



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10

1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

OUTER CONTINENTAL SHELF
PREVENTION OF SIGNIFICANT DETERIORATION
PERMIT TO CONSTRUCT

Permit Number: R10OCS/PSD-AK-09-01 Issuance Date: March 31, 2010

In accordance with the provisions of Clean Air Act (CAA) Section 328 and Code of Federal Regulations (CFR) Title 40, Part 55, and the provisions of Part C to Title I of the CAA and 40 CFR § 52.21,

Shell Gulf of Mexico Inc.
3601 C Street, Suite 1000
Anchorage, AK 99503

is authorized to construct and operate the Frontier Discoverer drillship and its air emission units and to conduct other air pollutant emitting activities in accordance with the permit conditions listed in this permit, and only at the following lease blocks from the Chukchi Sea lease sale 193:

- NR02-02: 6819 6820 6821 6822 6868 6869 6870 6871 6872 6918 6919 6920 6921 6922 6968 6969 6970 6971 6972 7018 7019 7020 7021 7022 7023 7068 7069 7072
NR03-01: 6105 6106 6155 6156 6161 6162 6211 6212 6261 6363 6364 6413 6414 6415 6418 6419 6462 6463 6464 6465 6467 6468 6469 6512 6513 6514 6515 6516 6517 6518 6519 6562 6563 6564 6565 6567 6568 6569 6612 6613 6614 6615 6616 6617 6618 6665 6666 6667 6668 6705 6706 6712 6715 6716 6717 6753 6754 6755 6756 6761 6762 6765 6766 6767 6803 6804 6805 6810 6811 6812 6813 6814 6815 6816 6817 6853 6854 6855 6860 6861 6862 6863 6864 6865 6866 6903 6904 6905 6908 6909 6910 6911 6912 6913 6914 6915 6916 6953 6954 6955 6956 6957 6958 6959 6960 6961 6962 6963 6964 6965 7006 7007 7008 7009 7010 7011 7012 7013 7014 7056 7057 7058 7059 7060 7061 7062 7063 7106 7107 7108 7109 7110 7119
NR03-02: 6114 6115 6161 6163 6164 6165 6213 6214 6215 6220 6259 6261 6263 6264 6265 6270 6271 6321 6322 6359 6360 6371 6372 6409 6410 6422 6423 6459 6508 6558 6608 6658 6671 6672 6708 6713 6714 6715 6721 6722 6757 6761 6762 6763 6764 6765 6766 6771 6807 6811 6812 6813 6814 6815 6816 6817 6856 6862 6863 6864 6865 6866 6905 6912 6913 6914 6915 6916
NR04-01: 6352 6401 6402 6452 6453 6503 6504 6554 6604
NR03-03: 6007 6008 6009 6010 6017 6018 6020 6056 6057 6058 6059 6067 6068 6070 6108 6219 6560 6561 6609 6610 6611 6658 6659 6660 6709 6721 6722 6723 6759 6771 6772 6773 6823

Terms not otherwise defined in this permit have the meaning assigned to them in the referenced statutes and regulations. All terms and conditions of the permit are enforceable by the United States Environmental Protection Agency and citizens under the Clean Air Act.

/S/

Richard Albright
Director, Office of Air, Waste and Toxics

March 31, 2010
Date

ABBREVIATIONS AND ACRONYMS

BACT.....	Best Available Control Technology
CFR.....	Code of Federal Regulations
CO.....	Carbon Monoxide
EPA.....	United States Environmental Protection Agency
hp.....	brake horsepower
kW.....	kiloWatts (mechanical)
kWe.....	kiloWatts electrical
lbs.....	pounds
MMBtu/hr.....	Million British thermal units per hour
NA.....	Not applicable
NAAQS.....	National Ambient Air Quality Standards
NH ₃	Ammonia
NMHC.....	Non-methane hydrocarbons
NO _x	Oxides of Nitrogen
OCS.....	Outer Continental Shelf
PM.....	Particulate Matter
PM _{2.5}	Particulate Matter with an aerodynamic diameter less than 2.5 microns
PM ₁₀	Particulate Matter with an aerodynamic diameter less than 10 microns
ppmv.....	parts per million by volume
PSD.....	Prevention of Significant Deterioration
PTE.....	Potential to Emit
QA/QC.....	Quality Assurance/Quality Control
SCR.....	Selective Catalytic Reduction
SO ₂	Sulfur Dioxide
VOC.....	Volatile Organic Compound

AUTHORITY

The United States Environmental Protection Agency (EPA) is proposing to issue this outer continental shelf (OCS)/prevention of significant deterioration (PSD) permit pursuant to Section 328 of the CAA, 42 U.S.C. § 7627, and the implementing OCS regulations at 40 CFR Part 55, and pursuant to Part C to Title I of the CAA, 42 USC §§ 7470 to 7492, and the implementing PSD air quality regulations at 40 CFR § 52.21. This proposed action is based upon the application initially submitted by Shell Offshore Inc. on December 19, 2008, supplemental submittals identified in the administrative record for this permit action, and upon the technical analysis performed by EPA.

FINDINGS

On the basis of the information in the administrative record, EPA has determined that:

1. The permittee will meet all of the applicable requirements of the 40 CFR Part 55;
2. The permittee will meet all of the applicable requirements of the 40 CFR § 52.21.

APPROVAL CONDITIONS

Shell Gulf of Mexico Inc. (Shell or permittee) is authorized to construct and operate the vessels and emission units listed in Tables 1 through 5, at any of the lease blocks identified on Page 1 of this permit, and consistent with the representations in the permit application and subject to the conditions in this permit.

Table 1 – Frontier Discoverer Emission Units

ID	Description	Make and Model	Rating ^a
FD-1 – 6	Generator Engines	Caterpillar D399 SCAC 1200 rpm	1,325 hp
FD-7	Propulsion Engine	Mitsubishi 6UEC65	7,200 hp
FD-8	Emergency Generator	Caterpillar 3304	131 hp
FD-9 – 11	MLC Compressor Engines	Caterpillar C-15	540 hp
FD-12 – 13	HPU Engines	To be determined	250 hp
FD-14	Port Deck Crane Engine	Caterpillar D343	365 hp
FD-15	Starboard Deck Crane Engine	Caterpillar D343	365 hp
FD-16 – 17	Cementing Unit Engines	Detroit 8V-71N	335 hp
FD-18	Cementing Unit Engine	GM 3-71	147 hp
FD-19	Logging Winch Engine	Caterpillar C7	250 hp
FD-20	Logging Winch Engine	John Deere PE4020TF270D	35 hp
FD-21 – 22	Heat Boilers	Clayton 200	7.97 MMBtu/hr
FD-23	Incinerator	TeamTec GS500C	276 lb/hr
FD-24 -30	Fuel Tanks	Not applicable (NA)	Various
FD-31	Supply Ship Generator Engine(s)	Generic	584 hp
FD-32	Drilling Mud System	NA	NA
FD-33	Shallow Gas Diverter System	NA	NA

^a Permit conditions may limit operation to less than rated capacity.

Table 2 – Icebreaker #1

Description	Make and Model	Maximum Aggregate Rating ^a
Aggregate of Propulsion Engines and Generator Engines	Various	31,200 hp
Generator Engine(s)	Various	2,800 hp
Heat Boiler(s)	Various	10 MMBtu/hr
Incinerator	Various	154 lbs/hr

^a Permit conditions may limit operation to less than rated capacity.

Table 3 – Icebreaker #2

ID	Description	Make and Model	Rating ^a
Tor Viking			
TV-1 - 2	Main Propulsion Engines	Caterpillar MaK 8M32	5,046 hp
TV-3 - 4	Main Propulsion Engines	Caterpillar MaK 6M32	3,784 hp
TV-5 – 6	Non-propulsion Generator Engines	Caterpillar 3412	1,168 hp
TV-7	Heat Boiler	NA	1.37 MMBtu/hr
TV-8	Incinerator	NA	151 lb/hr
Hull 247^b			
	Main Engines	NA	24 MW ^c
	Heat Boiler	NA	4 MMBtu/hr
	Incinerator	NA	151 lb/hr

^a Permit conditions may limit operation to less than rated capacity.

^b Hull 247 is the shipbuilder's (Edison Chouest) designation for a vessel to be built under contract to Shell. The final name for the vessel may be different than this temporary designation.

^c This represents an aggregate rating of all engines on board Hull 247.

Table 4 – Supply Ship

Description	Make and Model	Maximum Aggregate Rating ^a
Propulsion Engines and Non-Propulsion Generator Engine(s), Excluding Emergency Engine	Various	7,784 hp
Propulsion Engines only	Various	7,200 hp
Emergency Engine	Various	200 kW

^a Permit conditions may limit operation to less than rated capacity.

Table 5 – Oil Spill Response Fleet

ID	Description	Make and Model	Rating ^a
Oil Spill Response Main Ship - Nanuq			
N-1 – 2	Propulsion Engines	Caterpillar 3608	2,710 kW
N-3 – 4	Electrical Generators	Caterpillar 3508	1,285 hp
N-5	Emergency Generator	John Deere	166 kW
N-6	Incinerator	ASC/CP100	125 lbs/hr
Oil Spill Response Work Boat - Kvichak 34-foot No. 1			
K-1 – 2	Propulsion Engines	Cummins QSB	300 hp
K-3	Generator Engines	Various	12 hp
Oil Spill Response Work Boat - Kvichak 34-foot No. 2			
K-4 – 5	Propulsion Engines	Cummins QSB	300 hp
K-6	Generator Engines	Various	12 hp
Oil Spill Response Work Boat - Kvichak 34-foot No. 3			
K-7 – 8	Propulsion Engines	Cummins QSB	300 hp
K-9	Generator Engines	Various	12 hp

^a Permit conditions may limit operation to less than rated capacity.

Effective Date. This permit becomes effective 30 days after the service of notice of the final permit decision, unless review of the permit decision is requested pursuant to 40 CFR § 124.19.

OCS Source. Permit conditions contained in Sections B through Q, except for those conditions addressing notification, reporting and testing, apply only during the time that the Frontier Discoverer drillship (Discoverer) is an OCS Source. Permit conditions in Sections A and R as well as permit conditions contained in Sections B through Q addressing notification, reporting and testing apply at all times as specified.

For the purpose of this permit, the Discoverer is an “OCS Source” between the time the Discoverer is declared by the Discoverer’s on-site company representative to be secure and stable in a position to commence exploratory activity at the drill site until the Discoverer’s on-site company representative declares that, due to retrieval of anchors or disconnection of its anchors, it is no longer sufficiently stable to conduct exploratory activity at the drill site, as documented by the records maintained pursuant to Condition B.2.2.

A. GENERALLY APPLICABLE REQUIREMENTS

- 1. Construction and Operation.** The permittee shall construct and operate the OCS Source and the Associated Fleet in accordance with the application and supporting materials submitted by the permittee as identified in the Statement of Basis for this permit action and in accordance with this permit. For purposes of this permit, Icebreaker #1, Icebreaker #2, the supply ship, the Nanuq and Kvichaks No. 1-3 shall collectively be referred to as the “Associated Fleet.”
- 2. Compliance Required.** The permittee shall comply with all requirements of 40 CFR § 52.21, Part 55, and this permit. Failure to do so shall be considered a violation of Section

111(e) and 165 of the CAA. All enforcement provisions of the CAA, including but not limited to, Section 113, 114, 120, 167, 303, and 304 apply to the permittee.

3. **Compliance with Other Requirements.** This permit does not relieve the permittee of the responsibility to comply fully with applicable provisions of any other requirements under federal law.
4. **Notification to Owners, Operators, and Contractors.** The permittee must notify all other owners or operators, contractors, and the subsequent owners or operators associated with emissions from the source of the conditions of this permit.
5. **Expiration of Approval to Construct.** As provided in 40 CFR § 52.21(f)(4), this approval shall become invalid if construction is not commenced within 18 months after the effective date of this permit, construction is discontinued for a period of 18 months, or construction is not completed within a reasonable time. EPA may extend the 18-month period upon a satisfactory showing that an extension is justified.
6. **Permit Revision, Termination and Reissuance.** This permit may be revised, terminated, or revoked and reissued by EPA for cause. Cause exists to revise, terminate, or revoke and reissue this permit under the following circumstances:
 - 6.1 This permit contains a material mistake;
 - 6.2 Materially inaccurate statements were made in establishing the terms or conditions of this permit;
 - 6.3 The permittee fails to comply with any material condition of this permit; or
 - 6.4 This permit must be revised, terminated, or revoked and reissued to assure compliance with Clean Air Act requirements.

A request by the permittee for modification, revocation and reissuance, or termination or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

7. **Credible Evidence.** For the purpose of establishing whether or not the permittee has violated or is in violation of any requirement of this permit, nothing in this permit shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether the permittee would have been in compliance with applicable requirements if the appropriate performance or reference test or procedure had been performed.
8. **Inspection and Entry.** Upon presentation of credentials and other documents as may be required by law, the permittee shall allow EPA or an authorized representative to perform the following:
 - 8.1 Enter upon the Discoverer, any support vessel, any location where emissions-related activity is conducted, or any location where records must be kept under the conditions of the permit;
 - 8.2 Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit;

- 8.3 Inspect at reasonable times any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and
- 8.4 As authorized by the Clean Air Act, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the permit or applicable requirements.

9. Recordkeeping Requirements. In addition to the specific recordkeeping requirements contained in the source-wide and emission unit sections of this permit, the permittee shall keep records of required monitoring information that include the following:

- 9.1 The date, place, and time of sampling or measurements;
- 9.2 The date(s) analyses were performed;
- 9.3 The company or entity that performed the analyses;
- 9.4 The analytical techniques or methods used;
- 9.5 The results of such analyses;
- 9.6 The operating conditions as existing at the time of sampling or measurement;
- 9.7 Copies of all reports and certifications submitted pursuant to this permit; and
- 9.8 The locations where samples were taken.

The permittee shall retain records of all required monitoring data and support information for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records, all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by this permit.

10. Agency Notifications. Unless otherwise specified in this permit, any documents required to be submitted under this permit, including reports, test data, monitoring data, notifications, and applications for renewals and permit modifications shall be submitted to:

OCS/PSD Air Quality Permits
U.S. EPA - Region 10, AWT-107
1200 Sixth Avenue, Suite 900
Seattle, WA 98101
Facsimile no. 206-553-0110

- 11. Certification.** Any document required to be submitted under this permit shall be certified by a responsible official, as that term is defined in 40 CFR § 71.2, of the permittee as to truth, accuracy, and completeness. Such certification shall state that based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.
- 12. Severability.** The provisions of this permit are severable, and in the event of any challenge to any portion of this permit, or if any portion is held invalid, the remaining permit conditions shall remain valid and in force.

13. **Property Rights.** This permit does not convey any property rights of any sort, or any exclusive privilege.
14. **Information Request.** The permittee shall furnish the EPA, within a reasonable time, any information the EPA requests in writing to determine whether cause exists to modify, revoke and reissue, or terminate the permit or to determine compliance with the permit. Upon request, the permittee shall furnish the EPA with copies of records required to be kept by the permit.
15. **Excess Emission and Permit Deviation Reports.** Except as provided in Condition A.16, the permittee shall report all emissions or operations that exceed or deviate from the requirements of this permit as follows
 - 15.1 As soon as possible after the event commences or is identified, report via fax or email
 - 15.1.1 Emissions that present a potential threat to human health or safety; and
 - 15.1.2 Excess emissions that the permittee believes to be unavoidable.
 - 15.2 Within 3 business days after the event commenced or was identified, report via fax or email an unavoidable emergency, malfunction, or non-routine repair that causes emissions in excess of a technology based emission standard; any other exceedance of an emission limit; or any other exceedance of a throughput limit;
 - 15.3 Report all other permit deviations
 - 15.3.1 Within 30 days of the end of the month in which the deviation occurs, except as provided in Conditions A.15.1 and A.15.2; and
 - 15.3.2 For failure to monitor, as required in other applicable conditions of this permit.
 - 15.4 When reporting excess emissions, the permittee must report using the form contained in Attachment A to this permit. The permittee must provide all information called for by the form.
 - 15.5 When reporting a permit deviation, the permittee must report using the form contained in Attachment A to this permit. The permittee must provide all information called for by the form.
 - 15.6 If requested by the EPA, the permittee shall provide a more detailed written report as requested to follow up on an excess emissions report.
16. **Operating Reports.** During the life of this permit¹, the permittee shall submit an original and two copies of an Operating Report by March 31 for the preceding calendar year.
 - 16.1 The Operating Report must include all information required to be in Operating Reports by other conditions of this permit.

¹ “Life of this permit” is defined as the permit effective dates, including any periods of reporting obligations that extend beyond the permit effective dates. For example, if a permit expires prior to the end of a calendar year, there is still a reporting obligation to provide operating reports for the periods when the permit was in effect.

- 16.2 If excess emissions or permit deviations that occurred during the reporting period are not reported under Condition A.15, either
 - 16.2.1 The permittee shall identify:
 - 16.2.1.1 The date of the deviation;
 - 16.2.1.2 The equipment involved;
 - 16.2.1.3 The permit condition affected;
 - 16.2.1.4 A description of the excess emissions or permit deviation; and
 - 16.2.1.5 Any corrective action or preventive measures taken and the date or dates of such actions; or
 - 16.2.2 When excess emissions or permit deviations have already been reported under Condition A.15, the permittee shall cite the date or dates of those reports.
- 16.3 The Operating Report must include a listing of emissions monitored which trigger additional testing or monitoring, whether or not the emissions monitored exceed an emission standard. The permittee shall include in the report:
 - 16.3.1 The date of the emissions;
 - 16.3.2 The equipment involved;
 - 16.3.3 The permit condition affected; and
 - 16.3.4 The monitoring result which triggered the additional monitoring.

B. SOURCE-WIDE REQUIREMENTS

- 1. **Drill Site Notification.** At least 10 days prior to the Discoverer becoming an OCS Source, the permittee shall notify EPA via facsimile of the following information:
 - 1.1 The location of the proposed drill site, using coordinates in the following formats:
 - 1.1.1 Latitude and longitude, and
 - 1.1.2 Universal Transverse Mercator grid system.
 - 1.2 The lease block within the Chukchi Sea lease sale 193 where the drill site is located;
 - 1.3 The proposed date that the Discoverer will become an OCS Source at that drill site;
 - 1.4 Confirmation that emissions from the source would impact no Class I area. The confirmation shall include a description of the legal and factual basis for this determination; and
 - 1.5 Confirmation that emissions from the source would impact no area where an applicable increment was known to be violated. The confirmation shall include a description of the legal and factual basis for this determination.

2. Duration of Exploration Operations. The permittee shall only conduct exploration drilling operations in the Chukchi Sea between July 1 and December 31 each year (referred to hereafter as the “drilling season”).

2.1 During any rolling 12-month period, the permittee shall not operate the Discoverer as an OCS Source in excess of 168 calendar days. Each partial day shall be counted as a calendar day.

2.2 For each drill site at which the Discoverer operates, the permittee shall record the following:

2.2.1 The location of each drill site, using a modern global positioning system to determine the location. Location shall be recorded by providing coordinates in the following formats:

2.2.1.1 Latitude and longitude, and

2.2.1.2 Universal Transverse Mercator grid system.

2.2.2 The lease block within the Chukchi Sea lease sale 193 where the drill site is located;

2.2.3 The date and hour that the Discoverer became an OCS Source at that drill site;

2.2.4 The date and hour that the Discoverer ceased to be an OCS Source at that drill site.

2.3 Any time spent drilling a relief well shall be included in the time recorded in Conditions B.2.2.3 and B.2.2.4.

3. Drilling Season Notification. Each drilling season, the permittee shall report to EPA via facsimile the information below, within 3 days of occurrence:

3.1 The date and hour that the Discoverer became an OCS Source at the first drill site of that drilling season; and

3.2 The date and hour that the Discoverer ceased to be an OCS Source at the last drill site of that drilling season.

4. Best Available Control Technology (BACT) for Sulfur Dioxide (SO₂) Emissions from Discoverer Emission Units. The permittee shall not combust any liquid fuel with sulfur content greater than 0.0015 percent by weight, as determined by Condition B.4.1, in any emission unit on the Discoverer (except for Unit FD-7).

4.1 Representative fuel samples shall be obtained using one of the methods in 40 CFR § 80.330(b). The sulfur content of the fuel shall be determined using ASTM D 5453-08b.

4.2 Monitoring, Recordkeeping and Reporting. The permittee shall:

4.2.1 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. The permittee shall obtain a representative sample of the

- fuel and analyze the sample for sulfur content using the procedures in Condition B.4.1.
- 4.2.2 Thereafter, determine and record the sulfur content upon receiving each fuel shipment, as follows:
- 4.2.2.1 Obtain a representative sample of the fuel delivered and analyze the sample for sulfur content using the procedures in Condition B.4.1; or
- 4.2.2.2 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 the ASTM method listed in Condition B.4.1.
- 4.3 Within 3 business days of identification, report to EPA any instance of a liquid fuel with sulfur content greater than 0.0015 percent by weight being combusted in any emission unit on the Discoverer (except Unit FD-7).
- 5. SO₂ PTE Limit for Associated Fleet.** The permittee shall not combust any liquid fuel with sulfur content greater than 0.0015 percent by weight, as determined by Condition B.5.1, in any emission unit on any vessel in the Associated Fleet.
- 5.1 Representative fuel samples shall be obtained using one of the methods in 40 CFR § 80.330(b). The sulfur content of the fuel shall be determined using ASTM D 5453-08b.
- 5.2 Monitoring, Recordkeeping and Reporting. The permittee shall:
- 5.2.1 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 vessels comprising the Associated Fleet. The permittee shall obtain a representative sample of the fuel and analyze the sample for sulfur content using the procedures in Condition B.5.1.
- 5.2.2 Thereafter, determine and record the sulfur content upon receiving each fuel shipment, as follows:
- 5.2.2.1 Obtain a representative sample of the fuel delivered and analyze the sample for sulfur content using the procedures in Condition B.5.1; or
- 5.2.2.2 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 the ASTM method listed in Condition B.5.1.
- 5.3 Within 3 business days of identification, report to EPA any instance of a liquid fuel with sulfur content greater than 0.0015 percent by weight being combusted in any emission unit on any vessel in the Associated Fleet.

6. **BACT for Particulate Matter Emissions (PM, PM10, and PM2.5) from Discoverer Diesel IC Engine Crankcase Ventilation.** Except for the MLC Diesel Compressor Engines (FD-9 - 11) and the Caterpillar C7 Logging Winch Engine (FD-19), each diesel IC engine on the Discoverer shall be equipped with a closed crankcase ventilation (CCV) system.
7. **General Testing Requirements.** Whenever conducting a stack test required by this permit, and unless specifically stated otherwise in this permit, the permittee shall comply with the following testing requirements in addition to the specific testing requirements contained in the emission unit sections of this permit:
 - 7.1 The permittee shall provide EPA at least 30 days prior notice of any stack test. If after 30 days notice for an initially scheduled stack test, there is a delay in conducting the scheduled stack test, the permittee shall notify EPA as soon as possible of any delay in the original test date, either by providing at least 7 days prior notice of the rescheduled date of the stack test, or by arranging a rescheduled date with EPA by mutual agreement.
 - 7.2 The permittee shall submit to EPA a complete stack test plan within 60 days after receiving a request under Condition B.7.14 and at least 30 days prior to any required testing unless EPA agrees in writing to some other time period. Retesting may be done without resubmitting the plan provided it is conducted in accordance with the previously submitted plan. The source test plan shall include and address the following elements:
 - 7.2.1 Purpose and scope of testing;
 - 7.2.2 Source description, including a description of the operating scenarios and mode of operation during testing and including fuel sampling and analysis procedures;
 - 7.2.3 Schedule/dates of testing;
 - 7.2.4 Process data to be collected during the test and reported with the results, including source-specific data identified in the emission unit sections of this permit;
 - 7.2.5 Sampling and analysis procedures, specifically requesting approval for any proposed alternatives to the reference test methods, and addressing minimum test length (e.g., one hour, 8 hours, 24 hours, etc.) and minimum sample volume;
 - 7.2.6 Sampling location description and compliance with the reference test methods;
 - 7.2.7 Analysis procedures and laboratory identification;
 - 7.2.8 Quality assurance plan;
 - 7.2.9 Calibration procedures and frequency;
 - 7.2.10 Sample recovery and field documentation;
 - 7.2.11 Chain of custody procedures;
 - 7.2.12 Quality Assurance (QA)/Quality Control (QC) project flow chart;

- 7.2.13 Data processing and reporting;
- 7.2.14 Description of data handling and QC procedures; and
- 7.2.15 Report content and timing.
- 7.3 Unless EPA determines in writing that other operating conditions are representative of normal operations or unless specified in the emission unit sections of this permit, the source shall be operated at a capacity of at least 90% but no more than 100% of maximum during all tests.
- 7.4 Unless otherwise specified by an applicable requirement or test method, the permittee shall conduct source testing at a point or points that characterize the actual discharge into the ambient air.
- 7.5 Only regular operating staff may adjust the processes or emission control devices during or within 2 hours prior to the start of a source test. Any operating adjustments made during a source test, that are a result of consultation during the tests with source testing personnel, equipment vendors, or consultants, may render the source test invalid.
- 7.6 For the duration of each test run (unless otherwise specified), the permittee shall record the following information:
 - 7.6.1 All data which is required to be monitored during the test in the emission unit sections of this permit; and
 - 7.6.2 All continuous monitoring system data which is required to be routinely monitored in the emission unit sections of this permit for the emission unit being tested.
- 7.7 Each source test shall follow the reference test methods specified by this permit and consist of at least three (3) valid test runs. For purposes of this permit:
 - 7.7.1 EPA Test Methods 1, 2, 3A, 4, 5, 6C, 7E, 9, 10, 19, and 25A are set forth in 40 CFR Part 60, Appendix A;
 - 7.7.2 EPA Test Methods 201, 201A and 202 are set forth in 40 CFR Part 51, Subpart M;
 - 7.7.3 Conditional Test Method 027 (CTM-027), “Procedure for Collection and Analysis of Ammonia in Stationary Sources,” is set forth at <http://www.epa.gov/ttn/emc/ctm.html>;
 - 7.7.4 Conditional Test Method 038 (CTM-038), “Measurement of Ammonia Emissions from Highway, Nonroad, and Stationary Use Diesel Engines by Extractive Fourier Transform Infrared (FTIR) Spectroscopy,” is set forth at <http://www.epa.gov/ttn/emc/ctm.html>;
 - 7.7.5 Other Test Method 27 (OTM 27), “Determination of PM₁₀ and PM_{2.5} Emissions from Stationary Sources (Constant Sampling Rate Procedure),” is set forth at <http://www.epa.gov/ttn/emc/prelim.html>;
 - 7.7.6 Other Test Method 28 (OTM 28), “Dry Impinger Method for Determining Condensable Particulate Emissions from Stationary Sources,” is set forth at <http://www.epa.gov/ttn/emc/prelim.html>; and

- 7.7.7 ASTM D 5453-09 is set forth at <http://www.astm.org/Standards/D5453.htm>
- 7.8 Facilities for performing and observing the emission testing shall be provided that meet the requirements of 40 CFR § 60.8(e) and EPA Method 1.
- 7.9 Emission test reports shall be submitted to EPA within 45 days of completing any emission test required by this permit along with items required to be recorded in Condition B.7.6 above.
- 7.10 EPA Methods 1, 2, 3A, 3B, 4 and 19 shall be used as necessary to convert the measured NO_x, PM, PM₁₀, PM_{2.5} and CO emissions into units of the emission limits in the permit.
- 7.11 Source test emission data shall be reported as the arithmetic average of all valid test runs and in the terms of any applicable emission limit, unless otherwise specified in the emission unit sections of this permit.
- 7.12 An alternative test method or a deviation from a test method identified in this permit may be approved as follows:
- 7.12.1 The permittee must submit a written request to EPA at least 60 days before the stack test is scheduled to begin which includes the reasons why the alternative or deviation is needed and the rationale and data to demonstrate that the alternative test method or deviation from the reference test method:
- 7.12.1.1 Provides equal or improved accuracy and precision as compared to the specified reference test method; and
- 7.12.1.2 Does not decrease the stringency of the standard as compared to the specified reference test method.
- 7.12.2 If requested by EPA, the demonstration referred to in Condition 7.12.1 must use Method 301 in 40 CFR Part 63, Appendix A, to validate the alternative test method or deviation.
- 7.12.3 EPA must approve the request in writing.
- 7.12.4 Until EPA has given written approval to use an alternative test method or to deviate from the test method specified in this permit, the permittee is required to use the test method specified in this permit when conducting a source test under this permit.
- 7.13 The permittee may request an extension to a source test deadline established by the EPA. The permittee may delay a source test beyond the original deadline only if the extension is approved in writing by EPA.
- 7.14 In addition to any source testing explicitly required by this permit, the permittee shall conduct source testing as requested by the EPA to determine compliance with applicable permit requirements.

8. Prohibited Activities. The permittee shall not:

- 8.1 Flow test wells,
- 8.2 Flare gas,
- 8.3 Store liquid hydrocarbons recovered during well testing,

- 8.4 Refuel any vessel (including the Discoverer, and excluding the Kvichak workboats) within 25 miles of the Discoverer, while the Discoverer is an OCS Source, or
- 8.5 Allow any vessel associated with this project, and that is not authorized by Tables 1 through 5 of this permit, to approach within 25 miles of the Discoverer, while the Discoverer is an OCS Source.
- 9. Monthly Emissions Calculations.** By the tenth of each month, the permittee shall, using monitoring data collected pursuant to the requirements of this permit, calculate and record the monthly emissions of CO, NO_x, PM_{2.5}, PM₁₀, SO₂ and VOC for the preceding month.
- 10. Rolling 12-Month Emissions Calculations.** By the tenth of each month, the permittee shall calculate and record the rolling 12-month emissions of CO, NO_x, PM_{2.5}, PM₁₀, SO₂ and VOC by using the monthly emissions calculated for the previous 12 months pursuant to Condition B.9.
- 11. Good Operating and Maintenance Requirements.** At all times, including periods of startup, shutdown, and malfunction, the permittee shall, to the extent practicable, maintain and operate each emission unit, including any associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to EPA which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. The permittee shall keep records of any maintenance that would have a significant effect on emissions (the records may be kept in electronic format) and keep a copy of either the manufacturer's or the operator's maintenance procedures.

C. DISCOVERER GENERATOR ENGINES (FD-1 – 6)

- 1. Operation of Selective Catalytic Reduction (SCR) Unit.** At all times that any of Units FD-1 – 6 are in operation, the exhaust from each Unit shall be directed to an operating SCR unit.
- 2. Operation of Oxidation Catalyst.** At all times that any of Units FD-1 – 6 are in operation, the exhaust from each Unit shall be directed to an operating oxidation catalyst.
- 3. BACT Limits.** Emissions from each generator engine (Units FD-1 – 6) shall not exceed the emission limits specified for each of the pollutants below:
- 3.1 **Nitrogen oxides (NO_x):** 0.50 grams (g) per kilowatt-hour (kW-hr)
- 3.1.1 For compliance with Condition C.3.1, measurement of NO_x shall be determined using EPA Method 7E.
- 3.2 **Ammonia (NH₃):** 5 parts per million by volume (ppmv) at actual stack gas conditions
- 3.2.1 For compliance with Condition C.3.2, measurement of NH₃ shall be determined using EPA Conditional Test Method 027 or 038.
- 3.3 **Particulate Matter (PM):** 0.127 g/kW-hr
- 3.3.1 For compliance with Condition C.3.3, measurement of PM shall be

determined using EPA Method 5.

3.4 **Particulate Matter with an aerodynamic diameter less than 10 microns (PM₁₀):** 0.127 g/kW-hr

3.4.1 For compliance with Condition C.3.4, measurement of PM₁₀ shall be determined using EPA Method 201/201A and Other Test Method (OTM) 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

3.5 **Particulate Matter with an aerodynamic diameter less than 2.5 microns (PM_{2.5}):** 0.127 g/kW-hr.

3.5.1 For compliance with Condition C.3.5, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

3.6 **Visible Emissions:** Visible emissions, excluding condensed water vapor, shall not reduce visibility through the exhaust effluent more than 20 percent averaged over any six consecutive minutes.

3.6.1 For compliance with Condition C.3.6, measurement of visible emissions shall be determined using EPA Method 9.

3.7 **Carbon Monoxide (CO):** 0.1790 g/kW-hr

3.7.1 For compliance with Condition C.3.7, measurement of CO shall be determined using EPA Method 10.

3.8 **Volatile Organic Compounds (VOC):** 0.0230 g/kW-hr

3.8.1 For compliance with Condition C.3.8, measurement of VOC shall be determined using EPA Method 25A.

4. **Potential to Emit (PTE) Emission Limits.** Emissions from all six generator engines in aggregate (Units FD-1 – 6) shall not exceed the emission limits specified for each of the pollutants below:

4.1 **Nitrogen oxides (NO_x):** 9.000 tons/rolling 12-month period

4.1.1 For compliance with Condition C.4.1, measurement of NO_x shall be determined using EPA Method 7E.

4.2 **Particulate Matter with an aerodynamic diameter Less than 10 microns (PM₁₀):** 28.80 lbs/day

4.2.1 For compliance with Condition C.4.2, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

- 4.3 **Particulate Matter with an aerodynamic diameter less than 2.5 microns (PM_{2.5}):** 28.80 lbs/day
- 4.3.1 For compliance with Condition C.4.3, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
5. **Electrical Power Output Limit.** The permittee shall not operate Units FD-1 – 6 such that aggregate electrical power from the attached generators is in excess of 3,872 kWe for any hour that these units are operated.
6. **Stack Test Requirements.** The permittee shall stack test all of Units FD-1 – 6 as follows:
- 6.1 At the start of the first drilling season that the Discoverer operates under this permit in the Chukchi Sea, all six of Units FD-1 – 6 shall have been stack tested under the requirements of this section.
- 6.2 Each stack test shall be conducted at three different loads: 50%, 75% and 100%.
- 6.3 Each stack test run shall test for emissions of CO, NO_x, PM_{2.5}, PM₁₀, VOC, ammonia and visible emissions.
- 6.4 During each test run, the permittee shall monitor and record the following information:
- 6.4.1 Quantity of fuel used (in gallons);
- 6.4.2 Density of the fuel used (in lbs/gallon);
- 6.4.3 Heat content of the fuel used (in Btu/gallon); and
- 6.4.4 Electrical power produced (in kWe-hr).
- 6.5 For each engine, each load, and each pollutant, the permittee shall determine emission factors in the following units: g/kW-hr, g/kWe-hr, lbs/kW-hr, lbs/kWe-hr and lbs/gallon.
7. **Monitoring, Recordkeeping and Reporting:** The permittee shall:
- 7.1 Equip each of the generator engines (Units FD-1 – 6) on board the Discoverer with a electrical output monitoring device:
- 7.1.1 Each electrical output monitoring device shall measure the electrical output of the generator attached to each engine with an accuracy equal to or better than 2 percent of the engine’s maximum output (in kWe);
- 7.1.2 Each electrical output monitoring device shall measure the electrical output of the generator attached to each engine at least once every 10 minutes;
- 7.1.3 Each electrical output monitoring device shall be equipped to record each reading taken as well as provide and record average loads for each hour.

- 7.2 Maintain the accuracy of each electrical output monitoring device in accordance with manufacturer's recommendations.
- 7.3 Monitor and record the power output, in kWe, resulting from the operation of each of Units FD-1 – 6 at least once every 10 minutes;
- 7.4 Monitor and record the following operational parameters for each SCR, at least once every 10 minutes:
 - 7.4.1 The operational status of urea pump;
 - 7.4.2 The stack temperature upstream of the catalyst in either Celsius (°C), or Fahrenheit (°F); and
 - 7.4.3 The load level of all engines exhausting to the SCR system.
- 7.5 Monitor and record the hourly NO_x emissions from the exhaust of each engine, at least once per hour.
- 7.6 Each month, calculate and record NO_x emissions in g/kW-hr from each engine for each hour during the month, using the emission factors collected under Condition C.6.5 and power output data collected under Condition C.7.3, and converted to kW (mechanical).
- 7.7 Each day, calculate and record for the previous calendar day, the emissions of NO_x, PM_{2.5} and PM₁₀ in pounds per day from each engine by using the emission factors for each tested engine collected under Condition C.6.5 and electrical load data collected under Condition C.7.3, to determine emissions from that source. Emissions shall be calculated for each ten-minute load reading for each engine.
- 7.8 For the purposes of Conditions C.7.6 and C.7.7, if a specific emission unit has not been tested yet, the permittee shall use the highest emission factor for the corresponding load from the test results for any of the generator engines that have already been tested.
- 7.9 For the purposes of Condition C.7.7, if a specific load reading is missing, the permittee shall calculate the emissions for that missing load reading by using the emission factor and load combination that results in the highest emissions rate for that emissions unit. If the engine in question has not been tested yet, the permittee shall use the emission factor as provided for in Condition C.7.8.
- 7.10 For the purpose of Condition C.7.7, if either the urea pump is not operating or if the catalyst inlet temperature, measured in Condition C.7.4.2, is less than 250°C, calculate emissions of NO_x for the affected time period by using an uncontrolled emission factor obtained by applying a 95% NO_x-reduction efficiency to the emission factor determined pursuant to Condition C.6.5

D. DISCOVERER PROPULSION ENGINE (FD-7)

1. The permittee shall not operate Unit FD-7 for any reason when operating the Discoverer as an OCS Source.
2. The permittee shall report to EPA via facsimile any deviation from Condition D.1 within 3 business days of identification.

E. DISCOVERER EMERGENCY GENERATOR (FD-8)

1. The permittee shall operate Unit FD-8 for no more than:
 - 1.1 120 minutes during any one day; and
 - 1.2 48 hours during any rolling 12-month period.
2. For each instance in which Unit FD-8 is operated while the Discoverer is an OCS Source, the permittee shall record the duration of the episode and the reason for operating.
3. The permittee shall report to EPA via facsimile any deviation from Condition E.1 within 3 business days of identification.

F. MLC COMPRESSOR ENGINES (FD-9 - 11)

1. **Operation of Oxidation Catalyst.** At all times that any of Units FD-9 – 11 are in operation, the exhaust from each Unit shall be directed to an operating oxidation catalyst.
2. **BACT Limits.** Emissions from each MLC compressor engine (Units FD-9 – 11) shall not exceed the emission limits specified for each of the pollutants below:
 - 2.1 **NO_x and non-methane hydrocarbons (NMHC), in aggregate:** 4.0 g/kW-hr
 - 2.1.1 For compliance with Condition F.2.1, measurement of NO_x shall be determined using EPA Method 7E.
 - 2.1.2 For compliance with Condition F.2.1, measurement of NMHC shall be determined using EPA Method 25A.
 - 2.2 **PM:** 0.10 g/kW-hr
 - 2.2.1 For compliance with Condition F.2.2, measurement of PM shall be determined using EPA Method 5.
 - 2.3 **PM₁₀:** 0.10 g/kW-hr
 - 2.3.1 For compliance with Condition F.2.3, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 2.4 **PM_{2.5}:** 0.10 g/kW-hr
 - 2.4.1 For compliance with Condition F.2.4, measurement of PM_{2.5} shall be

determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

- 2.5 **Visible Emissions:** Visible emissions, excluding condensed water vapor, shall not reduce visibility through the exhaust effluent more than 20 percent averaged over any six consecutive minutes.
- 2.5.1 For compliance with Condition F.2.5, measurement of visible emissions shall be determined using EPA Method 9.
- 2.6 **CO:** 1.86 g/kW-hr.
- 2.6.1 For compliance with Condition F.2.6, measurement of CO shall be determined using EPA Method 10.
3. **PTE Annual Emission Limits.** Emissions from all three MLC compressor engines (Units FD-9 – 11) in aggregate shall not exceed the emission limits specified for each of the pollutants below:
- 3.1 **NO_x:** 5.37 tons/rolling 12-month period
- 3.1.1 For compliance with Condition F.3.1, measurement of NO_x shall be determined using EPA Method 7E.
4. **PTE Daily Emission Limits.** Emissions from each MLC compressor engine (Units FD-9 – 11) shall not exceed the emission limits specified for each of the pollutants below:
- 4.1 **PM₁₀:** 2.4 lbs/day
- 4.1.1 For compliance with Condition F.4.1, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
- 4.2 **PM_{2.5}:** 2.4 lbs/day
- 4.2.1 For compliance with Condition F.4.2, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
5. **Fuel Usage Limit.** The permittee shall not use in excess of 81,346 gallons of fuel in all three of Units FD-9 – 11 in aggregate during any rolling 12-month period.
6. **Stack Test Requirements.** The permittee shall stack test all of Units FD-9 – 11 as follows:
- 6.1 At the start of the first drilling season that the Discoverer operates under this permit in the Chukchi Sea, all three of Units FD-9 – 11 shall have been stack tested under the requirements of this section.

- 6.2 Each stack test shall be conducted for the following pollutants, and at the different loads specified:
- 6.2.1 CO at one load between 50 and 70% load;
 - 6.2.2 NO_x at two loads – between 50 and 70% and between 80 and 100% loads;
 - 6.2.3 NMHC at one load between 50 and 70% load;
 - 6.2.4 PM_{2.5} at two loads – between 50 and 70% and between 80 and 100% loads;
 - 6.2.5 PM₁₀ at two loads – between 50 and 70% and between 80 and 100% loads; and
 - 6.2.6 Visible emissions at one load between 50 and 70% load.
- 6.3 During each test run, the permittee shall monitor and record the following information:
- 6.3.1 Quantity of fuel used (in gallons);
 - 6.3.2 Density of the fuel used (in lbs/gallon);
 - 6.3.3 Heat content of the fuel used (in Btu/gallon); and
 - 6.3.4 Mechanical power output (in kW).
- 6.4 For each engine, each load range, and each pollutant, the permittee shall determine emission factors in the following units: g/kW-hr, lbs/kW-hr and lbs/gallon.

7. Monitoring, Recordkeeping and Reporting: The permittee shall:

- 7.1 Equip each of Units FD-9 -11 with a diesel fuel flow meter, or install a single fuel meter for all of Units FD-9 -11:
 - 7.1.1 Each fuel flow meter shall be located so that there is no potential for fuel inflows or outflows between it and the engine(s) being served by the meter;
 - 7.1.2 Each fuel flow meter shall be totalizing and nonresettable; and
 - 7.1.3 Each fuel flow meter shall measure the fuel flow rate with accuracy equal to or better than 2 percent of the meter's upper range value.
- 7.2 No less than 60 days before initial deployment of the Discoverer to the Chukchi Sea for the first drilling season, collect information from the manufacturer of each fuel flow meter so as to determine its accuracy. Submit this information to EPA no less than 30 days prior to operation within the Chukchi Sea.
- 7.3 Maintain the accuracy of each fuel flow meter in accordance with manufacturer's recommendations.
- 7.4 Monitor and record fuel usage for each engine on a daily basis.
- 7.5 Each day, calculate and record for the previous calendar day, the emissions of NO_x, PM_{2.5} and PM₁₀ using the highest emission factor collected under Condition F.6.4 and fuel usage data collected under Condition F.7.4.

G. HPU ENGINES (FD-12 - 13)

1. Operation of Catalyzed Diesel Particulate Filter (CDPF). At all times that any of Units FD-12 – 13 are in operation, the exhaust from each Unit shall be directed to an operating CleanAIR Systems CDPF, Part No. FDA300.

- 1.1 Each CDPF shall be equipped with an operating HiBACK monitor and alarm unit, that records exhaust pressure and temperature.
- 1.2 During each day that each of Units FD-12 -13 is operated, the exhaust temperature shall be above 300°C, or 572 °F for at least 30% of the time.

2. BACT Limits. Emissions from each HPU engine (Units FD-12 – 13) shall not exceed the emission limits specified for each of the pollutants below:

- 2.1 **NO_x and NMHC**, in aggregate: 4.0 g/kW-hr
 - 2.1.1 For compliance with Condition G.2.1, measurement of NO_x shall be determined using EPA Method 7E.
- 2.2 **PM:** 0.030 g/kW-hr
 - 2.2.1 For compliance with Condition G.2.2, measurement of PM shall be determined using EPA Method 5.
- 2.3 **PM₁₀:** 0.030 g/kW-hr
 - 2.3.1 For compliance with Condition G.2.3, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
- 2.4 **PM_{2.5}:** 0.030 g/kW-hr
 - 2.4.1 For compliance with Condition G.2.4, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
- 2.5 **Visible Emissions:** Visible emissions, excluding condensed water vapor, shall not reduce visibility through the exhaust effluent more than 20 percent averaged over any six consecutive minutes.
 - 2.5.1 For compliance with Condition G.2.5, measurement of visible emissions shall be determined using EPA Method 9.
- 2.6 **CO:** 0.70 g/kW-hr.
 - 2.6.1 For compliance with Condition G.2.6, measurement of CO shall be determined using EPA Method 10.

- 3. BACT Good Combustion Practices for NO_x.** The permittee shall:
 - 3.1 Ensure that a full-time equipment maintenance specialist shall be on board at all times during operation as an OCS Source;
 - 3.2 Train operating personnel to identify signs of improper operation and maintenance, including visible plumes, and to report these events to the maintenance specialist as soon as possible, but no later than within three hours of identification;
 - 3.3 Have the maintenance specialist inspect, at least once each week, each of Units FD-12 – 13 for proper operation and maintenance consistent with the manufacturer’s recommendations;
 - 3.4 Ensure that the operation and maintenance manual provided by the manufacturer for each of Units FD-12 – 13 shall be kept on board the Discoverer at all times;
 - 3.5 Follow the manufacturer’s recommended operation and maintenance procedures for each of Units FD-12 – 13;
 - 3.6 Maintain, on board the Discoverer, a log detailing when reporting, inspections and maintenance are conducted pursuant to Conditions G.3.2, G.3.3 and G.3.5, respectively; and
 - 3.7 No less than 30 days prior to each deployment of the Discoverer to the Chukchi Sea, the permittee shall provide notice to the EPA on how the permittee shall comply with the requirements of Conditions G.3.1 and G.3.2 for the upcoming drilling season.

- 4. PTE Annual Emission Limits.** Emissions from both HPU engines (Units FD-12 – 13) in aggregate shall not exceed the emission limits specified for each of the pollutants below:
 - 4.1 **NO_x:** 8.18 tons/rolling 12-month period
 - 4.1.1 For compliance with Condition G.4.1, measurement of NO_x shall be determined using EPA Method 7E.

- 5. PTE Daily Emission Limits.** Emissions from each HPU engine (Units FD-12 – 13) shall not exceed the emission limits specified for each of the pollutants below:
 - 5.1 **PM₁₀:** 2.50 lbs/day
 - 5.1.1 For compliance with Condition G.5.1, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 5.2 **PM_{2.5}:** 2.50 lbs/day
 - 5.2.1 For compliance with Condition G.5.2, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

- 6. Annual Fuel Usage Limit.** The permittee shall not use in excess of 44,338 gallons of fuel

in both of Units FD-12 – 13 in aggregate during any rolling 12-month period.

7. Daily Fuel Usage Limits/Alternative Operating Scenarios. Units FD-12, FD-13 and FD-23 shall be operated under one of three operating scenarios: Base Operating Scenario, Alternative Operating Scenario #1 or Alternative Operating Scenario #2. The permittee shall not use fuel in excess of the following limits while operating under the operating scenarios:

- 7.1 Under Base Operating Scenario, the permittee shall not operate either of Units FD-12 - 13;
- 7.2 Under Alternative Operating Scenario #1, the permittee shall not use in excess of 352 gallons of fuel in both of Units FD-12 – 13 in aggregate during any calendar day; and
- 7.3 Under Alternative Operating Scenario #2, the permittee shall not use in excess of 704 gallons of fuel in both of Units FD-12 – 13 in aggregate during any calendar day.
- 7.4 For each calendar day that the permittee intends to operate under either of Alternative Operating Scenarios #1 or 2, the permittee shall record in a log, at the beginning of the calendar day, which scenario it will be operating under for the day. In the absence of a log entry, the permittee shall comply with the requirements applicable to the Base Operating Scenario.

8. Stack Test Requirements. The permittee shall stack test both of Units FD-12 – 13 as follows:

- 8.1 At the start of the first drilling season that the Discoverer operates under this permit in the Chukchi Sea, both of Units FD-12 – 13 shall have been stack tested under the requirements of this section.
- 8.2 Each stack test shall be conducted for the following pollutants, and at the different loads specified:
 - 8.2.1 CO at one load between 50 and 70% load;
 - 8.2.2 NO_x at two loads – between 50 and 70% and between 80 and 100% loads;
 - 8.2.3 PM_{2.5} at two loads – between 50 and 70% and between 80 and 100% loads;
 - 8.2.4 PM₁₀ at two loads – between 50 and 70% and between 80 and 100% loads;
 - 8.2.5 VOC at one load between 50 and 70% load; and
 - 8.2.6 Visible emissions at one load between 50 and 70% load.
- 8.3 During each test run, the permittee shall monitor and record the following information:
 - 8.3.1 Quantity of fuel used (in gallons);

- 8.3.2 Density of the fuel used (in lbs/gallon);
 - 8.3.3 Heat content of the fuel used (in Btu/gallon); and
 - 8.3.4 Mechanical power output (in kW).
- 8.4 For each engine, each load range, and each pollutant, the permittee shall determine emission factors in the following units: g/kW-hr, lbs/kW-hr and lbs/gallon.

9. Monitoring, Recordkeeping and Reporting: The permittee shall:

- 9.1 Equip each of Units FD-12 -13 with a diesel fuel flow meter, or install a single fuel meter for both of Units FD-12 -13:
 - 9.1.1 Each fuel flow meter shall be located so that there is no potential for fuel inflows or outflows between it and the engine(s) being served by the meter;
 - 9.1.2 Each fuel flow meter shall be totalizing and nonresettable; and
 - 9.1.3 Each fuel flow meter shall measure the fuel flow rate with accuracy equal to or better than 2 percent of the meter's upper range value.
- 9.2 No less than 60 days before initial deployment of the Discoverer to the Chukchi Sea for the first drilling season, collect information from the manufacturer of each fuel flow meter so as to determine its accuracy. Submit this information to EPA no less than 30 days prior to operation within the Chukchi Sea.
- 9.3 Maintain the accuracy of each fuel flow meter in accordance with manufacturer's recommendations.
- 9.4 Monitor and record fuel usage for each engine on a daily basis.
- 9.5 Monitor the exhaust temperature of each engine by use of the HiBACK monitor and alarm unit, whenever the engine is in operation.
- 9.6 Each day, calculate and record for the previous calendar day, the percent of operational time for each engine that the exhaust temperature was above 300°C (572°F).
- 9.7 Each day, calculate and record for the previous calendar day, the emissions of NO_x, PM_{2.5} and PM₁₀ using the highest emission factor collected under Condition G.8.4 and fuel usage data collected under Condition G.9.4.

H. DECK CRANES (FD-14 - 15)

- 1. Operation of Catalyzed Diesel Particulate Filter (CDPF).** At all times that any of Units FD-14 – 15 in operation, the exhaust from each Unit shall be directed to an operating CleanAIR Systems CDPF, Part No. 07040401AF.
 - 1.1 Each CDPF shall be equipped with an operating HiBACK monitor and alarm unit, that records exhaust pressure and temperature.
 - 1.2 During each day that each of Units FD-14 -15 is operated, the exhaust temperature shall be above 300°C, or 572°F, for at least 30% of the time.

- 2. BACT Limits.** Emissions from each deck crane engine (Units FD-14 – 15) shall not exceed the emission limits specified for each of the pollutants below:
- 2.1 **NO_x:** 10.327 g/kW-hr
 - 2.1.1 For compliance with Condition H.2.1, measurement of NO_x shall be determined using EPA Method 7E.
 - 2.2 **PM:** 0.0715 g/kW-hr
 - 2.2.1 For compliance with Condition H.2.2, measurement of PM shall be determined using EPA Method 5.
 - 2.3 **PM₁₀:** 0.0715 g/kW-hr.
 - 2.3.1 For compliance with Condition H.2.3, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 2.4 **PM_{2.5}:** 0.0715 g/kW-hr.
 - 2.4.1 For compliance with Condition H.2.4, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 2.5 **Visible Emissions:** Visible emissions, excluding condensed water vapor, shall not reduce visibility through the exhaust effluent more than 20 percent averaged over any six consecutive minutes.
 - 2.5.1 For compliance with Condition H.2.5, measurement of visible emissions shall be determined using EPA Method 9.
 - 2.6 **CO:** 0.220 g/kW-hr.
 - 2.6.1 For compliance with Condition H.2.6, measurement of CO shall be determined using EPA Method 10.
 - 2.7 **VOC:** 0.0640 g/kW-hr.
 - 2.7.1 For compliance with Condition H.2.7, measurement of VOC shall be determined using EPA Method 25A.
- 3. BACT Good Combustion Practices for NO_x.** The permittee shall:
- 3.1 Ensure that a full-time equipment maintenance specialist shall be on board at all times during operation as an OCS Source;
 - 3.2 Train operating personnel to identify signs of improper operation and maintenance, including visible plumes, and to report these events to the maintenance specialist as soon as possible, but no later than within three hours of identification;
 - 3.3 Have the maintenance specialist inspect, at least once each week, each of Units FD-

- 14 – 15 for proper operation and maintenance consistent with the manufacturer’s recommendations;
- 3.4 Ensure that the operation and maintenance manual provided by the manufacturer for each of Units FD-14 – 15 shall be kept on board the Discoverer at all times;
- 3.5 Follow the manufacturer’s recommended operation and maintenance procedures for each of Units FD-14 – 15;
- 3.6 Maintain, on board the Discoverer, a log detailing when reporting, inspections and maintenance are conducted pursuant to Conditions H.3.2, H.3.3 and H.3.5, respectively; and
- 3.7 No less than 30 days prior to initial deployment of the Discoverer to the Chukchi Sea, the permittee shall provide notice to the EPA on how the permittee shall comply with the requirements of Conditions H.3.1 and H.3.2 for the upcoming drilling season.
- 4. PTE Annual Emission Limits.** Emissions from both deck crane engines (Units FD-14 – 15) in aggregate shall not exceed the emission limits specified for each of the pollutants below:
- 4.1 **NO_x:** 9.50 tons/rolling 12-month period
- 4.1.1 For compliance with Condition H.4.1, measurement of NO_x shall be determined using EPA Method 7E.
- 5. PTE Daily Emission Limits.** Emissions from each deck crane engine (Units FD-14 – 15) shall not exceed the emission limits specified for each of the pollutants below:
- 5.1 **PM₁₀:** 0.96 lbs/day
- 5.1.1 For compliance with Condition H.5.1, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
- 5.2 **PM_{2.5}:** 0.96 lbs/day
- 5.2.1 For compliance with Condition H.5.2, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
- 6. Fuel Usage Limit.** The permittee shall not use in excess of 63,661 gallons of fuel in both of Units FD-14 – 15 in aggregate during any rolling 12-month period.
- 7. Stack Test Requirements.** The permittee shall stack test both of Units FD-14 – 15 as follows:
- 7.1 At the start of the first drilling season that the Discoverer operates under this permit in the Chukchi Sea, both of Units FD-14 – 15 shall have been stack tested under the requirements of this section.

- 7.2 Each stack test shall be conducted for the following pollutants, and at the different loads specified:
- 7.2.1 CO at one load between 60 and 80% load;
 - 7.2.2 NO_x at two loads – between 60 and 80% and between 80 and 100% loads;
 - 7.2.3 PM_{2.5} at two loads – between 60 and 80% and between 80 and 100% loads;
 - 7.2.4 PM₁₀ at two loads – between 60 and 80% and between 80 and 100% loads;
 - 7.2.5 VOC at one load between 60 and 80% load; and
 - 7.2.6 Visible emissions at one load between 60 and 80% load.
- 7.3 During each test run, the permittee shall monitor and record the following information:
- 7.3.1 Quantity of fuel used (in gallons);
 - 7.3.2 Density of the fuel used (in lbs/gallon);
 - 7.3.3 Heat content of the fuel used (in Btu/gallon); and
 - 7.3.4 Mechanical power output (in kW).
- 7.4 For each engine, each load range, and each pollutant, the permittee shall determine emission factors in the following units: g/kW-hr, lbs/kW-hr and lbs/gallon.

8. Monitoring, Recordkeeping and Reporting: The permittee shall:

- 8.1 Equip each of Units FD-14 -15 with a diesel fuel flow meter, or install a single fuel meter for both of Units FD-14 -15:
 - 8.1.1 Each fuel flow meter shall be located so that there is no potential for fuel inflows or outflows between it and the engine(s) being served by the meter;
 - 8.1.2 Each fuel flow meter shall be totalizing and nonresettable; and
 - 8.1.3 Each fuel flow meter shall measure the fuel flow rate with accuracy equal to or better than 2 percent of the meter's upper range value.
- 8.2 No less than 60 days before initial deployment of the Discoverer to the Chukchi Sea for the first drilling season, collect information from the manufacturer of each fuel flow meter so as to determine its accuracy. Submit this information to EPA no less than 30 days prior to operation within the Chukchi Sea.
- 8.3 Maintain the accuracy of each fuel flow meter in accordance with manufacturer's recommendations.
- 8.4 Monitor and record fuel usage for each engine on a daily basis.
- 8.5 Monitor and record the exhaust temperature of each engine by use of the HiBACK monitor and alarm unit, while the engine is in operation.

- 8.6 Each day, calculate and record for the previous calendar day, the percent of operational time for each engine that the exhaust temperature was above 300°C (572°F).
- 8.7 Each day, calculate and record for the previous calendar day, the emissions of NO_x, PM_{2.5} and PM₁₀ using the highest emission factor collected under Condition H.7.4 and fuel usage data collected under Condition H.8.4.

I. CEMENTING UNIT AND LOGGING WINCH ENGINES (FD-16 - 20)

1. Operation of Catalyzed Diesel Particulate Filter (CDPF). At all times that any of the cementing unit and logging winch engines (Units FD-16 – 20) are in operation, the exhaust from each Unit shall be directed to operating CleanAIR Systems CDPF, Part No. FDA300 for Units FD-16 and 17, Part No. FDA225 for Unit FD-18, and as specified by CleanAIR Systems for Units FD-19 - 20.

- 1.1 Each CDPF shall be equipped with an operating HiBACK monitor and alarm unit, that records exhaust pressure and temperature.
- 1.2 During each day that each of Units FD-16 – 20 is operated, the exhaust temperature shall be above 300°C, or 572°F, for at least 30% of the time.

2. BACT Limits. Emissions from each of Units FD-16 – 20 shall not exceed the emission limits specified for each of the pollutants below:

2.1 NO_x:

FD-16	13.155 g/kW-hr
FD-17	13.155 g/kW-hr
FD-18	15.717 g/kW-hr
FD-19	4.0 g/kW-hr
FD-20	7.50 g/kW-hr

2.1.1 For compliance with Condition I.2.1, measurement of NO_x shall be determined using EPA Method 7E.

2.2 PM:

FD-16	0.253 g/kW-hr
FD-17	0.253 g/kW-hr
FD-18	0.386 g/kW-hr
FD-19	0.03 g/kW-hr
FD-20	0.090 g/kW-hr

2.2.1 For compliance with Condition I.2.2, measurement of PM shall be determined using EPA Method 5.

2.3 PM₁₀:

FD-16	0.253 g/kW-hr
FD-17	0.253 g/kW-hr
FD-18	0.386 g/kW-hr
FD-19	0.03 g/kW-hr

FD-20 0.090 g/kW-hr

2.3.1 For compliance with Condition I.2.3, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

2.4 **PM_{2.5}:**

FD-16 0.253 g/kW-hr
FD-17 0.253 g/kW-hr
FD-18 0.386 g/kW-hr
FD-19 0.03 g/kW-hr
FD-20 0.090 g/kW-hr

2.4.1 For compliance with Condition I.2.4, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

2.5 **Visible Emissions:**

Visible emissions, excluding condensed water vapor, shall not reduce visibility through the exhaust effluent more than 20 percent averaged over any six consecutive minutes.

2.5.1 For compliance with Condition I.2.5, measurement of visible emissions shall be determined using EPA Method 9.

2.6 **CO:**

FD-16 0.40 g/kW-hr
FD-17 0.40 g/kW-hr
FD-18 0.880 g/kW-hr
FD-19 0.70 g/kW-hr
FD-20 0.550 g/kW-hr

2.6.1 For compliance with Condition I.2.6, measurement of CO shall be determined using EPA Method 10.

2.7 **VOC:**

FD-16 0.20 g/kW-hr
FD-17 0.20 g/kW-hr
FD-18 0.270 g/kW-hr
FD-19 4.0 g/kW-hr
FD-20 0.750 g/kW-hr

2.7.1 For compliance with Condition I.2.7, measurement of VOC shall be determined using EPA Method 25A.

3. BACT Good Combustion Practices for NO_x. The permittee shall:

3.1 Ensure that a full-time equipment maintenance specialist shall be on board at all

- times during operation as an OCS Source;
- 3.2 Train operating personnel to identify signs of improper operation and maintenance, including visible plumes, and to report these events to the maintenance specialist as soon as possible, but no later than within three hours of identification;
 - 3.3 Have the maintenance specialist inspect, at least once each week, each of Units FD-16 – 20 for proper operation and maintenance consistent with the manufacturer’s recommendations;
 - 3.4 Ensure that the operation and maintenance manual provided by the manufacturer for each of Units FD-16 – 20 shall be kept on board the Discoverer at all times;
 - 3.5 Follow the manufacturer’s recommended operation and maintenance procedures for each of Units FD-16 – 20;
 - 3.6 Maintain, on board the Discoverer, a log detailing when reporting, inspections and maintenance are conducted pursuant to Conditions I.3.2, I.3.3 and I.3.5, respectively; and
 - 3.7 No less than 30 days prior to initial deployment of the Discoverer to the Chukchi Sea, the permittee shall provide notice to the EPA on how the permittee shall comply with the requirements of Conditions I.3.1 and I.3.2 for the upcoming drilling season.
- 4. PTE Annual Emission Limits.** Emissions from all cementing unit and logging winch engines (Units FD-16 – 20) in aggregate shall not exceed the emission limits specified for each of the pollutants below:
- 4.1 **NO_x:** 11.84 tons/rolling 12-month period
 - 4.1.1 For compliance with Condition I.4.1, measurement of NO_x shall be determined using EPA Method 7E.
- 5. PTE Daily Emission Limits.** Emissions from all cementing unit and logging winch engines (Units FD-16 – 20) in aggregate shall not exceed the emission limits specified for each of the pollutants below:
- 5.1 **PM₁₀:** 3.46 lbs/day
 - 5.1.1 For compliance with Condition I.5.1, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 5.2 **PM_{2.5}:** 3.46 lbs/day
 - 5.2.1 For compliance with Condition I.5.2, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

6. Fuel Usage Limit. The permittee shall not use in excess of:

- 6.1 53,760 gallons of fuel in all Units FD-16 – 20 in aggregate during any rolling 12-month period; and
- 6.2 320 gallons of fuel in all Units FD-16 – 20 in aggregate during any calendar day.

7. Stack Test Requirements. The permittee shall stack test all of Units FD-16 – 20 as follows:

- 7.1 At the start of the first drilling season that the Discoverer operates under this permit in the Chukchi Sea, all of Units FD-16 – 20 shall have been stack tested under the requirements of this section.
- 7.2 Each stack test shall be conducted for the following pollutants, and at the different loads specified:
 - 7.2.1 CO at one load between 50 and 70% load;
 - 7.2.2 NO_x at two loads – between 50 and 70% and between 80 and 100% loads;
 - 7.2.3 PM_{2.5} at two loads – between 50 and 70% and between 80 and 100% loads;
 - 7.2.4 PM₁₀ at two loads – between 50 and 70% and between 80 and 100% loads;
 - 7.2.5 VOC at one load between 50 and 70% load; and
 - 7.2.6 Visible emissions at one load between 50 and 70% load.
- 7.3 During each test run, the permittee shall monitor and record the following information:
 - 7.3.1 Quantity of fuel used (in gallons);
 - 7.3.2 Density of the fuel used (in lbs/gallon);
 - 7.3.3 Heat content of the fuel used (in Btu/gallon); and
 - 7.3.4 Mechanical power output (in kW).
- 7.4 For each engine, each load range, and each pollutant, the permittee shall determine emission factors in the following units: g/kW-hr, lbs/kW-hr and lbs/gallon.

8. Monitoring, Recordkeeping and Reporting: The permittee shall:

- 8.1 Equip each of Units FD-16 - 20 with a diesel fuel flow meter, or install a single fuel meter for all of Units FD-16 - 20:
 - 8.1.1 Each fuel flow meter shall be located so that there is no potential for fuel inflows or outflows between it and the engine(s) being served by the meter;
 - 8.1.2 Each fuel flow meter shall be totalizing and nonresettable; and
 - 8.1.3 Each fuel flow meter shall measure the fuel flow rate with accuracy equal to or better than 2 percent of the meter's upper range value.

- 8.2 No less than 60 days before initial deployment of the Discoverer to the Chukchi Sea for the first drilling season, collect information from the manufacturer of each fuel flow meter so as to determine its accuracy. Submit this information to EPA no less than 30 days prior to operation within the Chukchi Sea.
- 8.3 Maintain the accuracy of each fuel flow meter in accordance with manufacturer's recommendations.
- 8.4 Monitor and record fuel usage for each engine on a daily basis.
- 8.5 Monitor and record the exhaust temperature of each of engines FD-16 - 20 by use of the HiBACK monitor and alarm unit, while the engine is in operation.
- 8.6 Each day, for each of engines FD-16 - 20, calculate and record for the previous calendar day, the percent of operational time for each engine that the exhaust temperature was above 300°C (572°F).
- 8.7 Each day, calculate and record for the previous calendar day, the emissions of NO_x, PM_{2.5} and PM₁₀ using the highest emission factor collected under Condition I.7.4 and fuel usage data collected under Condition I.8.4.

J. HEAT BOILERS (FD-21 - 22)

1. BACT Limits. Emissions from each of the heat boilers (Units FD-21 – 22) shall not exceed the emission limits specified for each of the pollutants below:

- 1.1 **NO_x:** 0.20 lbs/MMBtu
 - 1.1.1 For compliance with Condition J.1.1, measurement of NO_x shall be determined using EPA Method 7E.
- 1.2 **PM:** 0.0235 lbs/MMBtu
 - 1.2.1 For compliance with Condition J.1.2, measurement of PM shall be determined using EPA Method 5.
- 1.3 **PM₁₀:** 0.0235 lbs/MMBtu
 - 1.3.1 For compliance with Condition J.1.3, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
- 1.4 **PM_{2.5}:** 0.0235 lbs/MMBtu
 - 1.4.1 For compliance with Condition J.1.4, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
- 1.5 **Visible Emissions:** Visible emissions, excluding condensed water vapor, shall not reduce visibility through the

exhaust effluent more than 20 percent averaged over any six consecutive minutes.

1.5.1 For compliance with Condition J.1.5, measurement of visible emissions shall be determined using EPA Method 9.

1.6 **CO:** 0.0770 lbs/MMBtu

1.6.1 For compliance with Condition J.1.6, measurement of CO shall be determined using EPA Method 10.

1.7 **VOC:** 0.00140 lbs/MMBtu

1.7.1 For compliance with Condition J.1.7, measurement of VOC shall be determined using EPA Method 25A.

2. BACT Good Combustion Practices for NO_x, PM, PM_{2.5}, PM₁₀, CO and VOC. The permittee shall:

2.1 Ensure that a full-time equipment maintenance specialist shall be on board at all times during operation as an OCS Source;

2.2 Train operating personnel to identify signs of improper operation and maintenance, including visible plumes, and to report these events to the maintenance specialist as soon as possible, but no later than within three hours of identification;

2.3 Have the maintenance specialist inspect, at least once each week, each of Units FD-21 – 22 for proper operation and maintenance consistent with the manufacturer’s recommendations;

2.4 Ensure that the operation and maintenance manual provided by the manufacturer for each of Units FD-21 – 22 shall be kept on board the Discoverer at all times;

2.5 Follow the manufacturer’s recommended operation and maintenance procedures for each of Units FD-21 – 22;

2.6 Maintain, on board the Discoverer, a log detailing when reporting, inspections and maintenance are conducted pursuant to Conditions J.2.2, J.2.3 and J.2.5, respectively; and

2.7 No less than 30 days prior to initial deployment of the Discoverer to the Chukchi Sea, the permittee shall provide notice to the EPA on how the permittee shall comply with the requirements of Conditions J.2.1 and J.2.2 for the upcoming drilling season.

3. PTE Annual Emission Limits. Emissions from all heat boilers (Units FD-21 – 22) in aggregate shall not exceed the emission limits specified for each of the pollutants below:

3.1 **NO_x:** 6.46 tons/rolling 12-month period

3.1.1 For compliance with Condition J.3.1, measurement of NO_x shall be determined using EPA Method 7E.

4. PTE Daily Emission Limits. Emissions from each heat boiler (Units FD-21 – 22) shall not exceed the emission limits specified for each of the pollutants below:

4.1 **PM₁₀:** 4.50 lbs/day

4.1.1 For compliance with Condition J.4.1, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

4.2 **PM_{2.5}:** 4.50 lbs/day

4.2.1 For compliance with Condition J.4.2, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

5. Stack Test Requirements. The permittee shall stack test both of Units FD-21 – 22 as follows:

5.1 At the start of the first drilling season that the Discoverer operates under this permit in the Chukchi Sea, both of Units FD-21 – 22 shall have been stack tested under the requirements of this section.

5.2 Each stack test shall be conducted for the following pollutants, and at the different loads specified:

- 5.2.1 CO at 100% load;
- 5.2.2 NO_x at 50% and 100% loads;
- 5.2.3 PM_{2.5} at 50% and 100% loads;
- 5.2.4 PM₁₀ at 50% and 100% loads;
- 5.2.5 VOC at 100% load; and
- 5.2.6 Visible emissions at 100% load.

5.3 During each test run, the permittee shall monitor and record the following information:

- 5.3.1 Quantity of fuel used (in gallons);
- 5.3.2 Density of the fuel used (in lbs/gallon); and
- 5.3.3 Heat content of the fuel used (in Btu/gallon).

5.4 For each boiler, each load range and each pollutant, the permittee shall determine emission factors in the following units: lbs/MMBtu and lbs/gallon.

6. Monitoring, Recordkeeping and Reporting: The permittee shall:

6.1 Equip each of Units FD-21 - 22 with a diesel fuel flow meter, or install a single fuel meter for both of Units FD-21 - 22:

- 6.1.1 Each fuel flow meter shall be located so that there is no potential for fuel inflows or outflows between it and the boiler(s) being served by the meter;
- 6.1.2 Each fuel flow meter shall be totalizing and nonresettable; and

- 6.1.3 Each fuel flow meter shall measure the fuel flow rate with accuracy equal to or better than 2 percent of the meter's upper range value.
- 6.2 No less than 60 days before initial deployment of the Discoverer to the Chukchi Sea for the first drilling season, collect information from the manufacturer of each fuel flow meter so as to determine its accuracy. Submit this information to EPA no less than 30 days prior to operation within the Chukchi Sea.
- 6.3 Maintain the accuracy of each fuel flow meter in accordance with manufacturer's recommendations.
- 6.4 Monitor and record fuel usage for each boiler on a daily basis.
- 6.5 Each day, calculate and record for the previous calendar day, the emissions of NO_x, PM_{2.5} and PM₁₀ using the highest emission factor collected under Condition J.5.4 and fuel usage data collected under Condition J.6.4.

K. INCINERATOR (FD-23)

- 1. **BACT Limits.** Emissions from the incinerator (Unit FD-23) shall not exceed the emission limits specified for each of the pollutants below:
 - 1.1 **NO_x:** 5.0 lbs/ton of waste incinerated
 - 1.1.1 For compliance with Condition K.1.1, measurement of NO_x shall be determined using EPA Method 7E.
 - 1.2 **PM:** 8.20 lbs/ ton of waste incinerated
 - 1.2.1 For compliance with Condition K.1.2, measurement of PM shall be determined using EPA Method 5.
 - 1.3 **PM₁₀:** 8.20 lbs/ton of waste incinerated
 - 1.3.1 For compliance with Condition K.1.3, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 1.4 **PM_{2.5}:** 7.00 lbs/ton of waste incinerated
 - 1.4.1 For compliance with Condition K.1.4, measurement of PM_{2.5} shall be determined using OTM 27 and OTM 28, provided, however, that if proposed changes to Method 201/201A in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 1/201A shall be used in lieu of OTM 27 and if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 1.5 **CO:** 31.0 lbs/ton of waste incinerated
 - 1.5.1 For compliance with Condition K.1.5, measurement of CO shall be determined using EPA Method 10.

- 1.6 **VOC:** 3.0 lbs/ton of waste incinerated
 - 1.6.1 For compliance with Condition K.1.6, measurement of VOC shall be determined using EPA Method 25A.
2. **BACT Good Combustion Practices for NO_x, PM, PM_{2.5}, PM₁₀, CO and VOC.** The permittee shall:
 - 2.1 Ensure that a full-time equipment maintenance specialist shall be on board at all times during operation as an OCS Source;
 - 2.2 Train operating personnel to identify signs of improper operation and maintenance, including visible plumes, and to report these events to the maintenance specialist as soon as possible, but no later than within three hour of identification;
 - 2.3 Have the maintenance specialist inspect, at least once each week, Unit FD-23 for proper operation and maintenance consistent with the manufacturer’s recommendations;
 - 2.4 Ensure that the operation and maintenance manual provided by the manufacturer for Unit FD-23 shall be kept on board the Discoverer at all times;
 - 2.5 Follow the manufacturer’s recommended operation and maintenance procedures for Unit FD-23;
 - 2.6 Maintain, on board the Discoverer, a log detailing when reporting, inspections and maintenance are conducted pursuant to Conditions K.2.2, K.2.3 and K.2.5, respectively; and
 - 2.7 No less than 30 days prior to initial deployment of the Discoverer to the Chukchi Sea, the permittee shall provide notice to the EPA on how the permittee shall comply with the requirements of Conditions K.2.1 and K.2.2 for the upcoming drilling season.
3. **PTE Annual Emission Limits.** Emissions from the incinerator (Unit FD-23) shall not exceed the emission limits specified for each of the pollutants below:
 - 3.1 **NO_x:** 0.06 tons/rolling 12-month period
 - 3.1.1 For compliance with Condition K.3.1, measurement of NO_x shall be determined using EPA Method 7E.
4. **PTE Daily Emission Limits.** Emissions from the incinerator (Unit FD-23) shall not exceed the emission limits specified for each of the pollutants below:
 - 4.1 **PM₁₀:** 5.33 lbs/day
 - 4.1.1 For compliance with Condition K.4.1, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 4.2 **PM_{2.5}:** 4.55 lbs/day
 - 4.2.1 For compliance with Condition K.4.2, measurement of PM_{2.5} shall be

determined using OTM 27 and OTM 28, provided, however, that if proposed changes to Method 201/201A in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 1/201A shall be used in lieu of OTM 27 and if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

5. **PTE Throughput-Based Emission Limits.** Emissions from the incinerator (Unit FD-23) shall not exceed the emission limits specified for each of the pollutants below:
 - 5.1 **PM₁₀:** 8.20 lbs/ton of waste incinerated
 - 5.1.1 For compliance with Condition K.5.1, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 5.2 **PM_{2.5}:** 7.00 lbs//ton of waste incinerated
 - 5.2.1 For compliance with Condition K.5.2, measurement of PM_{2.5} shall be determined using OTM 27 and OTM 28, provided, however, that if proposed changes to Method 201/201A in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 1/201A shall be used in lieu of OTM 27 and if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 5.3 **SO₂:** 2.50 lbs//ton of waste incinerated
 - 5.3.1 For compliance with Condition K.5.3, measurement of SO₂ shall be determined using EPA Method 6C.
6. **Annual Waste Throughput Limit.** The permittee shall not incinerate in excess of 50,400 lbs of all types of waste in Unit FD-23 during any rolling 12-month period.
7. **Daily Fuel Usage Limits/Alternative Operating Scenarios.** Units FD-12, FD-13 and FD-23 shall be operated under one of three operating scenarios: Base Operating Scenario, Alternative Operating Scenario #1 or Alternative Operating Scenario #2. The permittee shall not incinerate waste in excess of the following limits while operating under the operating scenarios:
 - 7.1 Under Base Operating Scenario, the permittee shall not incinerate in excess of 1300 lbs of waste during any calendar day;
 - 7.2 Under Alternative Operating Scenario #1, the permittee shall not incinerate in excess of 800 lbs of waste during any calendar day; and
 - 7.3 Under Alternative Operating Scenario #2, the permittee shall not incinerate in excess of 300 lbs of waste during any calendar day.
 - 7.4 For each calendar day that the permittee intends to operate under either of Alternative Operating Scenarios #1 or 2, the permittee shall record as specified in

Condition G.7.4.

- 8. Waste Segregation Work Practice.** The permittee shall develop and implement a written waste segregation work practice plan to ensure that non-combustible items containing heavy metals that could be volatilized and emitted from the incinerator as PM are not introduced into the incinerator. The plan shall be submitted to EPA Region 10 at least 30 days prior to initial deployment of the Discoverer to the Chukchi Sea.
- 9. Stack Test Requirements.** Prior to each of the first three drilling seasons that the Discoverer operates under this permit in the Chukchi Sea, the permittee shall stack test the incinerator (Unit FD-23) as follows:

 - 9.1 Each stack test shall be conducted at full rated capacity.
 - 9.2 For the first drilling season, each stack test run shall test for emissions of CO, NO_x, PM_{2.5}, PM₁₀, SO₂ and VOC.
 - 9.3 For subsequent drilling seasons, each stack test run shall test for emissions of NO_x, PM_{2.5}, PM₁₀, and SO₂.
 - 9.4 During each test run, the permittee shall monitor and record the following information:

 - 9.4.1 Quantity of fuel used (in gallons);
 - 9.4.2 Density of the fuel used (in lbs/gallon);
 - 9.4.3 Heat content of the fuel used (in Btu/gallon);
 - 9.4.4 Quantity of waste incinerated (tons); and
 - 9.4.5 Type of waste incinerated.
 - 9.5 For each pollutant, the permittee shall determine emission factors in the following units: lbs/ton of waste incinerated.
- 10. Monitoring, Recordkeeping and Reporting:** The permittee shall:

 - 10.1 For each batch of waste charged to the incinerator:

 - 10.1.1 Record the date and time that each batch of waste was charged to the incinerator;
 - 10.1.2 Weigh the batch of waste by using a weigh scale used that shall be accurate to within 0.5 lbs; and
 - 10.1.3 Record the weight of each batch of waste charged to the incinerator.
 - 10.2 No less than 60 days before initial deployment of the Discoverer to the Chukchi Sea for the first drilling season, collect information from the manufacturer of the weigh scale to determine its accuracy. Submit this information to EPA no less than 30 days prior to operation within the Chukchi Sea.

- 10.3 Maintain the accuracy of the weigh scale in accordance with manufacturer's recommendations.
- 10.4 Monitor and record the exhaust temperature of the incinerator at least every 15 minutes.
- 10.5 Each day, calculate and record for the previous calendar day, the emissions of NO_x, PM_{2.5} and PM₁₀ using the highest emission factor collected under Condition K.9.5 and waste material incinerated throughput collected under Condition K.10.1.

L. SUPPLY SHIP GENERATOR ENGINE (FD-31)

- 1. **Operational Limits.** For events where the supply ship is attached to the Discoverer, the permittee shall:
 - 1.1 Not use in excess of 184.0 gallons of fuel per day in the non-propulsion generators (not including the emergency engine), in aggregate;
 - 1.2 Not use in excess of 1472.0 gallons of fuel during any rolling 12-month period in the non-propulsion generators (not including the emergency engine), in aggregate; and
 - 1.3 Limit the total number of events to 8 per rolling 12-month period.
- 2. **PTE Annual Emission Limits.** For events where the supply ship is attached to the Discoverer, emissions from operation of the supply ship generator engine (Unit FD-31) shall not exceed the emission limits specified for each of the pollutants below:
 - 2.1 **NO_x:** 0.43 tons/rolling 12-month period
 - 2.1.1 For compliance with Condition L.2.1, measurement of NO_x shall be determined using EPA Method 7E.
- 3. **PTE Daily Emission Limits.** For events where the supply ship is attached to the Discoverer, emissions from operation of the supply ship generator engine (Unit FD-31) shall not exceed the emission limits specified for each of the pollutants below:
 - 3.1 **PM₁₀:** 7.60 lbs/day
 - 3.1.1 For compliance with Condition L.3.1, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 3.2 **PM_{2.5}:** 7.60 lbs/day
 - 3.2.1 For compliance with Condition L.3.2, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

4. **Stack Test Requirements.** Prior to the first supply ship trip of each drilling season to resupply the Discoverer while the Discoverer is operating under this permit in the Chukchi Sea, the permittee shall stack test the supply ship generator engine (Unit FD-31) as follows:
 - 4.1 If the generator from the intended supply ship has already been tested pursuant to Conditions L.4.2 through L.4.5 during the past 5 years, no additional stack testing is required;
 - 4.2 Each stack test shall be conducted at 100% load.
 - 4.3 Each stack test run shall test for emissions of NO_x, PM_{2.5} and PM₁₀.
 - 4.4 During each test run, the permittee shall monitor and record the following information:
 - 4.4.1 Manufacturer and model no. of the engine;
 - 4.4.2 The rated capacity of the engine (in hp);
 - 4.4.3 Quantity of fuel used (in gallons);
 - 4.4.4 Density of the fuel used (in lbs/gallon);
 - 4.4.5 Heat content of the fuel used (in Btu/gallon); and
 - 4.4.6 Electrical power output (in kWe).
 - 4.5 For each engine, each load range, and each pollutant, the permittee shall determine emission factors in the following units: lbs/kWe-hr and lbs/gallon.
5. **Monitoring, Recordkeeping and Reporting:** The permittee shall:
 - 5.1 Equip each of the non-propulsion generator engines (not including the emergency engine) with a diesel fuel flow meter, or install a single fuel meter for all of these engines:
 - 5.1.1 Each fuel flow meter shall be located so that there is no potential for fuel inflows or outflows between it and the engine(s) being served by the meter;
 - 5.1.2 Each fuel flow meter shall be totalizing and nonresettable; and
 - 5.1.3 Each fuel flow meter shall measure the fuel flow rate with accuracy equal to or better than 2 percent of the meter's upper range value.
 - 5.2 No less than 60 days before the first deployment to the Chukchi Sea of a vessel as the supply ship, collect information from the manufacturer of each fuel flow meter so as to determine its accuracy. Submit this information to EPA no less than 30 days prior to departure of the supply vessel to the Chukchi Sea.
 - 5.3 Maintain the accuracy of each fuel flow meter in accordance with manufacturer's recommendations.
 - 5.4 Monitor and record fuel usage for the non-propulsion generators while the supply vessel is attached to the Discoverer.

- 5.5 For each event, record the date and time that the supply ship attaches to the Discoverer;
- 5.6 For each event, record the date and time that the supply ship detaches from the Discoverer;
- 5.7 For each event, record the manufacturer, model no. and rated capacity (in hp) of the supply ship generator engine; and
- 5.8 For each event, calculate daily emissions of NO_x, PM_{2.5} and PM₁₀ using the highest emission factor collected under Condition L.4.5 and fuel usage data collected under Condition L.5.4.

M. SHALLOW GAS DIVERTER SYSTEM (FD-33)

1. Shallow Gas Diversions. The permittee shall:

- 1.1 Record the frequency and duration of each shallow gas diversion.
- 1.2 Report the frequency and duration of each shallow gas diversion no later than February 1st for the time period beginning January 1st and ending December 31st of the preceding year.

N. ICEBREAKER #1

1. Aggregate Capacity Limits. For a given drilling season, the permittee may select any vessel as Icebreaker #1, subject to the following conditions:

- 1.1 The total capacity of all propulsion engines on Icebreaker #1 shall not exceed 28,400 hp.
- 1.2 The total capacity of all generator engines on Icebreaker #1 shall not exceed 2,800 hp.
- 1.3 The total capacity of all boilers on Icebreaker #1 shall not exceed 10 MMBtu/hr.
- 1.4 The total capacity of all incinerators on Icebreaker #1 shall not exceed 154 lbs/hr.
- 1.5 Total uncontrolled emissions of PM_{2.5} from all emission sources on board Icebreaker #1 shall not exceed 42.20 lbs/hour.
 - 1.5.1 For compliance with Condition N.1.5, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 1.5.2 For the purposes of Condition N.1.5, emissions from each emission unit shall be based on operation of that emission unit at 100% of rated capacity, except for the propulsion engines, for which emissions shall be based on operation of that emission unit at 80% of rated capacity.

- 1.6 Total uncontrolled emissions of PM₁₀ from all emission sources on board Icebreaker #1 shall not exceed 48.0 lbs/hour.
 - 1.6.1 For compliance with Condition N.1.6, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 1.6.2 For the purposes of Condition N.1.6, emissions from each emission unit shall be based on operation of that emission unit at 100% of rated capacity, except for the propulsion engines, for which emissions shall be based on operation of that emission unit at 80% of rated capacity.
- 1.7 No later than 45 days prior to deployment to the Chukchi Sea each drilling season, the permittee shall provide notification to EPA of the vessel selected as Icebreaker #1. The notification shall include a list of all emission sources on board the vessel as well as manufacturer, model and rated capacity of each such emission source, and the conversion efficiency (mechanical to electrical) of each generator on board.
2. **Capacity Limit on Icebreaker #1 Propulsion Engines.** At all times while the Discoverer is an OCS Source and Icebreaker #1 is within 25 miles of the Discoverer, the permittee shall limit operation of the propulsion engines in Icebreaker #1 to no greater than 80% of rated capacity.
3. **PTE Annual Emission Limits.** At all times while the Discoverer is an OCS Source and Icebreaker #1 is within 25 miles of the Discoverer, emissions from all emission sources on Icebreaker #1 in aggregate shall not exceed the emission limits specified for each of the pollutants below:
 - 3.1 **NO_x:** 850.0 tons/rolling 12-month period
 - 3.1.1 For compliance with Condition N.3.1, measurement of NO_x shall be determined using EPA Method 7E.
4. **PTE Daily Emission Limits.** At all times while the Discoverer is an OCS Source and Icebreaker #1 is within 25 miles of the Discoverer, emissions from all emission sources on Icebreaker #1 in aggregate shall not exceed the emission limits specified for each of the pollutants below:
 - 4.1 **PM₁₀:** 1,098.0 lbs/day
 - 4.1.1 For compliance with Condition N.4.1, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 4.2 **PM_{2.5}:** 966.0 lbs/day
 - 4.2.1 For compliance with Condition N.4.2, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of

OTM 28.

5. **Electrical Power Output Limit.** At all times while the Discoverer is an OCS Source and Icebreaker #1 is within 25 miles of the Discoverer, the permittee shall not operate the internal combustion engines in excess of:
 - 5.1 28,233,704 kWe from all of the generators on board Icebreaker #1 in aggregate during any rolling 12-month period; or
 - 5.2 420,188 kWe from all of the generators on board Icebreaker #1 in aggregate during any calendar day;
6. **Fuel Usage Limit.** At all times while the Discoverer is an OCS Source and Icebreaker #1 is within 25 miles of the Discoverer, the permittee shall not use fuel in excess of:
 - 6.1 302,400 gallons in all heat boilers on board Icebreaker #1 in aggregate during any rolling 12-month period; or
 - 6.2 1,800 gallons in all heat boilers on board Icebreaker #1 in aggregate during any calendar day.
7. **Operating Location and Distance from Discoverer.** Except when transferring crew and supplies to and from the Discoverer, or traveling on other non-icebreaking activities, Icebreaker #1 shall operate outside of a cone with its apex 150 meters behind the stern of the Discoverer, plus and minus 20 degrees from the centerline of the Discoverer, and extending 4800 meters beyond the bow of the Discoverer.
 - 7.1 For the purpose of Condition N.7, the permittee shall use a global positioning system or laser range finder capable of accuracy to within 10 meters; and
 - 7.2 For each event when Icebreaker #1 enters the cone described in Condition N.7, the permittee shall record the following information:
 - 7.2.1 The time and date that Icebreaker #1 entered the cone;
 - 7.2.2 The location coordinates where Icebreaker #1 entered the cone;
 - 7.2.3 The time and date that Icebreaker #1 exited the cone;
 - 7.2.4 The location coordinates where Icebreaker #1 exited the cone;
 - 7.2.5 The purpose of Icebreaker #1 entering the cone; and
 - 7.2.6 The operating load of each engine during transit through the cone.
8. **Attachment to Discoverer.** At no time shall Icebreaker #1 be attached to the Discoverer.
9. **Volume Source Limit for Icebreaker #1.** The permittee shall ensure that the volume source release height of Icebreaker #1 is no less than 25.22 meters.
 - 9.1 For the purposes of Condition N.9, the volume source release height shall be determined by:
 - 9.1.1 The permittee shall obtain the vessel source dimensions and emission source parameters;

9.1.2 The permittee shall determine the volume source release height based on plume rise and by using the following information:

9.1.2.1 The SCREEN3 model as set forth in 40 CFR Part 51, Appendix W;

9.1.2.2 An hourly meteorological condition of “D stability,” as that term is used in 40 CFR Part 51, Appendix W;

9.1.2.3 A wind speed of 20 meters per second; and

9.1.2.4 The vessel dimensions and emission source parameters required under Condition N.9.1.1.

9.1.3 If EPA promulgates a different screening model in place of SCREEN3 in 40 CFR Part 51, Appendix W, the permittee shall use that newly promulgated screening model to determine the volume source release height.

10. Stack Test Requirements. Prior to each of the first two drilling seasons that a vessel is used as Icebreaker #1, and while the Discoverer is operating under this permit in the Chukchi Sea, the permittee shall stack test each propulsion engine, non-propulsion generator engine, boiler and incinerator on Icebreaker #1 as follows:

10.1 Each stack test on the propulsion engines shall be conducted at three different loads: 30%, 60% and 80%.

10.2 Each stack test on the non-propulsion generator engines shall be conducted at two different load ranges: 50 - 60% and 90 - 100%.

10.3 Each stack test on the boilers shall be conducted at full loads.

10.4 Each stack test on the incinerator shall be conducted at full load.

10.5 Each stack test run shall test for emissions of NO_x, PM_{2.5} and PM₁₀.

10.6 During each test run for the propulsion engines, generator engines, and boilers, the permittee shall monitor and record the following information:

10.6.1 Quantity of fuel used (in gallons);

10.6.2 Density of the fuel used (in lbs/gallon);

10.6.3 Heat content of the fuel used (in Btu/gallon); and

10.6.4 For the engines, electrical power output (in kWe).

10.7 During each test run for the incinerator, the permittee shall monitor and record the quantity of waste material incinerated (in lbs).

10.8 For each engine, each load range, and each pollutant, the permittee shall determine emission factors in the following units: lbs/kWe-hr and lbs/gallon.

10.9 For each boiler, and each pollutant, the permittee shall determine emission factors in the following units: lbs/MMBtu and lbs/gallon.

10.10 For each incinerator, and each pollutant, the permittee shall determine emission factors in the following units: lbs/ton of waste combusted.

11. Monitoring, Recordkeeping and Reporting. The permittee shall:

11.1 Equip each of the propulsion engines and generator engines on board Icebreaker #1 with an electrical output monitoring device:

11.1.1 Each electrical output monitoring device shall measure the electrical output of the generator attached to each engine with an accuracy equal to or better than 2 percent of the engine's maximum output (in kWe);

11.1.2 Each electrical output monitoring device shall measure the electrical output of the generator attached to each engine at least once every 10 minutes;

11.1.3 Each electrical output monitoring device shall be equipped to record each reading taken as well as provide and record average loads for each hour.

11.2 Maintain the accuracy of each electrical output monitoring device in accordance with manufacturer's recommendations.

11.3 Monitor and record the electrical load for each engine at least once every ten minutes, and record the average hourly load for each hour.

11.4 Equip each of the boilers on board Icebreaker #1 with a diesel fuel flow meter, or install a single fuel meter for all of the boilers:

11.4.1 Each fuel flow meter shall be located so that there is no potential for fuel inflows or outflows between it and the boiler(s) being served by the meter;

11.4.2 Each fuel flow meter shall be totalizing and nonresettable; and

11.4.3 Each fuel flow meter shall measure the fuel flow rate with accuracy equal to or better than 2 percent of the meter's upper range value.

11.5 No less than 60 days before initial deployment of the Discoverer to the Chukchi Sea for the first drilling season, collect information from the manufacturer of each fuel flow meter so as to determine its accuracy. Submit this information to EPA no less than 30 days prior to operation within the Chukchi Sea.

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

11.7 Monitor and record fuel usage for each boiler.

11.8 At least 45 days before deployment to the Discoverer each drilling season, the permittee shall notify the EPA of the volume source release height of Icebreaker #1.

11.9 Once each hour, and using a global positioning system or laser range finder capable of accuracy to within 10 meters, measure and record the date, time and location of Icebreaker #1.

11.10 Once each hour, monitor and record the date, time, direction the bow of the Discoverer is pointed, and wind direction at the Discoverer.

- 11.11 Record any instance that Icebreaker #1 attaches to the Discoverer.
- 11.12 Each day, calculate and record for the previous calendar day, the emissions of NO_x, PM_{2.5} and PM₁₀ in pounds per day from the boilers and incinerator by using the highest emission factor for each tested boiler or incinerator collected under Conditions N.10.9 and N.10.10 and fuel usage data collected under Condition N.11.7, to determine emissions from that source. For the purposes of this condition, the permittee shall assume that the incinerator has been operated continuously at the maximum operating rate, and shall use the highest emission factor collected under Condition N.10.10.
- 11.13 Each day, calculate and record for the previous calendar day, the emissions of NO_x, PM_{2.5} and PM₁₀ in pounds per day from each engine by using the emission factors for each tested engine collected under Conditions N.10.8 and electrical load data collected under Condition N.11.3, to determine emissions from that source. Emissions shall be calculated for each ten-minute load reading for each engine.
- 11.14 For the purposes of Conditions N.11.12 and N.11.13, if a specific emission unit has not been tested yet, the permittee shall use the highest emission factor for the corresponding load from the test results for any equivalent emission unit in equivalent service that has already been tested.
- 11.15 For the purposes of Conditions N.11.12 and N.11.13, if a specific load reading is missing, the permittee shall calculate the emissions for that missing load reading by using the emission factor and load combination that results in the highest emissions rate for that emissions unit. If the engine in question has not been tested yet, the permittee shall use the emission factor as provided for in Condition N.11.14.

O. ICEBREAKER #2

- 1. Icebreaker #2 Vessel Alternatives.** For a given drilling season, the permittee may use either the Tor Viking or Hull 247 as Icebreaker #2, subject to the conditions in Section O of this permit. Hull 247 is a temporary vessel name assigned by the shipbuilder, Edison Chouest. This permit is intended to apply to this vessel even when renamed with its permanent name.
 - 1.1 The total capacity of all propulsion engines on Icebreaker #2 shall not exceed 17,660 hp for the Tor Viking and 24,000 kW for Hull247;
 - 1.2 The total capacity of all non-propulsion generator engines on Icebreaker #2 shall not exceed 2,336 hp for the Tor Viking and Hull 247 shall not have electrical generation capacity in addition to the engines specified in Condition O.1.1;
 - 1.3 The total capacity of all boilers on Icebreaker #2 shall not exceed 1.37 MMBtu/hr for the Tor Viking and 4.00 MMBtu/hr for Hull 247;
 - 1.4 The total capacity of all incinerators on Icebreaker #2 shall not exceed 151.23 lbs/hr.
 - 1.5 Total uncontrolled emissions of PM_{2.5} from all emission sources on board Icebreaker #2 shall not exceed 11.4 lbs/hour.

- 1.5.1 For compliance with Condition O.1.5, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
- 1.5.2 For the purposes of Condition O.1.5, emissions from each emission unit shall be based on operation of that emission unit at 100% of rated capacity, except for the propulsion engines, for which emissions shall be based on operation of that emission unit at 80% of rated capacity.
- 1.6 Total uncontrolled emissions of PM₁₀ from all emission sources on board Icebreaker #2 shall not exceed 11.7 lbs/hour.
 - 1.6.1 For compliance with Condition O.1.6, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.
 - 1.6.2 For the purposes of Condition O.1.6, emissions from each emission unit shall be based on operation of that emission unit at 100% of rated capacity, except for the propulsion engines, for which emissions shall be based on operation of that emission unit at 80% of rated capacity.
- 1.7 No later than 45 days prior to deployment to the Chukchi Sea each drilling season, the permittee shall provide notification to EPA of the vessel selected as Icebreaker #2. The notification shall include a list of all emission sources on board the vessel as well as manufacturer, model and rated capacity of each emission source.
- 1.8 At all times that any of the engines on board Icebreaker #2 are in operation, the exhaust from each engine shall be directed to an operating SCR unit.
2. **Capacity Limit on Icebreaker #2 Propulsion Engines.** At all times while the Discoverer is an OCS Source and Icebreaker #2 is within 25 miles of the Discoverer, the permittee shall limit operation of the propulsion engines in Icebreaker #2 to 80% of rated capacity.
3. **PTE Annual Emission Limits.** At all times while the Discoverer is an OCS Source and Icebreaker #2 is within 25 miles of the Discoverer, emissions from all emission sources on Icebreaker #2 in aggregate shall not exceed the emission limits specified for each of the pollutants below:
 - 3.1 **NO_x:** 71.2 tons/rolling 12-month period
 - 3.1.1 For compliance with Condition O.3.1, measurement of NO_x shall be determined using EPA Method 7E.
4. **PTE Daily Emission Limits.** At all times while the Discoverer is an OCS Source and Icebreaker #2 is within 25 miles of the Discoverer, emissions from all emission sources on Icebreaker #2 in aggregate shall not exceed the emission limits specified for each of the pollutants below:
 - 4.1 **PM₁₀:** 280.5 lbs/day

4.1.1 For compliance with Condition O.4.1, measurement of PM₁₀ shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

4.2 **PM_{2.5}:** 272.9 lbs/day

4.2.1 For compliance with Condition O.4.2, measurement of PM_{2.5} shall be determined using EPA Method 201/201A and OTM 28, provided, however, that if proposed changes to Method 202 in 56 Fed. Reg. 12970 (March 25, 2009) become final and effective, EPA Method 202 shall be used in lieu of OTM 28.

5. Electrical Power Output Limit. At all times while the Discoverer is an OCS Source and Icebreaker #2 is within 25 miles of the Discoverer, the permittee shall not operate the internal combustion engines in excess of:

5.1 18,058,216 kWe-hr from all of the generators on board the Tor Viking in aggregate during any rolling 12-month period; or

5.2 31,904,074 kWe-hr from all of the generators on board Hull 247 in aggregate during any rolling 12-month period; or

5.3 282,867 kWe-hr from all of the generators on board the Tor Viking in aggregate during any calendar day;

5.4 423,936 kWe-hr from all of the generators on board Hull 247 in aggregate during any calendar day;

6. Fuel Usage Limit. At all times while the Discoverer is an OCS Source and Icebreaker #2 is within 25 miles of the Discoverer, the permittee shall not use fuel in excess of:

6.1 40,320 gallons in all heat boilers on board the Tor Viking in aggregate during any rolling 12-month period; or

6.2 120,960 gallons in all heat boilers on board Hull 247 in aggregate during any rolling 12-month period; or

6.3 240 gallons in all heat boilers on board the Tor Viking in aggregate during any calendar day.

6.4 720 gallons in all heat boilers on board Hull 247 in aggregate during any calendar day.

7. Operating Distance from Discoverer. Except when transferring crew and supplies to and from the Discoverer, when traveling on other non-icebreaking activities, or as provided for in Conditions O.8 and O.9, Icebreaker #2 shall operate outside of a cone with its apex 150 meters behind the stern of the Discoverer, plus and minus 20 degrees from the centerline of the Discoverer, and extending 1000 meters beyond the bow of the Discoverer.

7.1 For the purpose of Condition O.7, the permittee shall use a global positioning system or laser range finder capable of accuracy to within 10 meters.

- 7.2 For each event when Icebreaker #2 enters the cone described in Condition O.7, the permittee shall record the following information:
 - 7.2.1 The time and date that Icebreaker #2 entered the cone;
 - 7.2.2 The location coordinates where Icebreaker #2 entered the cone;
 - 7.2.3 The time and date that Icebreaker #2 exited the cone;
 - 7.2.4 The location coordinates where Icebreaker #2 exited the cone;
 - 7.2.5 The purpose of Icebreaker #2 entering the cone; and
 - 7.2.6 The operating load of each engine during transit through the cone.
8. **Anchor Handling Operations.** Notwithstanding Conditions O.7, Icebreaker #2 may operate within 1,000 meters of the Discoverer while Icebreaker #2 is being used to either set or retrieve anchors for the Discoverer.
9. **Bow Washing Operations.** Notwithstanding Conditions O.7, Icebreaker #2 may operate within 1,000 meters of the Discoverer while Icebreaker #2 is being used to remove ice from the bow of the Discoverer (i.e. bow washing), subject to the following conditions:
 - 9.1 During bow washing operations, Icebreaker #2 shall operate such that the distance from the rearmost stack on the icebreaker to the centerline (which stretches from the mid-point of the stern to the mid-point of the bow) of the Discoverer shall not be less than 100 meters;
 - 9.2 The permittee shall record the date, hour and minute that Icebreaker #2 begins its approach to the Discoverer to remove bow ice;
 - 9.3 The permittee shall, every 5 minutes after the time in Condition O.9.2, record the distance between the rearmost stack on Icebreaker #2 and the centerline of the Discoverer, until completion of bow washing operations as specified in Condition O.9.4;
 - 9.4 The permittee shall record the date, hour and minute that Icebreaker #2 returns to its ice management position at least 1,000 meters from the Discoverer;
 - 9.5 For the purpose of Condition O.9, the permittee shall use a global positioning system or laser range finder capable of accuracy to within 10 meter.
10. **Attachment to Discoverer.** At no time shall Icebreaker #2 be attached to the Discoverer.
11. **Volume Source Limit for Icebreaker #2.** The permittee shall ensure that the volume source release height of Icebreaker #2 is no less than 25.22 meters.
 - 11.1 For the purposes of Condition O.11, the volume source release height shall be determined by:
 - 11.1.1 The permittee shall obtain the vessel source dimensions and emission source parameters;
 - 11.1.2 The permittee shall determine the volume source release height based on plume rise and by using the following information:

- 11.1.2.1 The SCREEN3 model as set forth in 40 CFR Part 51, Appendix W;
- 11.1.2.2 An hourly meteorological condition of “D stability,” as that term is used in 40 CFR Part 51, Appendix W;
- 11.1.2.3 A wind speed of 20 meters per second; and
- 11.1.2.4 The vessel dimensions and emission source parameters required under Condition O.11.1.1.

11.1.3 If EPA promulgates a different screening model in place of SCREEN3 in 40 CFR Part 51, Appendix W, the permittee shall use that newly promulgated screening model to determine the volume source release height.

12. Stack Test Requirements. Prior to each of the first two drilling seasons that a vessel is used as Icebreaker #2, and while the Discoverer is operating under this permit in the Chukchi Sea, the permittee shall stack test each propulsion engine, non-propulsion generator engine, boiler and incinerator on Icebreaker #2 as follows:

- 12.1 Each stack test on the propulsion engines shall be conducted at four different loads: 20%, 40%, 60% and 80%.
- 12.2 Each stack test on the non-propulsion generator engines shall be conducted at two different load ranges: 50 – 60 % and 90 - 100%.
- 12.3 Each stack test on the boilers shall be conducted at full loads.
- 12.4 Each stack test on the incinerator shall be conducted at full load.
- 12.5 Each stack test run shall test for emissions of NO_x, PM_{2.5} and PM₁₀.
- 12.6 During each test run for the propulsion engines, generator engines, and boilers, the permittee shall monitor and record the following information:
 - 12.6.1 Quantity of fuel used (in gallons);
 - 12.6.2 Density of the fuel used (in lbs/gallon);
 - 12.6.3 Heat content of the fuel used (in Btu/gallon); and
 - 12.6.4 For the engines, electrical power output (in kWe).
- 12.7 During each test run for the incinerator, the permittee shall monitor and record the quantity of waste material incinerated (in lbs).
- 12.8 For each engine, each load range, and each pollutant, the permittee shall determine emission factors in the following units: lbs/kWe-hr and lbs/gallon.
- 12.9 For each boiler, and each pollutant, the permittee shall determine emission factors in the following units: lbs/MMBtu and lbs/gallon.
- 12.10 For each incinerator, and each pollutant, the permittee shall determine emission factors in the following units: lbs/ton of waste combusted.

13. Monitoring, Recordkeeping and Reporting. The permittee shall:

- 13.1 Equip each of the propulsion engines and generator engines on board Icebreaker #2 with an electrical output monitoring device:
 - 13.1.1 Each electrical output monitoring device shall measure the electrical output of the generator attached to each engine with an accuracy equal to or better than 2 percent of the engine's maximum output (in kWe);
 - 13.1.2 Each electrical output monitoring device shall measure the electrical output of the generator attached to each engine at least once every 10 minutes;
 - 13.1.3 Each electrical output monitoring device shall be equipped to record each reading taken as well as provide and record average loads for each hour.
- 13.2 Maintain the accuracy of each electrical output monitoring device in accordance with manufacturer's recommendations.
- 13.3 Monitor and record the electrical load for each engine at least once every ten minutes, and record the average hourly load for each hour.
- 13.4 Equip each of the boilers on board Icebreaker #2 with a diesel fuel flow meter, or install a single fuel meter for all of the boilers:
 - 13.4.1 Each fuel flow meter shall be located so that there is no potential for fuel inflows or outflows between it and the boiler(s) being served by the meter;
 - 13.4.2 Each fuel flow meter shall be totalizing and nonresettable; and
 - 13.4.3 Each fuel flow meter shall measure the fuel flow rate with accuracy equal to or better than 2 percent of the meter's upper range value.
- 13.5 No less than 60 days before initial deployment of the Discoverer to the Chukchi Sea for the first drilling season, collect information from the manufacturer of each fuel flow meter so as to determine its accuracy. Submit this information to EPA no less than 30 days prior to operation within the Chukchi Sea.
- 13.6 Maintain the accuracy of each fuel flow meter in accordance with manufacturer's recommendations.
- 13.7 Monitor and record fuel usage for each boiler.
- 13.8 At least 45 days before deployment to the Discoverer each drilling season, the permittee shall notify the EPA of the volume source release height of Icebreaker #2.
- 13.9 Once each hour, and using a global positioning system or laser range finder capable of accuracy to within 10 meters, measure and record the date, time and location of Icebreaker #2.
- 13.10 Once each hour, monitor and record the date, time, direction the bow of the Discoverer is pointed, and wind direction at the Discoverer.
- 13.11 Record any instance that Icebreaker #2 attaches to the Discoverer.

- 13.12 Each day, calculate and record for the previous calendar day, the emissions of NO_x, PM_{2.5} and PM₁₀ in pounds per day from the boilers and incinerator by using the highest emission factor for each tested boiler or incinerator collected under Conditions O.12.9 and O.12.10 and fuel usage data collected under Condition O.13.7, to determine emissions from that source. For the purposes of this condition, the permittee shall assume that the incinerator has been operated continuously at the maximum operating rate, and shall use the highest emission factor collected under Condition O.12.10.
- 13.13 Each day, calculate and record for the previous calendar day, the emissions of NO_x, PM_{2.5} and PM₁₀ in pounds per day from each engine by using the emission factors for each tested engine collected under Conditions O.12.8 and electrical load data collected under Condition O.13.3, to determine emissions from that source. Emissions shall be calculated for each ten-minute load reading for each engine.
- 13.14 For the purposes of Conditions O.13.12 and O.13.13, if a specific emission unit has not been tested yet, the permittee shall use the highest emission factor for the corresponding load from the test results from an equivalent emission unit in equivalent service that has already been tested.
- 13.15 For the purposes of Conditions O.13.12 and O.13.13, if a specific load reading is missing, the permittee shall calculate the emissions for that missing load reading by using the emission factor and load combination that results in the highest emissions rate for that emissions unit. If the engine in question has not been tested yet, the permittee shall use the emission factor as provided for in Condition O.13.14.
- 13.16 Monitor and record at least once every 15 minutes the following parameters associated with each SCR system aboard Icebreaker #2:
- 13.16.1 Operational status of urea pump; and
 - 13.16.2 Stack temperature upstream of the catalyst.
- 13.17 For the purpose of Condition O.13.13, if either the urea pump is not operating or if the catalyst inlet temperature, measured in Condition O.13.16.2, is less than 250°C, calculate emissions of NO_x for the affected time period by using an uncontrolled emission factor obtained by applying a 95% NO_x-reduction efficiency to the emission factor determined pursuant to Condition O.12.8

P. SUPPLY SHIP

- 1. Operational Limits on Supply Ship Engines.** At all times while the Discoverer is an OCS Source and the supply ship is within 25 miles of the Discoverer, the permittee shall:
- 1.1 Not operate the emergency engine;
 - 1.2 Limit operation of the propulsion engines in the supply ship to no greater than the limit as determined by the equation below:

$$\text{Operating limit (in percent of full load)} = (5760 - (X - 584)) / (7784 - X) * 100$$

Where X = maximum rating (in hp) of all non-propulsion engines (excluding emergency engine) on board the supply ship.

2. Volume Source Limit for Supply Ship. The permittee shall ensure that the volume source release height of the supply ship is no less than 15.24 meters.

2.1 For the purposes of Condition P.2, the volume source release height shall be determined by:

2.1.1 The permittee shall obtain the vessel source dimensions and emission source parameters;

2.1.2 The permittee shall determine the volume source release height based on plume rise and by using the following information:

2.1.2.1 The SCREEN3 model as set forth in 40 CFR Part 51, Appendix W;

2.1.2.2 A hourly meteorological condition of “D stability,” as that term is defined in 40 CFR Part 51, Appendix W;

2.1.2.3 A wind speed of 20 meters per second; and

2.1.2.4 The vessel dimensions and emission source parameters required under Condition P.2.1.1.

2.1.3 If EPA promulgates a new screening model in place of SCREEN3 in 40 CFR Part 51, Appendix W, the permittee shall use that newly promulgated screening model to determine the volume source release height.

3. Monitoring, Recordkeeping and Reporting. The permittee shall:

3.1 At all times while the Discoverer is an OCS Source and the supply ship is within 25 miles of the Discoverer, monitor the power output of each propulsion engine on the supply ship at least once every 15 minutes.

3.1.1 The monitored power output shall be recorded as a direct readout value as well as a percentage of the rated capacity of each engine.

3.2 At least 45 days before deployment to the Discoverer each drilling season, the permittee shall notify the EPA of the volume source release height.

3.3 For each trip to the Discoverer while the Discoverer is an OCS Source, the permittee shall record the following:

3.3.1 The date and time that the supply ship came within 25 miles of the Discoverer; and

3.3.2 After the delivery to the Discoverer, the date and time that the supply ship was no longer within 25 miles of the Discoverer.

Q. OIL SPILL RESPONSE FLEET

1. Operation of Catalyzed Diesel Particulate Filter (CDPF). At all times while the Discoverer is an OCS Source and the Nanuq is within 25 miles of the Discoverer, and any of the Nanuq propulsion engines (Units N-1 - 2) or non-propulsion generator engines

(Units N-3 -4) are in operation, the exhaust from each Unit shall be directed to operating CleanAIR Systems CDPF, as specified by CleanAIR Systems.

- 1.1 Each CDPF shall be equipped with an operating HiBACK monitor and alarm unit, that records exhaust pressure and temperature.
- 1.2 During each day that each of Units N-1 - 4 is operated, the exhaust temperature shall be above 300°C, or 572°F, for at least 30% of the time.
2. **PTE Annual NO_x Emission Limits.** At all times while the Discoverer is an OCS Source and the Nanuq is within 25 miles of the Discoverer, emissions of NO_x from operation of the Nanuq propulsion engines (Units N-1 -2) and Nanuq non-propulsion generator engines (Units N-3 – 4) shall not exceed the emission limits specified below:
 - 2.1 Nanuq propulsion engines (Units N-1 -2): 118.61 tons/rolling 12-month period
Nanuq generators (Units N-3 – 4): 53.36 tons/rolling 12-month period
 - 2.1.1 For compliance with Condition Q.2.1, measurement of NO_x shall be determined using EPA Method 7E.
3. **Fuel Usage Limit.** At all times while the Discoverer is an OCS Source and the Nanuq is within 25 miles of the Discoverer, the permittee shall not use in excess of:
 - 3.1 504,000 gallons of fuel in the Nanuq propulsion engines (Units N-1 - 2) in aggregate during any rolling 12-month period;
 - 3.2 134,400 gallons of fuel in the Nanuq non-propulsion generator engines (Units N-3 – 4) in aggregate during any rolling 12-month period;
 - 3.3 3,000 gallons of fuel in the Nanuq propulsion engines (Units N-1 - 2) in aggregate during any calendar day;
 - 3.4 800 gallons of fuel in the Nanuq non-propulsion generator engines (Units N-3 – 4) in aggregate during any calendar day.
4. **Operating Distance from Discoverer.** Except for transport of crew and supplies to and from the Discoverer or when responding to an oil spill, the oil spill response fleet shall operate such that the closest point of the fleet to the closest point on the Discoverer shall not be less than 2,000 meters.
 - 4.1 For the purpose of Condition Q.4, the permittee shall use a global positioning system or laser range finder capable of accuracy to within 10 meters.
5. **Operating Location.** Except for transport of crew and supplies to and from the Discoverer or when responding to an oil spill, the oil spill response fleet shall operate at a location that is downwind from the Discoverer.
6. **Attachment to Discoverer.** At no time shall the Nanuq or any of the Kvichak work boats be attached to the Discoverer.
7. **Stack Test Requirements.** Prior to each of the first two drilling seasons while the Discoverer is operating under this permit in the Chukchi Sea, the permittee shall stack test at least one of the Nanuq propulsion engines (Units N-1 – 2) and one of the Nanuq non-

propulsion generator engines (Units N-3 – 4) as follows:

- 7.1 At the end of two drilling seasons that the Discoverer operates under this permit in the Chukchi Sea, all of Units N-1 – 4 shall have been stack tested under the requirements of this section.
- 7.2 Each stack test shall be conducted at four different loads - 25%, 50%, 75% and 100% for the propulsion engines and at two loads – 50% and 100% for the non-propulsion engines.
- 7.3 Each stack test run shall test for emissions of NO_x.
- 7.4 During each test run, the permittee shall monitor and record the following information:
 - 7.4.1 Quantity of fuel used (in gallons);
 - 7.4.2 Density of the fuel used (in lbs/gallon);
 - 7.4.3 Heat content of the fuel used (in Btu/gallon); and
 - 7.4.4 Electrical power output (in kWe).
- 7.5 For each engine, each load, and each pollutant, the permittee shall determine emission factors in the following units: lbs/kWe-hr and lbs/gallon.

8. Monitoring, Recordkeeping and Reporting. The permittee shall:

- 8.1 Equip each of Units FD-N-1 - 4 with a diesel fuel flow meter, or install a single fuel meter for all of Units FD-N-1 - 4:
 - 8.1.1 Each fuel flow meter shall be located so that there is no potential for fuel inflows or outflows between it and the engine(s) being served by the meter;
 - 8.1.2 Each fuel flow meter shall be totalizing and nonresettable; and
 - 8.1.3 Each fuel flow meter shall measure the fuel flow rate with accuracy equal to or better than 2 percent of the meter's upper range value.
- 8.2 No less than 60 days before initial deployment of the Discoverer to the Chukchi Sea for the first drilling season, collect information from the manufacturer of each fuel flow meter so as to determine its accuracy. Submit this information to EPA no less than 30 days prior to operation within the Chukchi Sea.
- 8.3 Maintain the accuracy of each fuel flow meter in accordance with manufacturer's recommendations.
- 8.4 Monitor and record fuel usage for each propulsion and generator engine (Units N-1 – 4) on a daily basis.
- 8.5 Once each hour, and using a global positioning system or laser range finder capable of accuracy to within 10 meters, measure and record the location of the Nanuq and the distance from the closest point of the oil spill response fleet to the closest point on the Discoverer.

- 8.6 Once each hour, monitor and record the wind direction at the Discoverer.
- 8.7 Record any instance that the Nanuq or Kvichak work boats attach to the Discoverer.
- 8.8 Each day, calculate and record for the previous calendar day, the emissions of NO_x, using the highest emission factor for each tested engine collected under Condition Q.7.5 and fuel usage data collected under Condition Q.8.4.
- 8.9 Monitor and record the exhaust temperature of each engine by use of the HiBACK monitor and alarm unit, while the engine is in operation.
- 8.10 Each day, calculate and record for the previous calendar day, the percent of operational time for each engine that the exhaust temperature was above 300°C (572°F).

R. POST-CONSTRUCTION AMBIENT AIR QUALITY MONITORING

1. **Ambient Air Quality Monitoring Station.** The permittee shall install, operate and maintain a Federal Reference Method or Federal Equivalent Method ambient air quality monitoring station to measure and record PM_{2.5} concentration data in accordance with EPA, 1984a: *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*, EPA-450/4-87-007, May 1987, U.S. Environmental Protection Agency, Research Triangle Park, NC..
 - 1.1 An alternative PM_{2.5} monitoring station may be used in lieu of the required monitoring station provided that approval of the monitoring station is obtained from EPA;
 - 1.2 The permittee shall use a continuous sampler and a manual sampler to measure PM_{2.5}. In addition, filters from the manual sampler shall be analyzed as provided for in the EPA-approved ambient air quality and meteorological monitoring plan required pursuant to Condition R.3 to allow for the chemical speciation of PM_{2.5} constituents, including but not limited to sulfates, nitrates, organics, metals, sea salt and crustal matter.
 - 1.3 The monitoring period shall commence within 120 days after the final permit is issued and shall continue for a minimum of 1 year after commencement of initial operation of the Discoverer in the Chukchi Sea as an OCS Source;
 - 1.4 The data recovery shall be as provided for in the EPA-approved ambient air quality and meteorological monitoring plan required pursuant to Condition R.3; and
 - 1.5 The monitoring station shall continue to operate and record data until such time that written approval is obtained from EPA authorizing the termination of its operation.
2. **Meteorological Monitoring Station.** The permittee shall install, operate and maintain a meteorological monitoring station to monitor and record data in accordance with EPA, 1984a: *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*, EPA-450/4-87-007, May 1987, U.S. Environmental Protection Agency, Research Triangle Park, NC..

- 2.1 An alternative meteorological monitoring station may be used in lieu of the required monitoring station provided that approval of the monitoring station is obtained from EPA;
 - 2.2 Data shall include horizontal wind direction and speed, temperature, solar radiation and temperature difference;
 - 2.3 Each quarter's data recovery shall be as provided for in the EPA-approved ambient air quality and meteorological monitoring plan required pursuant to Condition R.3;
 - 2.4 The monitoring period shall commence within 120 days after the final permit is issued and shall continue for a minimum of 1 year after commencement of operation of the OCS Source; and
 - 2.5 The monitoring station shall continue to operate and record data until such time that written approval is obtained from EPA authorizing the termination of its operation.
- 3. Ambient Air Quality and Meteorological Monitoring Plan.** At least 60 days prior to the commencement of the data collection, the permittee shall submit to EPA for approval an ambient air quality and meteorological monitoring plan for the post-construction monitoring requirements specified in Conditions R.1 and R.2 in accordance with the requirements of 40 CFR Part 58, Appendix A “Quality Assurance Requirements for SLAMS, SPMs and PSD Air Monitoring.” The plan shall include a description of the proposed monitoring site.
- 4. Monthly Reporting.** Within 45 days after the end of each calendar month, the permittee shall submit to EPA a printed summary of the PM_{2.5} and meteorological monitoring data collected during the prior calendar month.
- 5. Audit Reports.** The permittee shall submit audit reports with 45 days after the following events:
- 5.1 Completion of the post-installation equipment audit;
 - 5.2 Completion of independent performance and system audits;
 - 5.3 Completion of quarterly audits required for ambient air quality data collection system; and
 - 5.4 Completion of the semi-annual audits required for the meteorological data collection system.
- Quarterly and semi-annual audit periods shall be based on a calendar year.
- 6. Annual Report.** Within 60 days after the end of each calendar year and following completion of the collection of monitoring, the permittee shall submit to EPA annual/final reports in text, tabular, and graphic forms, including data in digitized format. The digitized formats of the measured air quality and meteorological data shall be in ASCII format and AIRS format.
- 7. System and Performance Audit Report.** Within 60 days after completion of data collection, the permittee shall also submit the final report for the system and performance audits required prior to monitoring termination.

Attachment A to Permit
EPA Notification Form
Excess Emissions and Permit Deviation Reporting

OCS Source (Facility) Name

Air Quality Permit Number

Company Name

When did you identify the Excess Emissions/Permit Deviation?

Date: / / Time: :

When did the event/deviation occur?

Begin: Date: / / Time: : (please use 24hr clock)

End: Date: / / Time: : (please use 24hr clock)

What was the duration of the event/deviation: : (hrs:min) or days
(total # of hrs, min, or days, if intermittent then include only the duration of the actual emissions/deviation)

Reason for notification: (please check only 1 box and go to the corresponding section)

Excess Emissions Complete Section 1 and Certify

Deviation from Permit Conditions Complete Section 2 and Certify

Deviation from Compliance Order by Consent, Compliance Order, or Settlement Agreement Complete Section 2 and Certify

Section 1. Excess Emissions

(a) Was the exceedance Intermittent or Continuous

(b) Cause of Event (Check one that applies):

Start Up/Shut Down

Natural Cause (weather/earthquake/flood)

Control Equipment Failure

Scheduled Maintenance/Equipment Adjustments

Bad fuel/coal/gas

Upset Condition

Other

(c) Description:

Describe briefly what happened and the cause. Include the parameters/operating conditions exceeded, limits, monitoring data and exceedance.

(d) Emission Units Involved:

Identify the emission units or source involved in the event, using the same identification number and name as in the permit. Identify each emission standard (including any throughput limit) potentially exceeded during the event and the exceedance.

Unit ID	Emission Unit Name	Permit Condition Exceeded/Limit/ Potential Exceedance

(e) Type of Incident (please check only one):

- Opacity percent Venting (gas/scf) Control
Equipment Down
 Fugitive Emissions Emission Limit Exceeded Record Keeping
Failure
 Marine Vessel Opacity Flaring Other:

(f) Unavoidable Emissions:

Do you intend to assert that these excess emissions were unavoidable? YES
 NO

Certify Report (go to end of form)

Section 2. Permit Deviations

(a) Permit Deviation Type (check one only) (check boxes correspond with sections in permit):

- Source Specific
- Failure to monitor/report
- General Source Test/Monitoring Requirements
- Recordkeeping/Reporting/Compliance Certification
- Standard Conditions Not Included in Permit
- Generally Applicable Requirements
- Reporting/Monitoring for Diesel Engines
- Insignificant Source
- Facility Wide
- Other Section: (title of section and section # of your permit)

(b) Emission Units Involved:

Identify the source involved in the event, using the same identification number and name as in the permit. List the corresponding Permit condition and the deviation.

Unit ID	Emission Unit Name	Permit Condition /Potential Deviation

(c) Description of Potential Deviation:

Describe briefly what happened and the cause. Include the parameters/operating conditions and the potential deviation.

(d) Corrective Actions:

Describe actions taken to correct the deviation or potential deviation and to prevent future recurrence.

Certification:

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.

Printed Name	Title	Date
Signature	Phone number	

NOTE: *This document must be certified in accordance with Permit Condition A.11*

To Submit this Report:

1. Fax this form to: Facsimile no. 206-553-0110

Or

2. E-mail to: R10OCSAirPermits_Reports@epa.gov

Or

3. Mail to: OCS/PSD Air Quality Permits
U.S. EPA - Region 10, AWT-107
1200 Sixth Avenue, Suite 900
Seattle, WA 98101