name of the stationary source, emissions unit and location, stationary source type, observer's name and affiliation, and the date on the Visible Emissions Field Data Sheet in Section 2.

b. The time, estimated distance to the emissions location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), plume background, and operating rate (load or fuel consumption rate) on the sheet at the time opacity observations are initiated and completed;

c. The presence or absence of an attached or detached plume and the approximate distance from the emissions outlet to the point in the plume at which the observations are made;

d. Opacity observations to the nearest five percent at 15-second intervals on the Visible Emissions Observation Record in Section 2; and

e. The minimum number of observations required by the permit; each momentary observation recorded shall be deemed to represent the average opacity of emissions for a 15-second period.

11.3 For each performance test conducted, report the results to EPA within 30 days of completing the test.

12. **Particulate Matter.** The permittee shall not cause or allow particulate matter emitted from fuel-burning equipment to exceed, per cubic foot of exhaust gas corrected to standard conditions and averaged over three hours, 0.05 grains.

12.1 The permittee shall not operate Units FD-8, FD-12, FD-12, FD-13, FD-14, FD-15, FD-16, FD-17, FD-18, and FD-19 without a diesel exhaust particulate matter filter system.

a. Document the installation of the each particulate matter filter system and the resultant pollution control efficiency as installed.

b. Report the data required by Condition 12.1.a within 30 days of initial operation of an emissions unit.

12.2 The permittee shall maintain each diesel exhaust particulate matter filter system per the manufacturer's maintenance procedures.

a. Maintain on-site a copy of the manufacturer's maintenance procedures.

b. Record any actions taken to verify and maintain each particulate matter filter system's pollution control efficiency.

12.3 The permittee shall not combust any liquid fuel with sulfur content greater than 0.05 percent by weight in Units FD-8, FD-12, FD-12, FD-13, FD-14, FD-15, FD-16, FD-17, FD-18, and FD-19.

a. Monitor and keep records as follows:

(i) Prior to mobilizing the Discoverer for the first time at the beginning of a drilling season, the permittee shall determine the sulfur content in each fuel oil storage tank supplying fuel to Units FD-8, FD-12, FD-12, FD-13, FD-14, FD-15, FD-16, FD-17, FD-18, and FD-19. Obtain a representative sample of the fuel and analyze the sample for sulfur content using ASTM D-129, D-2622, or D-4294.

(ii) Thereafter, determine the sulfur content upon receiving each fuel shipment.

(A) Obtain a representative sample of the fuel delivered and analyze the sample for sulfur content using ASTM D-129, D-2622, or D-4294; or

(B) Obtain a single certification of sulfur content for each shipment of fuel from the fuel supplier based on an analysis of the fuel, providing that the certification indicates that the sulfur content has been determined by one of the ASTM methods listed above.

b. Within 3 days of identification, report to EPA any instance of a liquid fuel with sulfur content greater than 0.05 percent by weight being combusted in Unit FD-8, FD-12, FD-12, FD-13, FD-14, FD-15, FD-16, FD-17, FD-18, and FD-19.

13. Sulfur Compound Emissions. The permittee shall not cause or allow sulfur compound emissions, expressed as sulfur dioxide, to exceed 500 ppm averaged over three hours.

13.1 Monitoring and Recordkeeping. Monitor and keep records of the sulfur content in the fuel combusted pursuant to Condition 9.a.

13.2 Report to EPA pursuant to Condition 9.b.

Generally Applicable Requirements

14. **Ambient Impacts.** The permittee shall not cause or contribute to a violation of a national ambient air quality standard or the standards of Alaska (18 AAC 50.110).

15. **Good Air Pollution Control Practices.** The permittee shall maintain and operate Emission Units in Source Groups A1, A2, K, and T, listed in Table 1, according to the manufacturer recommendations.

16. **Recordkeeping Requirements.** The permittee shall keep all records required by this permit for at least five years after the date of collection.

17. **Certification.** The permittee shall certify all reports, or other documents submitted to the EPA and required under the permit by including the signature of a responsible official for the permitted stationary source following the statement: "Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete." All reports and documents must be certified upon submittal.

18. **Termination.** This approval shall become invalid if construction of the Kulluk exploratory drilling activity is not commenced within 18 months after the effective date of this permit, or if construction of the activity is discontinued for a period of 18 months, unless EPA extends the 18-month period upon a satisfactory showing that an extension is justified, pursuant to 40 CFR 55.6(b)(4).

Section 2. Permit Documentation

Date of Document	Description of Document
December 29, 2006	Application for Minor Permit
February 7, 2007	Supplement to Application
March 26, 2007	Supplement to Application
March 29, 2007	Supplement to Application

Section 3. Attachments/Forms

Permit No. R10OCS-AK-07-02 - Visible Emissions Field Data Sheet

Certified Observer: _____

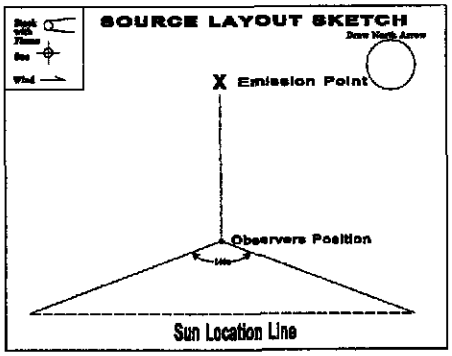
Company & Stationary Source: _____

Location: _____

Test No.: _____ Date: _____

Emission Unit: _____

Operating Rate: _____



Clock Time	Initial				Final
Observer location Distance to discharge					
Direction from discharge					
Height of observer point					
Background description					
Weather conditions Wind Direction					
Wind speed					
Ambient temperature					
Relative humidity					
Sky conditions: (clear, overcast, % clouds, etc.)					
Plume description: Color					
Distance visible					
Water droplet plume? (Attached or detached?)					
Other information					

Permit No. R10OCS-AK-07-02 - Visible Emissions Observation Record

Page ___ of ___

Company & Stationary Source_____ Certified Observer_____

Test Number_____ Clock time_____

Date:		Visibility Reduction Every 15 Seconds (Opacity)				Steam Plume (check if applicable)		Comments
Hr	Min	0	15	30	45	Attached	Detached	

Additional information:

_____ _____

Observer Signature and Date Certified By and Date

Data Reduction:

Duration of Observation Period (minutes) _____ Duration Required by Permit (minutes)_____

Number of Observations _____ Highest Six –Minute Average Opacity (%)_____

Number of Observations exceeding 20 % _____

Average Opacity Summary

Set Number	Time Start—End	Opacity	
		Sum	Average