



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10
1200 Sixth Avenue
Seattle, WA 98101

RECEIVED
U.S. E.P.A.

JUN 30 AM 10:18

June 19, 2008

ENVIR. APPEALS BOARD

Reply To
Attn Of: ORC-158

U.S. Environmental Protection Agency
Clerk of the Board, Environmental Appeals Board (MC 1103B)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460-0001

Re: Notification of Response to Remand Order Shell Off Shore Inc. OCS Permit Nos.
R10OCS-AK-07-01 and R10OCS-AK-07-02.
Appeal Nos. 07-01& 07-02

Dear Sir or Madam:

On September 14, 2007, the Environmental Appeals Board (EAB) issued an order that denied review and part and remanded the Outer Continental Shelf (OCS) Minor Air Quality Control permits issued to Shell Offshore Inc. for the Kulluk Drilling Unit and the Frontier Discoverer Drilling Unit. This letter is written to provide notification to the EAB and to the participants in the permit appeal that EPA has revised and reissued a Minor Air Quality Control Permit for the Kulluk Drilling Unit (OCS Permit No. R10ORC-AK-07-01 (revised)) and has suspended further permitting activity with respect to the Frontier Discoverer Drilling Unit.

The revised permit, issued by EPA Region 10 on June 18, 2008, for the Kulluk Drilling unit is enclosed. Also enclosed is the response to comments received on the draft revised permit.

In accordance with 40 C.F.R. § 124.15, this permit will become effective no sooner than July 21, 2008 unless a petition for review is filed with the EAB. Additionally, pursuant to Permit Condition 28, this permit is not effective until EPA has completed its consultation obligations under the Endangered Species Act (ESA) with respect to the polar bear, and the permittee has amended its application and/or EPA has amended the terms of this permit as a result of the consultation.

Pursuant to the EAB's remand order, the Petitioners and others with standing to appeal under 40 C.F.R § 124.19 may file an appeal with the EAB pursuant to 40 C.F.R. § 124.19. Also in accordance with the remand order, any such appeal must be limited to the remanded issues and issues arising as a result of any modification the Region made to its permitting decisions on remand.

Please feel free to contact me at (206) 553-1169 should you have questions regarding this notification.

Sincerely,

for 

Juliane Matthews
Assistant Regional Counsel

Enclosures

cc: Christopher Winter, CRAG Law Center
Michael LeVine, EARTHJUSTICE
Susan Mathiascheck, Patton Boggs



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

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

Permit Number: R10OCS-AK-07-01 (Revised)

The United States Environmental Protection Agency (EPA) under the authority of Clean Air Act (Act) Section 328 [42 U.S.C. 7627] and Code of Federal Regulations Title 40, Part 55 issues Air Quality Control Minor Permit No. R10OCS-AK-07-01 to the permittee identified below:

Permittee: Shell Offshore, Inc.
3601 C Street, Suite 1334
Anchorage, AK 99503

Owner: Same as permittee

Operator: Frontier Drilling USA, Inc.
1000 Louisiana, Suite 1210
Houston, TX 77002

OCS Source: Kulluk Drilling Unit (Kulluk)


Project: Portable Exploratory Drilling Operation

Location: Any Drill Site within a Beaufort Sea outer continental shelf (OCS) lease block authorized by the United States Minerals Management Service (MMS) within 25 miles of the State of Alaska's seaward boundary

Source Contact: Susan Childs
Shell Offshore, Inc.
3601 C Street, Suite 1334
Anchorage, AK 99503
Phone: 907-770-3700
E-mail: Susan.Childs@shell.com

Fee Contact: Same as source contact

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


Richard Albright
Director, Office of Air, Waste and Toxics

6/18/08
Date

Table of Contents

Section 1. Terms and Conditions	4
Definitions	4
Requirement to Pay Fees	11
Owner Requested Limits Rendering Prevention of Significant Deterioration (PSD) Review Unnecessary	11
Standard for Incinerators	17
Standard for Fuel-Burning Equipment	18
Ambient Air Quality Protection (NO ₂ , PM ₁₀ , and SO ₂)	22
Section 2. Permit Documentation	25
Section 3. Attachments/Forms	26
Permit No. R10OCS-AK-07-01 - Visible Emissions Field Data Sheet.....	26
Permit No. R10OCS-AK-07-01 - Visible Emissions Observation Record	27

Abbreviations/Acronyms

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

Units and Measures

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

Pollutants

CO	Carbon Monoxide
HAPS	Hazardous Air Pollutants
NO _x	Oxides of Nitrogen
NO ₂	Nitrogen Dioxide
NO	Nitric Oxide
PM ₁₀	Particulate Matter with an aerodynamic diameter less than 10 microns
SO ₂	Sulfur Dioxide
VOC	Volatile Organic Compound

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

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

Section 1. Terms and Conditions

Definitions

1. The following terms shall have the meaning ascribed to them here:
 - 1.1 A Planned Well is a well selected in advance of the drilling season that is drilled to collect discrete information.
 - 1.2 A Relief Well is a well drilled near and deflected into a Planned Well that is out of control, making it possible to bring the wild well under control.
 - 1.3 A Replacement Well is a well drilled near a Planned Well that has been plugged and abandoned without being drilled to its intended depth. The Replacement Well is intended to collect, from an alternate location, the same discrete information originally sought from drilling of the Planned Well.
 - 1.4 A Drill Site is a location on the surface of the water occupied by the Kulluk, and from this location the Kulluk is permanently or temporarily attached to the seabed and erected thereon and used for the purpose of exploring resources therefrom. The Kulluk is said to be occupying a Drill Site when the Kulluk is connected to at least one of its anchors and that anchor is attached to the seabed.
 - 1.5 OCS Source Activities include the following activities:
 - a. Air pollutant emitting activities undertaken by Kulluk emission units listed in Table 1 of this permit and occurring while the Kulluk is occupying a Drill Site, and
 - b. Air pollutant emitting activities undertaken by support vessel emission units listed in Table 2 of this permit and occurring while:
 - (i) The support vessel is physically attached to the Kulluk, and
 - (ii) The Kulluk is occupying a Drill Site.
 - c. Notwithstanding Condition 1.5.b, emission units generating output exclusively for the purpose of propelling a vessel are not engaging in OCS Source Activities.
 - 1.6 An Exploratory Operation is the collection of all OCS Source Activities undertaken to construct a single Planned Well and any of its associated Relief Well(s) and Replacement Well(s).

Authorizations/Emission Unit Inventory and Description

2. Minor Permit No. R10OCS-AK-07-01 (Revised) authorizes the permittee to mobilize, operate, and demobilize the Kulluk at a Drill Site authorized by MMS in the Beaufort Sea OCS within 25 miles of the State of Alaska's seaward boundary, in accordance with the terms and conditions of this permit.
 - 2.1 The permittee shall record those time periods during which the Kulluk is within 25 miles of a Drill Site.
 - 2.2 The permittee shall record the location of each Drill Site.
 - a. A modern global positioning system shall be utilized to determine the location.
 - b. Location shall be recorded by providing coordinates in the following formats:
 - (i) Latitude and longitude, and
 - (ii) Universal Transverse Mercator grid system.
 - 2.3 The permittee shall identify other Drill Sites formerly occupied by the Kulluk in the same rolling 52-week period and record the distance between each of these Drill Sites.
 - 2.4 The Permittee shall record the date and hour of both initial and final operation of the Kulluk at each Drill Site for each season.
 - a. The initial operation of the Kulluk at each Drill Site is defined as the first completion of (i) setting an anchor to the seabed and (ii) connecting that anchor to the Kulluk.
 - b. The final operation of the Kulluk at each Drill Site is defined as when the Kulluk disconnects from the last of its anchors or removes the last of its anchors from the seabed.
 - 2.5 The permittee shall report to EPA via facsimile or e-mail the information within 3 days of initial operation at a Drill Site:
 - a. The intended purpose of the activities to be undertaken at the Drill Site, and
 - b. The information required to be recorded in Condition 2.2, 2.3, and 2.4.a.
 - 2.6 The permittee shall report to EPA via facsimile or e-mail within 3 days of final operation at a Drill Site the information required by Condition 2.1, 2.4.b. and identify days, if any, between initial operation and final operation that the Kulluk was not occupying a Drill Site.

3. Minor Permit No. R10OCS-AK-07-01 (Revised) authorizes the permittee to utilize vessels in support of the Kulluk in accordance with the terms and conditions of this permit as follows:
- 3.1 The permittee shall record those time periods during which a support vessel is within 25 miles of a Drill Site.
 - 3.2 The permittee shall report to EPA via facsimile or e-mail within 3 days of final operation at a Drill Site the information required by Condition 3.1.
 - 3.3 Conditions 6, 7, 8, 9, and 10 apply to emissions units on support vessels operating at or within 25 miles of the drill site.
 - 3.4 Conditions 11, 12, 13, 14, 21 and 22 apply to emissions units on supports vessels when:
 - a. The vessel is physically attached to the Kulluk at a drill site, and
 - b. The emission unit is engaged in any activity not directly related to propulsion of a vessel.
 - 3.5 The permittee may use an alternative support vessel not listed in Table 2 without a permit revision as follows:
 - a. Notify EPA of the alternative support vessel 45 days prior to operation within 25 miles of a drill site.
 - (i) The notification shall include a list of emissions units, ratings, emission factors, and a proposed methodology for monitoring vessel emissions.
 - b. Operate the alternative support vessel in accordance with:
 - (i) All terms and conditions of this permit, and
 - (ii) An EPA-approved methodology for monitoring vessel emissions, similar to those described under Condition 8.
 - 3.6 The permittee shall not operate an alternative support vessel prior to receiving EPA approval of a methodology for monitoring vessel emissions.
4. The emissions units listed in Table 1 are collectively referred to as the Kulluk. The Unit ID will be used to identify an emissions unit. The Source Group will be used to identify a collection of emissions units utilizing the same emission factor to determine NO_x emissions.

Unit ID	Source Group	Unit Description	Make/Model	Rating	
K-1	A1	Electrical Generator Engine	EMD / unknown	2,816	hp
K-2	A1	Electrical Generator Engine	EMD / unknown	2,816	hp
K-3	A1	Electrical Generator Engine	EMD / unknown	2,816	hp
K-4	A3	Emergency Electrical Generator Engine	Unknown	920	hp
K-8	A3	Deck Crane Engine	Mercedes / OM404	293	kW
K-9	A3	Deck Crane Engine	Mercedes / OM404	293	kW
K-10	A3	Deck Crane Engine	Mercedes / OM404	293	kW
K-11	A3	Thrustmaster Engine	Caterpillar / 3516 B	2,000	hp
K-12	A3	Thrustmaster Engine	Caterpillar / 3516 B	2,000	hp
K-13	A3	HPP Engine	Unknown	320	hp
K-14	A3	HPP Engine	Unknown	320	hp
K-15	A2	Heat Boiler	Unknown	2.4	mmBtu/hr
K-16	A2	Heat Boiler	Unknown	2.4	mmBtu/hr
K-17	A2	Hot Water Heat	Unknown	0.54	mmBtu/hr
K-18	A2	Hot Water Heat	Unknown	0.54	mmBtu/hr
K-19	K	Incinerator	TeamTec / GS500C	276	lb/hr
K-20	T	Fuel Tank	Unknown / Kulluk ID: 5P-10C	680	Cubic meters
K-21	T	Fuel Tank	Unknown / Kulluk ID: 5P-10C	676	Cubic meters
K-22	T	Fuel Tank	Unknown / Kulluk ID: 5P-10C	247	Cubic meters

³ The Source Group for which an emissions unit is identified is used for the purpose of determining NO_x emissions pursuant to Condition 8.

Table 1 – Kulluk Emission Units					
Unit ID	Source Group	Unit Description	Make/Model	Rating	
K-23	M	Drilling Mud System			
K-24	D	Shallow Gas Diverter System			

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

5.1 Emissions from the Kulluk and support vessels will be considered direct emissions from an Exploratory Operation when located within 25 miles of a Drill Site associated with that Exploratory Operation for the following purposes:

- a. Determining assessable emissions, and
- b. Determining regulatory applicability.

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

- a. The vessel is physically attached to the Kulluk at a Drill Site, and
- b. The emission unit is engaged in any activity not directly related to propulsion of a vessel.

Table 2 – Kulluk Support Vessels					
Unit ID	Source Group	Unit Description	Make/Model	Rating	
Vladimir Ignatjuk (icebreaker)					
VI-1	B1	Main Propulsion Engine		5,800	hp
VI-2	B1	Main Propulsion Engine		5,800	hp
VI-3	B1	Main Propulsion Engine		5,800	hp

⁴ The Source Group for which an emissions unit is identified is used for the purpose of determining NO_x emissions pursuant to Condition 8.

Table 2 – Kulluk Support Vessels					
Unit ID	Source	Unit Description	Make/Model	Rating	
VI-4	B1	Main Propulsion Engine		5,800	hp
VI-5	B2	Electrical Generator Engine		1,431	hp
VI-6	B2	Electrical Generator Engine		1,431	hp
VI-7	B3	Heat Boiler		2.4	mmBtu/hr
VI-8	B3	Hot Water Heater		0.54	mmBtu/hr
VI-9	K	Incinerator		66	Lb/hr
Tor Viking II (icebreaker)					
TV-1	C1	Main Prop. Engine / Electrical Generator Engine	MaK 8M32	5,046	hp
TV-2	C1	Main Prop. Engine / Electrical Generator Engine	MaK 8M32	5,046	hp
TV-3	C1	Main Prop. Engine / Electrical Generator Engine	MaK 6M32	3,784	hp
TV-4	C1	Main Prop. Engine / Electrical Generator Engine	MaK 6M32	3,784	hp
TV-5	C2	Harbor Electrical Generator Engine	Caterpillar 3412	1,168	hp
TV-6	C2	Harbor Electrical Generator Engine	Caterpillar 3412	1,168	hp
TV-7	C3	Heat Boiler		1.37	mmBtu/hr
Jim Kilabuk (resupply vessel)					
JK-1	D	Main Propulsion Engine	EMD / V20 645	3,600	hp
JK-2	D	Main Propulsion Engine	EMD / V20 645	3,600	hp
JK-3	D	Electrical Generator Engine	Caterpillar / D3406	292	hp
JK-4	D	Electrical Generator Engine	Caterpillar / D3406	292	hp
JK-5	D	HPP Engine	Caterpillar / D343	300	hp
JK-6	D	Bow Thruster	Caterpillar / D343	300	hp
Nanuq (Main Oil Spill Response Vessel)					
N-1	E	Propulsion Engine		2,710	hp

Table 2 – Kulluk Support Vessels

Unit ID	Source Group	Unit Description	Make/Model	Rating	
N-2	E	Propulsion Engine		2,710	hp
N-3	E	Electrical Generator Engine		1,285	hp
N-4	E	Electrical Generator Engine		1,285	hp
N-5	E	Emergency Electrical Generator Engine		1,285	hp
N-6	E	Boiler		3.2	MMBtu/hr
N-7	K	Incinerator	ASC / CP100	125	lb/hr
Kvichak No. 1 (34-foot Oil Spill Response Work Boat)					
OSRK1-1	E	Engine		300	hp
OSRK1-2	E	Engine		300	hp
OSRK1-3	E	Electrical Generator Engine		12	hp
Kvichak No. 2 (34-foot Oil Spill Response Work Boat)					
OSRK2-1	E	Engine		300	hp
OSRK2-2	E	Engine		300	hp
OSRK2-3	E	Electrical Generator Engine		12	hp
Affinity/Perseverance (Arctic tanker & oil spill response vessel)					
AP-1	E	Propulsion Engine	MAN B&W / 7S60MC	15,820	kW
AP-2	E	Electrical Generator Engine P	MAN B&W / 7L23	1,120	kW
AP-3	E	Electrical Generator Engine C	MAN B&W / 7L23	1,120	kW
AP-4	E	Electrical Generator Engine S	MAN B&W / 7L23	1,120	kW
AP-5	E	Emergency Electrical Generator Engine	Cummins / NT855	295	kW
AP-6	E	Framo Power Pack	Cummins / KTA19	477	kW
AP-7	E	Framo Power Pack	Cummins / KTA19	477	kW
AP-8	E	Framo Power Pack	Cummins / KTA19	477	kW
AP-9	E	Auxiliary Boiler	KangRim / MB07S01	85	MMBtu/hr
AP-10	E	Incinerator	TeamTec / OG 400	580	kW

Requirement to Pay Fees

- 6. Assessable Emissions.** The permittee shall pay to EPA an annual emission fee no later than July 1 of each year. The fee is based on assessable emissions at each Exploratory Operation as determined by EPA under 18 AAC 50.410. The assessable emission fee rate is set out in 18 AAC 50.410(b) or as modified by EPA. The EPA will assess fees per ton of each air pollutant that the Exploratory Operation emits or has the potential to emit in quantities greater than 10 tons per year. The quantity for which fees will be assessed per Exploratory Operation is the lesser of:
- 6.1 The Exploratory Operation's assessable potential to emit (sum of assessable pollutants) of 363 tons per year; or
 - 6.2 The Exploratory Operation's projected annual rate of emissions that will occur from July 1 to the following June 30, based upon actual annual emissions emitted during the most recent calendar year or another 12-month period approved in writing by EPA, when demonstrated by
 - a. An enforceable test method described in 18 AAC 50.220;
 - b. Material balance calculations;
 - c. Emission factors from EPA's publication AP-42, Vol. I, adopted by reference in 18 AAC 50.035; or
 - d. Other methods and calculations approved by EPA.
- 7. Assessable Emission Estimates.** Emission fees will be assessed as follows:
- 7.1 No later than March 31 of each year, the permittee may submit an estimate of the each Exploratory Operation's assessable emissions to EPA Region 10, Office of Air, Waste and Toxics (AWT-107), ATTN: OCS Air Permit Program, 1200 Sixth Avenue, Suite 900, Seattle, WA 98101; the submittal must include all of the assumptions and calculations used to estimate the assessable emissions in sufficient detail, so EPA can verify the estimates; or
 - 7.2 If no estimate is received on or before March 31 of each year, emission fees for the next fiscal year will be based on the potential to emit set forth in condition 6.1.

Owner Requested Limits Rendering Prevention of Significant Deterioration (PSD) Review Unnecessary Pursuant to 18 AAC 50.508(5) as Incorporated by Reference into 40 C.F.R. Part 55

- 8. Nitrogen Oxides (NO_x) Emission Limitation.** The permittee shall not allow the sum of emissions from an Exploratory Operation and from the Kulluk and support vessels within 25 miles of that Exploratory Operation to exceed 245.0 tons of NO_x within any Rolling 52-week period.

- 8.1 When the Kulluk and its support vessels are in transit to or from a Drill Site associated with another Exploratory Operation less than 25 miles away, attribute the emissions as follows:
- a. Half of the transit emissions shall be attributed to one of the two Exploratory Operations, and
 - b. The other half of the transit emissions shall be attributed to the other Exploratory Operation.
- 8.2 No later than 3 business days after the end of the week, the permittee shall calculate and record the Rolling 52-week NO_x Emissions for an Exploratory Operation by adding the most recent Weekly NO_x Emissions to the preceding 51 Weekly NO_x Emissions.
- 8.3 The permittee shall report to EPA Rolling 52-week NO_x Emissions as follows:
- a. The permittee shall report to EPA a summary of Rolling 52-week NO_x Emissions annually to EPA. The report shall be submitted no later than February 1st for the time period beginning January 1st and ending December 31st of the preceding year.
 - b. The permittee shall report to EPA any exceedance of Condition 8 within 3 business days of identification.
- 8.4 The permittee shall calculate and record Weekly NO_x Emissions pursuant to Condition 8.5, Condition 8.6, and Condition 8.7.
- a. Condition 8.5 shall be used in those instances when the permittee is monitoring, or is attempting to monitor, a Source Group's collective fuel usage at least once every 7 days.
 - b. Condition 8.6 shall be used in those instances when the permittee is monitoring, or is attempting to monitor, each Source Unit's power output at least once every 15 minutes. This applies to all Source Units within a Source Group.
 - c. Condition 8.7 shall be used for each incinerator
 - d. Definitions.
 - (i) A Source Group is a group of emission units for which overall emissions are characterized by either:
 - (A) A single worst-case fuel-based emission factor, or
 - (B) A common set of load-dependent emission factors.

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

8.5 The permittee shall calculate and record Weekly NO_x Emissions for each Source Group as follows:

$$\text{Weekly NO}_x \text{ Emissions (tons)} = \left[\sum_{i=\text{SourceGroup}} (F_i \times EF_i) \right] / 2000,$$

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

- a. The permittee shall use Source Group-specific emission factors established pursuant to Condition 9.1.a. or 9.1.b.
- b. The permittee shall monitor and record cumulative Source Group fuel usage at least once every 7 days.
 - (i) Each fuel flow meter used to satisfy the requirement of Condition 8.5.b. shall measure the fuel flow rate with accuracy equal to or better than 2 percent of the meter's upper range value.
 - (ii) Collect information from the manufacturer of each fuel flow meter so as to determine its accuracy. Submit this information to EPA 45 days prior to operation within 25 miles of a Drill Site.
 - (iii) Maintain the accuracy of each fuel flow meter in accordance with manufacturer's recommendations.
- c. For each week that the permittee fails to determine cumulative Source Group fuel usage, the permittee shall determine emissions assuming the Source Group consumed diesel fuel as if operating at capacity for the week.

8.6 The permittee shall calculate and record Weekly NO_x Emissions for each Source Group as follows:

$$\text{Weekly NO}_x \text{ Emissions (tons)} = \left[\sum_{j=\text{SourceUnit}} \left[\sum_{n=\text{readings}} L_{j,n} \times EFE_{j,n} \right] + m_j \right] / 2000,$$

- j = Source Unit within Source Group

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

- a. The permittee shall use Source Group-specific emission factors established pursuant to Condition 9.1.b.
- b. The permittee shall monitor and record Source Unit load at least once every 15 minutes.
 - (i) For each hour that the permittee fails to determine Source Unit load at least once every 15 minutes, the permittee shall determine emissions utilizing the worst-case load-based emission (highest combined factor and load within range) established for the Source Group pursuant to Condition 9.1.b.

8.7 The permittee shall record Weekly NO_x Emissions for incinerators as 0.04 tons per week.

9. Source Group-Specific NO_x Emission Factors.

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

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

Source	Source Group	Emission Factor
Kulluk boilers/hot water heaters	A2	0.020
Kulluk remaining sources	A3	0.654
Vladimir Ignatjuk boiler / hot water heater	B3	0.020
Tor Viking II harbor electrical generator	C2	0.071 / 0.421 ⁵
Tor Viking II boiler	C3	0.020
Jim Kilabuk sources	D	0.654
Oil Spill Response Fleet sources	E	0.472

⁵ Controlled / Uncontrolled. Proceed to Condition 9.3 to select which emission factor to utilize.

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

- (i) Until new emission factors are approved by EPA pursuant to Condition 9.2, the emission factors listed in Table 4 shall be utilized.

Source Group	Source Group	EF _{Fuel} (lb NO _x / gal)	EF _{Load} (lb NO _x / Kw-hr)
Kulluk electrical generator engines	A1	0.293	0.0219
Vladimir Ignatjuk main propulsion engines	B1	0.811	0.056
Vladimir Ignatjuk main generator engines	B2	0.811	0.056
Tor Viking II main propulsion engines / generators	C1	0.111 / 0.389 ³	0.00828 / 0.0290 ³

- (ii) Upon EPA approval of a new emission factor, the new emission factor shall be utilized to calculate emissions beginning with the day upon which stack testing was performed to develop the new emission factor, except that for the first year a vessel is deployed, the new emission factor shall also be utilized to calculate emissions beginning with the day upon which the vessel first navigated within 25 miles of a Drill Site.

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

- a. Within 24 days of initial operation at the first Drill Site, the permittee shall conduct stack testing as follows:
- (i) Perform a stack test according to an EPA-approved stack test protocol on each class of engine within Source Groups B1 and C1 at three or more load points representing the expected operating range of the engines: 35%, 57%, and 80%.
- (A) If the permittee elects to perform a stack test for only one engine from within Source Group C1, the permittee shall test either Unit TV-1 or Unit TV-2.
- (ii) Perform a stack test according to an EPA-approved stack test protocol on one of the three engines within Source Groups A1 and B2 at three or more load points representing the expected operating range of the engines: 50%, 75%, and 100%.

- (iii) Before conducting any stack tests, the permittee shall submit a plan to EPA. The plan must include the methods and procedures to be used for sampling, testing, and quality assurance, and must specify how the emission unit will operate during the test and how the permittee will document that operation. The permittee shall submit a complete plan within at least 30 days before the scheduled date of any test unless EPA agrees in writing to some other time period. Retesting may be done without resubmitting the plan.
- b. Within 30 days of completing the testing, the permittee shall submit to EPA a new emission factor for approval. A stack test report is to be submitted along with the permittee's request for a new emission factor.
 - (i) The proposed fuel-based emission factor shall be equivalent to the worst-case emissions as reflected in the stack test results. The units of the fuel-based emission factor are "lb NO_x / gal."
 - (ii) The proposed load-based emission factor shall be a linear regression curve of emission factor as a function of load. The units of the load-based emission factor are "lb NO_x / Kw-hr."
- c. The new emission factor shall be considered approved within 30 days of its receipt at EPA unless:
 - (i) EPA disapproves the new emission factor, or
 - (ii) EPA requests additional information.
- d. The permittee may conduct further stack testing and submit new emission factors for approval in accordance with Conditions 9.2.a, 9.2.b, and 9.2.c.

9.3 Tor Viking Controlled and Uncontrolled Emission Factors.

- a. The permittee shall monitor and record at least once every 15 minutes the following parameters associated with the Tor Viking II Selective Catalytic Reduction Air Pollution Control System:
 - (i) Operational status of urea pump,
 - (ii) Stack temperature upstream of the catalyst, and
 - (iii) The load level of all engines exhausting to the SCR system.
- b. The permittee shall utilize a controlled emission factor for Source Group C1 and Source Group C2 for each 15-minute period in which:
 - (i) The urea pump is operating, and

- (ii) The catalyst inlet temperature is greater than or equal to 250°C, and
 - c. The permittee shall utilize an uncontrolled emission factor for Source Group C1 and Source Group C2 for each 15-minute period in which:
 - (i) The urea pump is not operating, or
 - (ii) The catalyst inlet temperature is less than 250°C.
10. **Sulfur Dioxide (SO₂) Emission Limitation.** The permittee shall not combust any liquid fuel with sulfur content greater than 0.19 percent by weight in any emission unit on the Kulluk or a support vessel.⁶
- a. **Monitoring and Recordkeeping.** Monitor and keep records as follows:
 - (i) Prior to mobilizing the Kulluk for the first time at the beginning of a drilling season, determine the sulfur content in each fuel oil storage tank on the Kulluk and all support vessels. The permittee shall obtain a representative sample of the fuel and analyze the sample for sulfur content using ASTM D-129, D-2622, or D-4294.
 - (ii) Thereafter, determine and record the sulfur content upon receiving each fuel shipment.
 - (A) Obtain a representative sample of the fuel delivered and analyze the sample for sulfur content using ASTM D-129, D-2622, or D-4294; or
 - (B) Obtain a single certification of sulfur content for each shipment of fuel from the fuel supplier based on an analysis of the fuel, providing that the certification indicates that the sulfur content has been determined by one of the ASTM methods listed above.
 - b. Within 3 business days of identification, report to EPA any instance of a liquid fuel with sulfur content greater than 0.19 percent by weight being combusted in any emission unit on the Kulluk or a support vessel.

Standard for Incinerators

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

⁶ Units K-8, K-9, K-10, K-13, and K-14 are further restricted to combusting only liquid fuel with a sulfur content less than 0.05 percent by weight pursuant to Condition 13.3.

- 11.1 Performance Test. Within 24 days of initial operation of Unit K-19, observe Unit K-19 exhaust for visible emissions using Method 9. Observe its exhaust, following 40 C.F.R. 60, Appendix A-4, Method 9, for 6 minutes to obtain 24 consecutive 15-second opacity observations.
- a. If performance testing under Condition 11.1 was accomplished previously at another drill site, no further performance testing is required for the remainder of that drilling season.
- 11.2 For each performance test conducted, record the following items:
- a. The name of the stationary source, emissions unit and location, stationary source type, observer's name and affiliation, and the date on the Visible Emissions Field Data Sheet in Section 3;
- b. The time, estimated distance to the emissions location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), plume background, and operating rate (load or fuel consumption rate) on the sheet at the time opacity observations are initiated and completed;
- c. The presence or absence of an attached or detached plume and the approximate distance from the emissions outlet to the point in the plume at which the observations are made;
- d. Opacity observations to the nearest five percent at 15-second intervals on the Visible Emissions Observation Record in Section 3; and
- e. The minimum number of observations required by the permit; each momentary observation recorded shall be deemed to represent the average opacity of emissions for a 15-second period.
- 11.3 For each performance test conducted, report the results to EPA within 30 days of completing the test.

Standard for Fuel-Burning Equipment

12. **Visible Emissions.** The permittee shall not cause or allow visible emissions, excluding condensed water vapor, emitted from fuel-burning equipment to reduce visibility through the exhaust effluent more than 20 percent averaged over any six consecutive minutes.
- 12.1 Performance Test. Within 24 days of initial operation of an emissions unit, observe its exhaust, following 40 C.F.R. 60, Appendix A-4, Method 9, for 6 minutes to obtain 24 consecutive 15-second opacity observations. This condition applies to Units K-1 through K-18.

- a. If performance testing under Condition 12.1 was accomplished previously at another drill site for a particular emissions unit, no further monitoring is required for that emissions unit for the remainder of that drilling season.

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

- a. The name of the stationary source, emissions unit and location, stationary source type, observer's name and affiliation, and the date on the Visible Emissions Field Data Sheet in Section 3;
- b. The time, estimated distance to the emissions location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), plume background, and operating rate (load or fuel consumption rate) on the sheet at the time opacity observations are initiated and completed;
- c. The presence or absence of an attached or detached plume and the approximate distance from the emissions outlet to the point in the plume at which the observations are made;
- d. Opacity observations to the nearest five percent at 15-second intervals on the Visible Emissions Observation Record in Section 3; and
- e. The minimum number of observations required by the permit; each momentary observation recorded shall be deemed to represent the average opacity of emissions for a 15-second period.

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

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

13.1 The permittee shall not operate Units K-8, K-9, K-10, K-13, and K-14 without a diesel exhaust particulate matter filter system.

- a. Document the installation of the each particulate matter filter system and the resultant pollution control efficiency as installed.
- b. Report the data required by Condition 13.1.a within 30 days of initial operation of an emissions unit.

- 13.2 The permittee shall maintain each diesel exhaust particulate matter filter system per the manufacturer's maintenance procedures.
- a. Maintain on-site a copy of the manufacturer's maintenance procedures.
 - b. Record any actions taken to verify and maintain each particulate matter filter system's pollution control efficiency.
- 13.3 The permittee shall not combust any liquid fuel with sulfur content greater than 0.05 percent by weight in Units K-8, K-9, K-10, K-13, and K-14.
- a. Monitor and keep records as follows:
 - (i) Prior to mobilizing the Kulluk for the first time at the beginning of a drilling season, the permittee shall determine the sulfur content in each fuel oil storage tank supplying fuel to Units K-8, K-9, K-10, K-13, and K-14. Obtain a representative sample of the fuel and analyze the sample for sulfur content using ASTM D-129, D-2622, or D-4294.
 - (ii) Thereafter, determine the sulfur content upon receiving each fuel shipment.
 - (A) Obtain a representative sample of the fuel delivered and analyze the sample for sulfur content using ASTM D-129, D-2622, or D-4294; or
 - (B) Obtain a single certification of sulfur content for each shipment of fuel from the fuel supplier based on an analysis of the fuel, providing that the certification indicates that the sulfur content has been determined by one of the ASTM methods listed above.
 - b. Within 3 business days of identification, report to EPA any instance of a liquid fuel with sulfur content greater than 0.05 percent by weight being combusted in Unit K-8, K-9, K-10, K-13, or K-14.
- 13.4 Compliance with Condition 13 shall be determined for Unit K-1, K-2, and K-3 pursuant to the following terms:
- a. Prior to mobilizing the Kulluk for the first time at the beginning of a drilling season, the permittee shall conduct stack testing as follows:
 - (i) Perform a stack test according to an EPA-approved stack test protocol on at least one of the engines at three or more load points representing the expected operating range of the engines.

- (ii) Before conducting any stack tests, the permittee shall submit a plan to EPA. The plan must include the methods and procedures to be used for sampling, testing, and quality assurance, and must specify how the emission unit will operate during the test and how the permittee will document that operation. The permittee shall submit a complete plan within at least 30 days before the scheduled date of any test unless EPA agrees in writing to some other time period. Retesting may be done without resubmitting the plan.
 - b. The permittee shall determine particulate matter emissions based upon engine load conditions as follows:
 - (i) Within 15 days of completing the testing, the permittee shall submit to EPA for approval a correlation of operating load (kW-hr) to PM emissions rate (gr/dscf) along with the stack test report upon which the correlation is founded.
 - (ii) The correlation shall be considered approved within 15 days of its receipt at EPA unless :
 - (A) EPA disapproves or partially approved the correlation, or
 - (B) EPA requests additional information.
 - c. The permittee shall monitor, calculate, and record emissions data as follows:
 - (i) Monitor and record each engine's operating load at least once every 15 minutes. At that time, identify whether the engine is transitioning between operating loads.
 - (ii) Every 15 minutes, calculate and record each engine's preceding 3-hour average operating load.
 - d. The permittee shall report to EPA as follows:
 - (i) The permittee shall report annually to EPA a summary of those 3-hour time periods during which an engine emitted, on average, particulate matter in concentrations in excess of the 0.05 gr/dscf as determined using the EPA-approved correlation.
 - (ii) The report shall be submitted no later than February 1st for the time period January 1st through December 31st of the preceding year.
- 14. Sulfur Compound Emissions.** The permittee shall not cause or allow sulfur compound emissions, expressed as sulfur dioxide, to exceed 500 ppm averaged over three hours.

14.1 **Monitoring and Recordkeeping.** Monitor and keep records of the sulfur content in the fuel combusted in Units K-1 through K-18 pursuant to Condition 10.a.

14.2 Report to EPA pursuant to Condition 10.b.

Ambient Air Quality Protection (NO₂, PM₁₀, and SO₂)

15. Duration of Exploratory Operation Activities

15.1 The permittee shall not have the Kulluk occupy Drill Sites associated with the same Exploratory Operation for more than 80 calendar days, in aggregate, during a rolling 52-week period.

15.2 The permittee shall not have the Kulluk occupy Drill Sites, in aggregate, for more than 160 calendar days during a rolling 52-week period.

15.3 The permittee shall comply with the recordkeeping and reporting requirements of Conditions 2.2, 2.3, 2.4, 2.5 and 2.6

16. Distance Between Drill Sites

16.1 The permittee shall not have the Kulluk occupy a Drill Site within 1,000 meters of another Drill Site occupied less than 52 weeks prior, unless the Drill Sites are associated with the same Exploratory Operation.

16.2 The permittee shall comply with the recordkeeping and reporting requirements of Conditions 2.2, 2.3, 2.4, 2.5, and 2.6.

17. Kulluk Main Electrical Generator Engines

17.1 The permittee shall not generate greater than 4.2 MW of electricity during any hour utilizing Units K-1, K-2, and K-3 while the Kulluk is occupying a Drill Site.

17.2 The permittee shall monitor and record power output resulting from the operation of Units K-1, K-2, and K-3 while the Kulluk is occupying a Drill Site at least once every 15 minutes.

17.3 The permittee shall report to EPA via facsimile or e-mail any exceedance of Condition 17.1 within 3 business days of identification.

18. Kulluk Emergency Electrical Generator Engine

18.1 The permittee shall operate Unit K-4 only in an emergency or as needed to maintain readiness while the Kulluk is occupying a Drill Site.

- 18.2 For each instance in which Unit K-4 is operated while the Kulluk is occupying a Drill Site, the permittee shall record the duration of the episode and the reason for operating.
- 18.3 The permittee shall report to EPA via facsimile or e-mail any deviation from Condition 18.1 within 3 business days of identification.

19. Kulluk Thrustmaster Engines

- 19.1 The permittee shall not operate Units K-11 and K-12 simultaneously while the Kulluk is occupying a Drill Site.
- 19.2 For each instance in which Units K-11 and K-12 are operated simultaneously while the Kulluk is occupying a Drill Site, the permittee shall record the duration of the episode and the reason for simultaneous operation.
- 19.3 The permittee shall report to EPA via facsimile or e-mail any deviation from Condition 19.1 within 3 business days of identification.

20. Jim Kilabuk Main Propulsion Engines

- 20.1 The permittee shall operate Units JK-1 and JK-2 at loads equal to or less than 10% of the maximum load while the Jim Kilabuk is physically attached to the Kulluk and the Kulluk is occupying a Drill Site.
- 20.2 For each instance in which either Unit JK-1 or JK-2 is operated while the Jim Kilabuk is physically attached to the Kulluk and the Kulluk is occupying a Drill Site, the permittee shall monitor and record the power output resulting from the operation of Units JK-1 and JK-2 at least once every 15 minutes.
- 20.3 The permittee shall report to EPA via facsimile or e-mail any exceedance of Condition 20.1 within 3 business days of identification.

Generally Applicable Requirements

21. **Ambient Impacts.** The permittee shall not cause or contribute to a violation of a national ambient air quality standard or the standards of Alaska (18 AAC 50.010).
22. **Good Air Pollution Control Practices.** The permittee shall maintain and operate Emission Units in Source Groups A1, A2, K, and T, listed in Table 1, according to the manufacturer recommendations.
23. **Recordkeeping Requirements.** The permittee shall keep all records required by this permit for at least five years after the date of collection.

24. **Certification.** The permittee shall certify all reports, or other documents submitted to the EPA and required under the permit by including the signature of a responsible official for the permitted stationary source following the statement: "Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete." All reports and documents must be certified upon submittal.
25. **Termination.** This approval shall become invalid if construction of an Exploratory Operation is not commenced within 18 months after the effective date of this permit, or if construction is discontinued for a period of 18 months, unless EPA extends the 18-month period upon a satisfactory showing that an extension is justified, pursuant to 40 CFR 55.6(b)(4).
26. **Permit Revision, Termination and Reissuance.** This permit may be terminated, revised, or revoked and reissued by EPA for cause. Cause exists to terminate, revise, or revoke and reissue this permit under the following circumstances:
- 26.1 This permit contains a material mistake;
 - 26.2 Materially inaccurate statements were made in establishing the terms or conditions of this permit;
 - 26.3 The permittee fails to comply with any material condition of this permit; or
 - 26.4 This permit must be terminated, revised, or revoked and reissued to assure compliance with Clean Air Act requirements.
27. **Shallow Gas Diversions.**
- 27.1 The permittee shall record the frequency and duration of each shallow gas diversion.
 - 27.2 The permittee shall 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.
28. **Effective Date.** This permit shall not become effective until: 1) EPA has completed its consultation obligations required under the Endangered Species Act with respect to the polar bear and the Shell Kulluk Drilling Unit OCS Permit No. R10OCS-AK-07-01 (Revised) and 2) the Permittee has amended its application and/or the EPA has amended the OCS permit terms to address any alternatives, conservation measures, reasonable and prudent measures, or terms and conditions deemed by EPA to be appropriate as a result of the consultation.

Section 2. Permit Documentation

Date of Document	Description of Document
December 29, 2006	Application for Minor Permit
February 7, 2007	Supplement to Application
March 26, 2007	Supplement to Application
March 29, 2007	Supplement to Application
January 8, 2008	Shell Impact Analysis Report with Cover Letter
January 8, 2008	Shell Modeling Files
January 8, 2008	Shell Kulluk Emissions Spreadsheet
January 14, 2008	Shell Stack Height Consistency in Impact Analysis Report
January 16, 2008	Shell PM ₁₀ and SO ₂ Annual Impacts in Impact Analysis Report
January 17, 2008	Shell Description of Thrustmaster HPU Control System
February 6, 2008	Shell Response to EPA January 18, 2008 Phone Record

Section 3. Attachments/Forms

Permit No. R10OCS-AK-07-01 - Visible Emissions Field Data Sheet

Certified Observer: _____

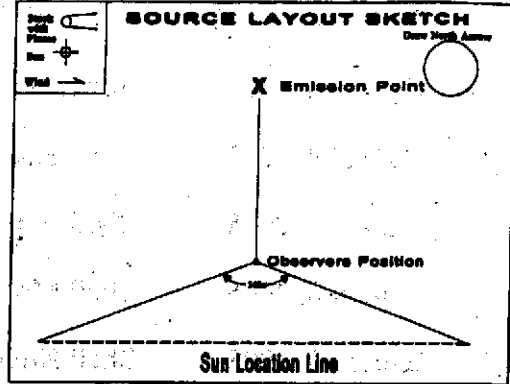
Company &
 Stationary Source: _____

Location: _____

Test No.: _____ Date: _____

Emission Unit: _____

Operating Rate: _____



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

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
Seattle, Washington**

**Shell Kulluk Drilling Unit
OCS Minor Permit No. R10OCS-AK-07-01
(Revised)**

RESPONSE TO PUBLIC COMMENTS

June 18, 2008

TABLE OF CONTENTS

Abbreviations and Acronyms.....	4
Executive Summary	6
General Scope of this Response to Comments.....	7
Category 1: Specific Textual Changes to the Permit.....	8
Subcategory 1-1: Changes in Response to Comments.....	8
Subcategory 1-2: Other Permit Changes	27
Category 2: General Comments in Support	29
Category 3: General Comments Requesting Permit Denial	30
Category 4: EPA Application Process	32
Category 5: Major Source General Comments.....	33
Category 6: BACT Analysis Requested.....	35
Category 7: Eighty Day Operating Limit Not Supported	35
Category 8: Kulluk Relief Well Capability	36
Category 9: Modeling Analysis.....	38
Subcategory 9-1: Meteorological Data used in Modeling.....	38
Subcategory 9-2: Emission Data used in Modeling.....	40
Subcategory 9-3: Model Selection	41
Category 10: Owner Requested Limit (ORL).....	43
Subcategory 10-1: ORL General.....	43
Subcategory 10-2: Completeness of Emissions Inventory.....	44
Subcategory 10-3: Stack Testing and Use of AP-42 Emission Factors	50
Category 11: Changes to Emission Inventory	53
Category 12: National Ambient Air Quality Standards and Cumulative Effects	57
Category 13: Definition of a Separate Stationary Source	58
Subcategory 13-1: General.....	58
Subcategory 13-2: Proximity.....	59
Subcategory 13-3: Operational Reliance	61
Subcategory 13-4: Subsequent Seasons.....	63
Subcategory 13-5: Support Information Not Available to Public	64
Category 14: Geographic Scope/Permit Duration	65
Category 15: Health Impacts.....	66
Category 16: Subsistence and Traditional Use	68
Category 17: Environmental Justice.....	70

Category 18: Permit Terms and Conditions related to Alaska Emission Standards	71
Category 19: Permit Expiration and Extension	72
Category 20: Public Comment/Public Hearing Process	73
Subcategory 20-1: Public Comment Period	73
Subcategory 20-2: Lack of Public Participation in Hearings	77
Subcategory 20-3: Teleconferencing Challenges	79
Subcategory 20-4: Translator Challenges	80
Subcategory 20-5: Information was Too Technical	80
Subcategory 20-6: Communications Protocol for the North Slope	81
Category 21: Clean Water Act	81
Category 22: Oil Spill Response Plan	82
Category 23: Global Warming/Climate Change	83
Category 24: National Environmental Policy Act	84
Category 25: 9 th Circuit Court Enjoins Drilling	84
Conclusion	85

Abbreviations and Acronyms

ADEC	Alaska Department of Environmental Conservation
AQIA	EPA Region 10 Air Quality Impact Analysis
ANWR	Arctic National Wildlife Refuge
BOP	Blow Out Preventer
BACT	Best Available Control Technology
CAA	Clean Air Act
CBD	Center for Biological Diversity
CBI	confidential business information
C.F.R.	Code of Federal Regulations
CO	Carbon Monoxide
EAB	Environmental Appeals Board
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
GAQM	Guideline on Air Quality Models (40 C.F.R. Part 51, Appendix W)
gr/dscf	Grains per Dry Standard Cubic Foot
HAP	Hazardous Air Pollutants
ICAS	Inupiat Community of the Arctic Slope
ISC	Industrial Source Complex
ISC2	Industrial Source Complex Short-Term
MACT	Maximum Achievable Control Technology
MIAR	Shell Modified Impacts Analysis Report
MMS	Minerals Management Service
NAAQS	National Ambient Air Quality Standards
NAEC	Northern Alaska Environmental Center
NEPA	National Environmental Policy Act
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NOI	Notice of Intent

NSB	North Slope Borough
NSR	New Source Review
NPDES	National Pollutant Discharge Elimination System
OCD	Offshore Coastal and Dispersion
OCS	Outer Continental Shelf
ORL	Owner Requested Limit
OSR	Oil Spill Response
PM	Particulate Matter
PM ₁₀	Particulate Matter \leq 10 microns aerodynamic diameter
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
REDOIL	Resisting Environmental Destruction on Indigenous Lands
SIC	Standard Industrial Classification
SO ₂	Sulfur Dioxide
SSOB	Supplemental Statement of Basis
TPY	Tons Per Year
VOC	Volatile Organic Compound

Executive Summary

On February 13, 2008, the U.S. Environmental Protection Agency Region 10 (EPA Region 10) made a preliminary permit decision regarding a proposed revised air quality permit for Shell Offshore Inc. (Shell). The proposed permit (# R10OCS-AK-07-01 Revision) would allow Shell to conduct exploratory drilling using the Kulluk drilling rig and its associated support vessels (Shell requested that EPA suspend permitting for the Frontier Discoverer drilling unit) in the outer continental shelf (OCS) of the Beaufort Sea of Alaska under a minor air quality permit in accordance with 40 C.F.R. Part 55. In accordance with 40 C.F.R. Part 124, EPA published notice of a public comment period from February 25, 2008 to April 1, 2008. The notice included information on scheduled public hearings in three North Slope communities in Alaska.

Written comments were received by the EPA from Shell (the applicant), the U.S. Mineral Management Service (MMS), the Alaska Oil and Gas Association (AOGA), the North Slope Borough (NSB), the Inupiat Community of the Arctic Slope (ICAS), Northern Alaska Environmental Center (NAEC), the Alaska Eskimo Whaling Commission (AEWC) and ASRC Energy Services. The letter from NAEC included comments on behalf of the Native Village of Hope, the Natural Resource Defense Council (NRDC), Pacific Environment, Resisting Environmental Destruction on Indigenous Lands (REDOIL), the Sierra Club, the Center for Biological Diversity (CBD), and the Alaska Wilderness League. The EPA also received written comments from one individual.

In addition to receiving written comments, the EPA held public hearings in the Alaska North Slope communities of Barrow, Kaktovik and Nuiqsut on March 25, 26 and 27, 2008, respectively. During these hearings, EPA received numerous comments on this proposed permit decision as oral testimony. This testimony was transcribed by a court reporter and has been included in the permit record.¹

This "Response to Comments" document summarizes the written and oral comments received by the EPA regarding this preliminary permit decision. After EPA's careful review and consideration, responses to these comments are presented herein.

¹ Hearing Transcripts and other documents in the permit record can be found online at: <http://yosemite.epa.gov/R10/AIRPAGE.NSF/Permits/OCS>

General Scope of this Response to Comments

On June 12, 2007, EPA Region 10 issued two final permits (R10OCS-AK-07-01 and R10OCS-AK-07-02) to Shell authorizing exploratory drilling using the Kulluk and Frontier Discoverer drilling units and their associated support vessels in the OCS of the Beaufort Sea of Alaska. A petition for review was filed with the Environmental Appeals Board (EAB). The EAB completed a review of the permits and on September 14, 2007 remanded the permits back to EPA on the sole issue of its "stationary source" determination for purposes of determining whether PSD permits would be required for Shell's proposed activities on the OCS (In re: Shell Offshore Inc., OCS Appeal Nos. 07-01 & 07-02, Slip Op at 69 (E.A.B., Sept. 14, 2007)). The EAB explained to the Petitioners and other participants with standing, that if they are not satisfied with EPA's explanation on remand, they may appeal to the EAB upon issuance EPA's subsequent permitting decision(s). The EAB further specified that "any appeal shall be limited to the issue being remanded and issues arising as a result of any modification that EPA Region 10 makes to its permitting decisions on remand." (E.A.B. Slip Op. at 69).

Thus, comments raised concerns that are unrelated to the stationary source determination, revised modeling analysis, or modified portions of the permit are beyond the scope of the remand and EPA need not address them in this response to comments document.

Category 1: Specific Textual Changes to the Permit

Subcategory 1-1: Changes in Response to Comments

COMMENT

Permit Cover Page

Shell requests that the Final Permit include on the cover page, on a new page two of the permit, or in the Final Permit cover letter, contact information for the relevant party (or parties) at EPA for matters relating to the Final Permit, including a physical address, a mailing address, an email address, facsimile and telephone numbers.

EPA RESPONSE

Shell is required to periodically submit information to EPA as required by the Final Permit. The following information is intended to facilitate the reporting process:

Physical / Mailing Address:

EPA Region 10
Office of Compliance and Enforcement
Air and RCRA Compliance Unit; OCE-127
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

Email Address:

R10AirPermitReports@epa.gov

Facsimile:

206.553.0110

Telephone Number:

206.553.1817

This information also appears in the cover letter accompanying the Final Permit.

COMMENT

Permit Term: Condition 1.1

Shell requests EPA clarify that Shell may identify a number of wells in advance of a given season for potential drilling during that season, and that Shell ultimately may select among those wells in drilling during that season. Given the uncertainties surrounding the timing of the open water season or other issues, Shell will not always be able to predict

how many or which wells it will drill during any given season, but Shell will have identified a set of prospective wells. The wells ultimately drilled during that season will be a subset of those previously identified wells. Thus, any one or more of those prospective wells identified or "selected" in advance of the drilling season may ultimately become a "Planned Well" when drilled.

In addition to providing an explanation to this effect in its Response to Comments, EPA should clarify Condition 1.1, which defines "Planned Well," as follows (added text underlined):

"A Planned Well is a well, selected from among prospective wells that are identified in advance of the drilling season, that is drilled to collect discrete information from a specific prospect."

EPA RESPONSE

The permit authorizes Shell to drill Planned Wells, Replacement Wells, and Relief Wells. With respect to Planned Wells, EPA agrees that Shell may identify a number of wells in advance of a given season for potential drilling during that season. A change to the permit, however, is not necessary to enable Shell to select from among those wells to drill.

Also, the phrase, "from a specific prospect" within the definition of Planned Well is unnecessary as it adds no further meaning to the definition. Condition 1.1 of the permit is amended as follows (deleted text in strikethrough):

- 1.1 A Planned Well is a well selected in advance of the drilling season that is drilled to collect discrete information ~~from a specific prospect.~~

COMMENT

Permit Term: Condition 1.3

Shell requested that the definition of "Replacement Well" should be modified slightly to clarify that such a well is intended to "replace" the original Planned Well and to obtain the same discrete information that Shell intended to obtain from the original Planned Well. Condition 1.3 should be modified to read as follows (added text underlined; deleted text in strikethrough):

"A Replacement Well is a well drilled near a Planned Well that has been plugged and abandoned without being drilled to its intended depth. The Replacement Well ~~collects~~ is intended to collect, from an alternate location, the same discrete information ~~from a specific prospect from an alternate location~~ originally sought from drilling of the Planned Well."

EPA RESPONSE

EPA agrees with the comment. Condition 1.3 shall read as follows (added text underlined; deleted text in strikethrough):

- 1.3 A Replacement Well is a well drilled near a Planned Well that has been plugged and abandoned without being drilled to its intended depth. The Replacement Well ~~collects~~ is intended to collect, from an alternate location, the same discrete information ~~from a specific prospect from an alternate location~~ originally sought from drilling of the Planned Well.

COMMENT

Permit Terms: Conditions 1.4, 2.3.a, 2.3.b, 2.5, and 9.2.a

A comment received from NAEC relates to the time periods during which the Kulluk becomes an OCS Source. This timing is based on anchor placement as specified in the permit conditions listed above. NAEC states,

"EPA has improperly determined that the Kulluk does not become a stationary source until the last of its anchors is attached to the seabed. As soon as one of its anchors has been attached to the seabed, the Kulluk becomes an OCS Source, and EPA should begin to measure (and regulate) emissions for purposes of its major source determination at that point. See 42 U.S.C. §7627(a)(4)(C)."

Shell also comments on this issue with specific textual recommendations for changing the permit stating that, as currently drafted, the definition of "Drill Site" in Condition 1.4 appears inconsistent with the language of Condition 2.3, defining initial and final operation at each Drill Site. The definitions in Condition 2.3 appear to comport more precisely with the regulatory definition of an OCS Source, which encompasses vessels only when they are "permanently or temporarily attached to the seabed and erected thereon and used for the purpose of exploring, developing or producing resources therefrom..." See 40 C.F.R. § 55.2. Until the Kulluk's anchoring process is complete, it is not "attached" to the seabed, nor is it being "used for the purpose of exploring" the seabed. Thus, the definition of Drill Site, as well as the terms of Condition 2.3, should reflect that the Kulluk is operating as an OCS Source only when the Kulluk is anchored in a manner sufficient to permit the proposed operations – i.e., the Kulluk is attached to all of the anchors in the relevant anchor pattern (discussed below), all of which are also attached to the seabed.

Thus, in Shell's view the definition of Drill Site should specify both (i) that the Kulluk is attached to its anchors, and (ii) that those anchors are attached to the seabed. There may

be instances – for example, in the event of a heavy ice incursion – during which the Kulluk would cease exploratory drilling operations, untether from its anchors, and move off from a “Drill Site” location, leaving its anchors in place, with the intent of returning after the ice had retreated to reconnect to its anchors and reinitiate drilling operations at that same Drill Site location. The Kulluk would not be an OCS Source, nor should it be considered to be occupying a “Drill Site,” during any such interim periods when it is not “attached” to the seabed for the purpose of exploration.

In addition, the comment states that EPA should make clear that the “initial” and “final” operation of the Kulluk, as defined in Sections 2.3, is intended to describe not only the very first and very last of the Kulluk’s operations at a given Drill Site, but also any “temporary” cessation of operations prior to final completion of operations at a Drill Site in order to move off of the Drill Site (e.g., due to ice incursions), and any re-initiation of operations at that Drill Site during the same season after the Kulluk has moved off the Drill Site (e.g., due to ice incursions) and then returned to resume operations. In other words, for purposes of calculating the number of days during which the Kulluk has drilled at a single drill site for purposes of compliance with Condition 15, there may be more than one “initial operation” time and more than one “final” operation time for each Drill Site within a given drilling season. Thus, any interim periods during which the Kulluk has disconnected from or raised anchors, (e.g., to leave the site during ice incursions) should not be considered to be included within the periods of operation bounded by Conditions 2.3.a and 2.3.b nor should any such periods be included in calculating the number of days during which the Kulluk has drilled at a single drill site for purposes of compliance with Condition 15.

Shell explains that it anticipates two anchor patterns that will allow it to safely commence OCS exploration activities. For drilling of mud cellars, Shell anticipates being able to initiate operations with eight of its twelve anchors attached to both the Kulluk and the seabed. Subsequently, after operations have commenced, the additional four anchors would be added. For all other exploratory operations, Shell will begin operations only after all twelve of the Kulluk’s anchors are set and the Kulluk is attached to those anchors.

Thus, with respect to drilling of mud cellars, Shell’s comment states that the definition of Drill Site should be revised to reflect that the Kulluk is occupying a Drill Site when it has a minimum of eight anchors to which it is attached, and which are attached to the seabed. For purposes of other exploratory activities, the definition of Drill Site should be revised to reflect the fact that the Kulluk is occupying a Drill Site when it is attached to all twelve anchors and all twelve of those anchors are attached to the seabed. In addition, Conditions 2.3.a and 2.3.b should be revised to reflect definitions of initial and final operation consistent with these anchor patterns.

Finally, the comment states that EPA should change the reference to the “seafloor” so that the Proposed Permit instead refers to the “seabed,” consistent with the language of 40 C.F.R. § 55.2, which defines “OCS Source” in terms of vessels permanently or temporarily attached to the “seabed.”

The definition of "Drill Site" in Condition 1.4 should be modified, therefore, to read as follows (added text underlined; deleted text in strikethrough):

"A Drill Site is a location on the surface of the water occupied by the Kulluk, ~~and from this location where~~ the Kulluk is permanently or temporarily attached to the seabed~~floor~~ and erected thereon and used for the purpose of exploring resources therefrom. The Kulluk is said to be occupying a Drill Site when it is attached to at least one of the anchors in the applicable anchor pattern and those anchors are is attached to the seabed~~floor~~. For purposes of drilling mud cellars, the applicable anchor pattern consists of a minimum of eight anchors. For purposes of other operations, the applicable anchor pattern consists of twelve anchors."

Condition 2.3.a should be modified to read as follows (added text underlined; deleted text in strikethrough):

"The initial operation of the Kulluk during any given operational period within a season at each Drill Site is defined as the completion of (i) the setting of the Kulluk's last anchor in the applicable anchor pattern on the seabed~~floor~~ and (ii) the Kulluk's connection to all anchors in the pattern. For purposes of drilling mud cellars, the applicable anchor pattern consists of eight anchors. For purposes of other operations, the applicable anchor pattern consists of twelve anchors. More than one initial operation may occur at each Drill Site within a given drilling season if drilling is interrupted and resumed there."

Condition 2.3.b should be modified to read as follows (added text underlined; deleted text in strikethrough):

"The final operation of the Kulluk during any given operational period within a season at each Drill Site is defined as when the Kulluk's intentionally disconnects from one of its anchors in the applicable anchor pattern or removes one of its last anchors is removed in the relevant anchor pattern from the seabed~~floor~~. For purposes of drilling mud cellars, the applicable anchor pattern consists of eight anchors. For purposes of other operations, the applicable anchor pattern consists of twelve anchors. More than one initial operation may occur at each Drill Site within a given drilling season if drilling is interrupted and resumed there."

EPA RESPONSE

In response to both NAEC and Shell comments, EPA notes that the statutory definition of OCS Source defines OCS Source as follows:

The terms "Outer Continental Shelf source" and "OCS source" include any equipment, activity, or facility which—

- (i) emits or has the potential to emit any air pollutant,*
- (ii) is regulated or authorized under the Outer Continental Shelf Lands Act [43 U.S.C. 1331 et seq.], and*
- (iii) is located on the Outer Continental Shelf or in or on waters above the Outer Continental Shelf.*

Such activities include, but are not limited to, platform and drill ship exploration, construction, development, production, processing, and transportation. For purposes of this subsection, emissions from any vessel servicing or associated with an OCS source, including emissions while at the OCS source or en route to or from the OCS source within 25 miles of the OCS source, shall be considered direct emissions from the OCS source.

42 U.S.C. §7627(a)(4)(C)

Based upon our review of the underlying statute and implementing regulation, EPA has determined that the Kulluk is an OCS source when it is attached to at least one anchor and that anchor is attached to the seabed. See SSOB at 4-5 (explaining that in applying the OCS requirements in the waters off of Alaska, an OCS "stationary source" means any building, structure, facility, or installation which emits or may emit a regulated NSR pollutant, and that Alaska defines "building, structure, facility, or installation" to include "a vessel that is anchored... within a locale"). Interim periods during which the Kulluk has disconnected from or raised all anchors, (e.g., to leave the site during ice incursions) should not be included within the periods of operation bounded by Conditions 2.4.a and 2.4.b nor should any such periods be included in calculating the number of days during which the Kulluk has drilled at a single drill site for purposes of compliance with Condition 15.

EPA is also amending Condition 9.2.a of the permit which requires Shell to conduct stack testing "within 24 hours of commencing operation at the first Drill Site." The phrase "commencing operation" was intended to mean "initial operation" as discussed above.

Condition 1.4 is amended as follows (added text underlined; deleted text in strikethrough):

- 1.4 A Drill Site is a location on the surface of the water occupied by the Kulluk, and from this location the Kulluk is permanently or temporarily attached to the seabed~~floor~~ and erected thereon and used for the purpose of exploring resources therefrom. The Kulluk is said to be occupying a Drill Site when the Kulluk is attached to at least one of its anchors and that anchor is attached to the seabed~~floor~~.

Condition 2.4 is amended as follows (added text underlined; deleted text in strikethrough):

- 2.4 The Permittee shall record the date and hour of both initial and final operation of the Kulluk at each Drill Site for each season.
- a. The initial operation of the Kulluk at each Drill Site is defined as ~~when the setting of the Kulluk's last anchor to the seafloor is completed~~ the first completion of (i) setting an anchor to the seabed floor, and (ii) connecting that anchor to the Kulluk.
- b. The final operation of the Kulluk at each Drill Site is defined as ~~when the Kulluk's last anchor is removed from the seafloor~~ when the Kulluk's disconnects from the last of its anchors or removes the last of its last anchors ~~is removed~~ from the seabed floor.

Condition 2.6 is amended as follows (added text underlined):

- 2.6 The permittee shall report to EPA via facsimile or e-mail within 3 days of final operation at a Drill Site the information required by Condition 2.4.b and identify the days, if any, between initial operation and final operation that the Kulluk was not occupying the Drill Site.

Condition 9.2.a is amended as follows (added text underlined; deleted text in strikethrough):

- 9.2 Development and Approval of New Emission Factors for Source Groups A1, B1, B2, and C1.
- a. Within 24 days of ~~commencing~~ initial operation at the first Drill Site, the permittee shall conduct stack testing as follows:

COMMENT

Permit Term: Condition 8

Shell commented that the heading preceding Condition 8 should be revised to clarify that the governing regulations expressly permit Shell to adopt Owner Requested Limits and thereby obtain a minor source permit. It is well established that a source that would otherwise exceed the 250 tpy threshold and be subject to PSD requirements may exempt itself from a regulation as a major source by "requesting the permitting authority to

impose a permit restriction on the source's capacity to emit." *In re Shell Offshore Inc.*, 13 E.A.B. at 69 slip op. at 13 (Sept. 14, 2007). Indeed, a number of North Slope air permit holders, including the North Slope Borough for its Barrow Thermal Oxidation System (Permit No. AQ0831MSS01), have air permits that include Owner Requested Limits in order to avoid classification either as a major source or a minor source. Thus, the heading preceding Condition 8 should be modified to read as follows (added text underlined):

"Owner Requested Limits Rendering Prevention of Significant Deterioration (PSD) Review Unnecessary Pursuant to 40 C.F.R. § 52.21 and 18 Alaska Admin. Code 50.508(5)."

EPA RESPONSE

EPA agrees with the comment and is providing a citation within the heading to Condition 8 that references the regulation enabling EPA to limit Shell's emissions so as to render PSD review unnecessary. Because the PSD regulations are not being implemented here, EPA is not making reference to 40 C.F.R. § 52.21. In addition, EPA is making reference to 18 Alaska Admin. Code 50.508(5) as it exists as a federal regulation EPA has incorporated by reference into 40 C.F.R. Part 55.

The heading preceding Condition 8 is amended as follows (added text underlined):

Owner Requested Limits Rendering Prevention of Significant Deterioration (PSD) Review Unnecessary Pursuant to 18 AAC 50.508(5) as Incorporated by Reference into 40 C.F.R. Part 55

COMMENT

Permit Term: Condition 8.2

Shell commented that EPA should specify that the calculations and record-keeping requirements of this Condition must be completed within three business days after the end of the week. Providing for notice within three business days provides ample expedience for purposes of any EPA response relating to these aspects of the permit and addresses the practical and feasibility concerns arising out of an obligation to prepare and submit reports to EPA during shift changes, holidays or weekend periods. Condition 8.2 should therefore be modified to read as follows (added text underlined):

"No later than 3 business days after the end of the week, the permittee shall calculate and record the Rolling 52-week NO_x Emissions for an Exploratory Operation by adding the most recent Weekly NO_x Emissions to the preceding 51 Weekly NO_x Emissions."

EPA RESPONSE

EPA agrees with the comment and is amending Condition 8.2 as follows (added text underlined):

- 8.2 No later than 3 business days after the end of the week, the permittee shall calculate and record the Rolling 52-week NO_x Emissions for an Exploratory Operation by adding the most recent Weekly NO_x Emissions to the preceding 51 Weekly NO_x Emissions."

COMMENT

Permit Term: Condition 8.3.a

Shell commented that as drafted, Condition 8.3.a provides for a reporting year from December 1st of one year through November 30th of the following year. In order to provide consistency with other reporting requirements and maintain a more predictable and manageable reporting regime, Shell requests that EPA provide for reporting based on the calendar year. Thus, the second sentence of Condition 8.3.a should be revised to read as follows (added text underlined; deleted text in strikethrough):

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

EPA RESPONSE

EPA agrees with the comment and amends Condition 8.3.a as follows (added text underlined; deleted text in strikethrough):

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

COMMENT

Permit Term: Condition 8.3.b.

EPA should specify that the reporting requirement of this Condition must be completed within three business days after the end of the week. Providing for notice within three business days provides ample expedience for purposes of any EPA response relating to these aspects of the permit and addresses the practical and feasibility concerns arising out

of an obligation to prepare and submit reports to EPA during shift changes, holidays or weekend periods. Thus, Condition 8.3.b should be revised to read as follows (added text underlined):

"The permittee shall report to EPA any exceedance of Condition 8 within 3 business days of identification."

EPA RESPONSE

EPA agrees with the comment and amends Condition 8.3.b as follows (added text underlined):

8.3.b The permittee shall report to EPA any exceedance of Condition 8 within 3 business days of identification."

COMMENT

Permit Terms: Condition 2.1 (new), 2.6 (formerly 2.5), 3.1 (new), 3.2 (new), 9.1.b (ii), and 9.2.d (new)

Shell commented that this permit condition refers only to 2007 emissions and should therefore be updated because the permit no longer is addressing 2007 emissions. This condition should be further revised to account for the possibility that Shell may obtain new stack test results in the future. Thus, this condition should be revised to read as follows (deleted text in strikethrough):

"New emissions factors based upon stack testing conducted in 2007, or based on more recent testing conducted subsequent to the permit issue date, shall be utilized to calculate all emissions ~~generated during 2007.~~"

EPA RESPONSE

EPA intended for Condition 9.1.b (ii) of the 2007 permit to require Shell to calculate 2007 emissions utilizing emission factors derived from 2007 stack testing conducted within 24 days of initial operation at the first Drill Site.² EPA incorrectly assumed that 2007 would be each vessel's first year of operation, and EPA is not certain when each vessel will begin exploratory operations. To avoid having to amend the permit again should a vessel not be deployed in 2008, Condition 9.1.b.(ii) has been amended to require Shell to calculate a vessel's entire first-year emissions utilizing emission factors derived from stack testing conducted during that same first year.

² Stack testing satisfying Condition 9.2.a. was obviously not conducted in 2007 given that initial operation was not achieved at any Drill Site.

EPA also intended for Condition 9.2 of the 2007 permit to allow Shell the opportunity to conduct stack testing in future years for the purpose of updating the emission factors. Condition 9.2.d has been created to allow just that.

Condition 9.1.b (ii) is amended as follows (added text underlined; deleted text in strikethrough):

9.1.b (ii) Upon EPA approval of a new emission factor, the new emission factor shall be utilized to calculate emissions beginning with the day upon which stack testing was performed to develop the new emission factor, except that: for the first year a vessel is deployed, the new emission factor shall also be utilized to calculate emissions beginning with the day upon which the vessel first navigated within 25 miles of a Drill Site.

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

Condition 9.1.b(ii)(A) has been removed from the final permit because it is no longer necessary given the revision to 9.1.b(ii).

Condition 9.2.d has been created as follows (added text underlined):

9.2.d The permittee may conduct further stack testing and submit new emission factors for approval in accordance with Conditions 9.2.a, 9.2.b, and 9.2.c.

Conditions 2.1 through 2.5 of the proposed permit have been renumbered 2.2 through 2.6.

Condition 2.1 has been created as follows (added text underlined):

2.1 The permittee shall record those time periods during which the Kulluk is within 25 miles of a Drill Site.

Condition 2.6 (formerly 2.5) has been amended (added text in underlined):

2.6 The permittee shall report to EPA via facsimile or e-mail within 3 days of final operation at a Drill Site the information required by Condition 2.1, 2.4.b and identify days, if any, between initial operation and final operation that the Kulluk was not occupying a Drill Site.

Conditions 3.1 through 3.4 of the proposed permit have been renumbered 3.3 through 3.6.

Condition 3.1 has been created as follows (added text underlined):

- 3.1 The permittee shall record those time periods during which a support vessel is within 25 miles of a Drill Site.

Condition 3.2 has been created as follows (added text underlined):

- 3.2 The permittee shall report to EPA via facsimile or e-mail within 3 days of final operation at a Drill Site the information required by Condition 3.1.

COMMENT

Permit Terms: Condition 9.2.b and 9.2.c

Shell requests that its submission of the emission test report and the new proposed emission factor provided for in this Condition be due within 30 days of completion of testing, rather than within 15 days of completion of the testing. Fifteen days is an extremely short time period for Shell's emission testing firm to move from completion of the testing through the entire QA/QC process, and then to prepare a draft test report, which Shell must then review and submit to EPA. Because once the new emission factor is approved, Condition 9.1.b (ii) applies that new emission factor retroactively, beginning with the day that the stack testing used to develop the emission factor was performed, the results of the process will not be affected by allowing Shell a more adequate time period during which to complete these items. Thus, Shell requests that EPA modify the first sentence of Condition 9.2.b to provide (added text underlined; deleted text in strikethrough):

"~~Within 15~~ 30 days of completing the testing, the permittee shall submit to EPA a new emission factor for approval."

EPA RESPONSE

EPA agrees with the comment and amends Condition 9.2.b as follows (added text underlined; deleted text in strikethrough):

- 9.2.b ~~Within 15~~ 30 days of completing the testing, the permittee shall submit to EPA a new emission factor for approval. A stack test report is to be submitted along with the permittee's request for a new emission factor.

It is also appropriate to extend to EPA additional time to review the stack test report along with the permittee's request for a new emission factor.

Condition 9.2.c is amended as follows (added text underlined; deleted text in strikethrough):

- 9.2.c The new emission factor shall be considered approved within ~~15~~ 30 days of its receipt at EPA unless:

COMMENT

Permit Term: Condition 10.b

Shell commented that EPA should specify that the reporting requirement of this Condition must be completed within three business days after the end of the week. Providing for notice within three business days provides ample expedience for purposes of any EPA response relating to these aspects of the permit and addresses the practical and feasibility concerns arising out of an obligation to prepare and submit reports to EPA during shift changes, holidays or weekend periods. Thus, Shell requests that Condition 10.b be modified to read as follows (added text underlined):

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

EPA RESPONSE

EPA agrees with the comment and amends Condition 10.b as follows (added text underlined):

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

COMMENT

Permit Term: Condition 13.3.b

Shell commented that EPA should specify that the reporting requirement of this Condition must be completed within three business days after the end of the week. Providing for notice within three business days provides ample expedience for purposes of any EPA response relating to these aspects of the permit and addresses the practical and feasibility concerns arising out of an obligation to prepare and submit reports to EPA during shift changes, holidays or weekend periods. Thus, Shell requests that Condition 13.3.b be modified to read (added text underlined):

"Within 3 business days of identification, report to EPA any instance of a liquid fuel with sulfur content greater than 0.05 percent by weight being combusted in Unit K-8, K-9, K-10, K-13, K-14."

EPA RESPONSE

EPA agrees with the comment and amends Condition 13.3.b as follows (added text underlined):

13.3.b Within 3 business days of identification, report to EPA any instance of a liquid fuel with sulfur content greater than 0.05 percent by weight being combusted in Unit K-8, K-9, K-10, K-13, K-14.

COMMENT

Permit Terms: Conditions 13.4.c (ii), 13.4.d (i), and 13.4.d (ii)

Shell commented that Condition 13.4.c (ii) requires Shell to calculate and record each main driver engine's preceding 3-hour average operating load every 15 minutes. Condition 13.4.d (i) requires Shell to report to EPA a summary of these 3-hour time periods in which each main driver engine emitted, on average, particulate matter greater than 0.05 gr/dscf as determined using the EPA-approved correlation.

These provisions could create a situation in which a single elevated 15-minute reading could trigger multiple (as many as twelve) overlapping elevated three-hour readings, which in turn could lead to a single elevated reading being multiple-counted as a series of as many as twelve separate violations of the restrictions set forth in this Condition.

EPA should therefore clarify that reporting pursuant to 13.4.d (i) and determining compliance with the three hour average limitation of Condition 13 are based on eight specific three-hour periods per day, e.g., 12:01 a.m. to 3:00 a.m.; 3:01 a.m. to 6:00 a.m.; 6:01 a.m. to 9:00 a.m.; etc., similar to the EPA ambient monitoring reporting requirements. Condition 13 should be revised to read as follows: (added text underlined; deleted text in strikethrough):

"Particulate Matter. The permittee shall not cause or allow particulate matter emitted from fuel-burning equipment to exceed; 0.05 grains per cubic foot of exhaust gas, corrected to standard conditions and averaged over any of the following three hour periods ~~hour hours, 0.05 grains:~~ 12:01 a.m. to 3:00 a.m.; 3:01 a.m. to 6:00 a.m.; 6:01 a.m. to 9:00 a.m.; 9:01 a.m. to 12:00 noon; 12:01 p.m. to 3:00 p.m.; 3:01 p.m. to 6:00 p.m.; 6:01 p.m. to 9:00 p.m.; 9:01 p.m. to 12:00 midnight."

To conform to the new Condition 13 requirement, Condition 13.4.d (i) should be revised to read as follows: (added text underlined; deleted text in strikethrough):

"The permittee shall report annually to EPA a summary of those 3-hour time periods, specified in Condition 13 above, during which

an engine emitted, on average, particulate matter in concentrations in excess of the 0.05 gr/dscf as determined using the EPA-approved correlation."

Finally, Condition 13.4.d (ii) should be revised to cover the calendar year. This condition provides for annual reporting, but again provides for that annual reporting to cover a 12 month period running from December 1 through November 30, rather than covering the calendar year. In order to provide consistency with other reporting requirements and maintain a more predictable and manageable reporting regime, Shell requests that EPA provide for reporting based on the calendar year. This provision should be revised to read as follows: (added text underlined; deleted text in strikethrough):

"The report shall be submitted no later than February 1st ~~December 31~~ for the time period January 1st through December 31st of the preceding year ~~beginning December 1 (of the previous calendar year) and ending November 30.~~"

EPA RESPONSE

Permit Condition 13 is intended to monitor compliance on a rolling 3-hour standard as is normal practice by permitting agencies, rather than a 3-hour block as suggested by Shell. Permit Conditions 13 is unchanged from the 2007 permit. Accordingly, comments regarding the compliance period in this permit condition are beyond the scope of the remand and a response is not necessary.

However, to provide consistency with other reporting requirements, EPA acknowledges the comment related to Condition 13.4.d (ii) and amends this condition as follows (added text underlined; deleted text in strikethrough):

13.4.d.(ii) The report shall be submitted no later than February 1st ~~December 31~~ for the time period January 1st through December 31st of the preceding year ~~beginning December 1 (of the previous calendar year) and ending November 30.~~"

COMMENT

Permit Terms: Conditions 17.3, 18.3, 19.3 and 20.3

With respect to each of these four Conditions, Shell commented that EPA should specify that the permittee must provide notice within three business days of identifying any specified exceedance. Providing for notice within three business days provides ample expedience for purposes of any EPA response relating to these aspects of the permit and addresses the practical and feasibility concerns arising out of an obligation to prepare and submit reports to EPA during shift changes, holidays or weekend periods.

EPA RESPONSE

EPA agrees with the comment and amends Conditions 17.3, 18.3, 19.3 and 20.3 as follows (added text underlined):

- 17.3 The permittee shall report to EPA via facsimile or e-mail any exceedance of Condition 17.1 within 3 business days of identification.
- 18.3 The permittee shall report to EPA via facsimile or e-mail any deviation from Condition 18.1 within 3 business days of identification.
- 19.3 The permittee shall report to EPA via facsimile or e-mail any deviation from Condition 19.1 within 3 business days of identification.
- 20.3 The permittee shall report to EPA via facsimile or e-mail any exceedance of Condition 20.1 within 3 business days of identification.

COMMENT**Permit Terms: Conditions 18.1 and 18.2**

Shell commented that these Conditions reference a misidentified emissions unit. The Kulluk Emergency Electrical Generator Engine is misidentified in the permit as Unit K-4. It should be identified as Unit K-7. Thus, in Conditions 18.1 and 18.2, EPA should delete references to Unit K-7. These Conditions should be revised to reference Unit K-4.

EPA RESPONSE

EPA acknowledges this comment and amends Conditions 18.1 and 18.2 as follows³ (added text underlined; deleted text in strikethrough):

- 18.1 The permittee shall operate Unit ~~K-7~~ K-4 only in an emergency or as needed to maintain readiness while the Kulluk is occupying a Drill Site.
- 18.2 For each instance in which Unit ~~K-7~~ K-4 is operated while the Kulluk is occupying a Drill Site, the permittee shall record the duration of the episode and the reason for operating.

³ See page 21 of the Statement of Basis for an explanation of why emission unit K-7 is no longer part of the emission inventory.

COMMENT**Permit Term: Condition 21**

Shell commented that this Condition incorrectly references 18 AAC 50.110 as the source of the Alaska ambient air quality standards. This should be revised to reference 18 AAC 50.010, which contains those standards.

EPA RESPONSE

EPA acknowledges this comment and amends Condition 21 as follows (added text underlined; deleted text in strikethrough):

21. **Ambient Impacts.** The permittee shall not cause or contribute to a violation of a national ambient air quality standard or the standards of Alaska (18 AAC ~~50.110~~ 50.010).

COMMENT**Permit Term: Condition 26**

Shell commented that Condition 26 should be revised to include an introductory paragraph that clarifies the procedures that would apply to EPA's reopening of the permit to terminate, revise, or revoke and reissue it. The recommended language affords to Shell a process for reopening this permit equivalent to the process that applies to a federal operating permit under EPA's regulations. See 40 C.F.R. § 71.7(f), (g). Shell states that the Kulluk Minor Permit is the first OCS permit of its kind and it is important for EPA to make clear that, in the event the Agency believes cause exists to terminate, revise, or revoke and reissue this permit, EPA does not intend to afford Shell lesser procedural protections during operations under this permit than would be afforded the holder of an on-shore Part 71 operating permit. Thus, Shell recommends that Condition 26 be revised as follows (added text underlined):

26. **Permit Revision, Termination and Reissuance.** This permit may be terminated, revised, or revoked and reissued by EPA for cause. Proceedings to reopen this permit for cause shall follow the same procedures as applied to the issuance of this initial permit and shall affect only those parts of the permit for which cause to reopen exists. EPA may reopen this permit for cause upon providing a notice of EPA's intent and a statement of reasons to Shell at least 30 days in advance of the date that the permit is to be reopened, and EPA shall provide Shell an opportunity for comment on EPA's proposed action and an opportunity for a hearing, except that EPA may provide a

shorter time period in the case of an emergency. Cause exists to terminate, revise, or revoke and reissue this permit under the following circumstances:

Further, Shell states that although Condition 26.1 needs no revision, Condition 26.2 and Condition 26.3 should be revised to conform to the Alaska permit regulations. The Alaska regulations provide that revision, termination, or reissuance of a permit is only necessary where there is a violation of a "material" permit term: "after 30 days' written notice to the permittee, the department (1) may modify, or revoke and reissue a construction, operating, or minor permit if the department finds that ... (B) the permittee has violated ... **a material** term or condition of a permit, approval, or acceptance issued under this chapter." 46 AAC 46.14.280(a) (emphasis added). The corresponding on-shore regulations appropriately establish a materiality threshold for actionable permit violations, which should be reflected in this OCS permit. Thus, Shell recommends that Condition 26.2 and 26.3 be revised as follows (added text underlined; deleted text in strikethrough):

- 26.2 Materially inaccurate statements were made in establishing the terms or conditions of this permit;
- 26.3 The permittee fails to comply with any material condition of this permit; or

Finally, Condition 26.4 should be revised as indicated to make it parallel with the introductory language of Condition 26. Thus, Shell recommends that Condition 26.4 be revised as follows (added text underlined; deleted text in strikethrough):

- 26.4 This permit must be terminated, revised, or revoked and reissued to assure compliance with Clean Air Act Requirements.

EPA RESPONSE

Pursuant to 40 C.F.R. § 55.6(a)(3), EPA followed the applicable procedures in 40 C.F.R. Part 124 in issuing the Shell OCS permit. Although neither 40 C.F.R. Part 55 nor Part 124 contain explicit provisions for terminating, revising, or revoking and reissuing a permit for cause, EPA believes it has inherent authority to take such action as the permit-issuing authority. Condition 26 implements and clarifies that authority. Should EPA decide cause exists to terminate, revise, revoke and reissue the Shell OCS permit, EPA will follow 40 C.F.R. Part 124, the same procedures that applied to initial issuance of the Shell OCS permit, which includes provisions for public notice and comment and appeal to the EAB. Because 40 C.F.R. Part 71 does not apply to issuance of OCS permits, EPA declines to follow Shell's suggestion that EPA follow the procedures of Part 71 in the case of a reopening for cause. In any event, the language that Shell proposes be added to Condition 26 goes beyond the language in 40 C.F.R. § 71.7(f) and (g). EPA does intend to give Shell reasonable notice prior to initiating a reopening of the permit.

With respect to Conditions 26.2, 26.3, and 26.4, EPA accepts Shell's request to amend the conditions. The suggested amendments reflect EPA's original intent. Conditions 26.2, 26.3, and 26.4 are amended as follows (added text underlined; deleted text in strikethrough):

- 26.2 Materially inaccurate statements were made in establishing the terms or conditions of this permit;
- 26.3 The permittee fails to comply with any material condition of this permit; or
- 26.4 This permit must be terminated, revised, or revoked and reissued to assure compliance with Clean Air Act requirements.

COMMENT

Permit Terms: Conditions 2.3 (formerly 2.2), 15.1, 15.2, and 16.1

There are some slight inconsistencies with regard to the one-year period over which certain compliance conditions are determined in the current Kulluk permit. Shell requests that EPA make these consistent in the direction of strengthening the protection of the NAAQS. In those compliance conditions referring to "calendar year", Shells asks that EPA modify them to refer to "rolling 52-week period" (which contains the calendar year as a subset) except for report submissions (Conditions 8 and 13) and the calculation of fees (Condition 6). The requested modifications should take place in Conditions 2.2, 15.1, 15.2, and 16.1.

EPA RESPONSE

EPA agrees with the comment and is amending Conditions 2.3 (formerly 2.2), 15.1, 15.2, and 16.1 as follows (added text underlined; deleted text in strikethrough):

- 2.3 The permittee shall identify other Drill Sites formerly occupied by the Kulluk in the same ~~calendar year~~ rolling 52-week period and record the distance between each of these Drill Sites.
- 15.1 The permittee shall not have the Kulluk occupy Drill Sites associated with the same Exploratory Operation for more than 80 calendar days, in aggregate, during a ~~calendar year~~ rolling 52-week period.
- 15.2 The permittee shall not have the Kulluk occupy Drill Sites, in aggregate, for more than 160 calendar days during a ~~calendar year~~ rolling 52-week period.

- 16.1 The permittee shall not have the Kulluk occupy a Drill Site within 1,000 meters of another Drill Site occupied less than 52 weeks prior, unless the Drill Sites are associated with the same Exploratory Operation.→

~~The Drill Sites are associated with the same Exploratory Operation, or~~

- ~~16.2 The previously occupied Drill Site was last occupied in a different calendar year.~~

Subcategory 1-2: Other Permit Changes

Permit Term: Condition 2

An editorial change is made to Condition 2 to clarify the permitted location as specified on the permit's cover page. As explained on the cover page, this permit applies to any Drill Site within a Beaufort Sea OCS lease block authorized by the US MMS within 25 miles of the State of Alaska's Seaward Boundary. The clause "within 25 miles of the State of Alaska's Seaward Boundary" was inadvertently omitted from Condition 2 in the proposed permit. Thus, Condition 2 is revised as follows (added text underlined; deleted text in strikethrough):

2. Minor Permit No. R10OCS-AK-07-01 (Revised) authorizes the permittee to mobilize, operate, and demobilize the Kulluk at a Drill Site authorized by MMS in the Beaufort Sea OCS within 25 miles of the State of Alaska's seaward boundary, in accordance with the terms and conditions of this permit.

Permit Term: Condition 25

The proposed Permit Condition 25 is changed for internal consistency purposes and is revised as follows (added text underlined; deleted text in strikethrough):

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

Permit Term: Condition 28**Endangered Species Act**

On May 15, 2008, the U.S. Department of the Interior listed the polar bear (*Ursus maritimus*) as a threatened species under the Endangered Species Act (ESA), 16 U.S.C. §1531 et seq. See 73 Fed. Reg. 28212 (May 15, 2008). During the original permitting of this action, EPA relied on the ESA consultation that was completed between the U.S. Fish and Wildlife Service (FWS) and the U.S. Minerals Management Service (MMS), which was designated as lead agency for ESA obligations relating to this project, to fulfill its ESA obligations. 50 C.F.R. § 402.07. As part of its role as lead agency, MMS considered the proposed project's impacts, including potential impacts associated with EPA's permitting action, on polar bears (which at the time were proposed for listing under the ESA) in its consultation with FWS. See May 30, 2007 EPA memorandum entitled, "ESA and EFH Obligations – Shell Offshore, Inc. OCS Permits Permit Nos. R10OCS-AK-07-01 and R10OCS-AK-07-02 Shell Kulluk and Shell Discoverer." However, as a result of the recent final listing, we understand that MMS has re-initiated consultation with FWS.

While EPA generally believes the most efficient way to ensure compliance with the ESA for this permit is to wait until ESA compliance is complete before issuing the final permit, that approach is not required by law in this case. Section 7(a)(2) of the ESA and the ESA implementing regulations do not specify the precise time when an ESA consultation must conclude relative to an agency action. 16 U.S.C. § 1536(a)(2); 50 C.F.R. §§ 402.13, 402.14. See also *Indeck-Elwood, LLC*, 13 E.A.D. ___, slip op. at 109-110 (EAB; Sept. 27, 2006) (finding that completion of the ESA consultation process during appeal of a PSD permit met the minimum legal requirements of the ESA). Section 7(d) of the ESA specifies that once the consultation process is initiated, as it has been in this case, agencies (and permit applicants) are prohibited from making any irreversible or irretrievable commitments of resources that would have the effect of foreclosing the formulation or implementation of any reasonable and prudent alternatives that may be needed to avoid violating section 7(a)(2). 16 U.S.C. § 1536(d); 50 C.F.R. § 402.09.

For several reasons – including the recent nature of the polar bear listing and coordination with MMS as the lead agency – EPA believes that issuance of the final permit prior to conclusion of the re-initiated ESA consultation is consistent with ESA requirements. See *Indeck-Elwood* slip op. at 112; see also 40 C.F.R. § 124.19(f)(1) (explaining when a federal PSD permit is final agency action).⁴

⁴ EPA notes that given the substantial public interest surrounding this permit, it is highly likely that the Shell permit will be appealed to the EAB. As in the *Indeck-Elwood* matter, the permit would not be effective until the conclusion of the appeal process and implementation of any actions needed to address the outcome of the appeal. *Indeck-Elwood* slip op. at 111, n. 150. Thus, there will likely be an opportunity for the ESA consultation to reach resolution while the appeal is pending and before the "final" permit is issued.

Most significantly, as an additional protection to ensure that no “irreversible or irretrievable commitments of resources” for the Shell OCS exploratory project occur prior to completion of the ESA process and to allow for consideration of the consultation’s outcome on the final permit, EPA has included in the minor source permit a condition delaying the effectiveness of the permit, and thus prohibiting any exploratory activity, until the ESA process concludes and providing for incorporation into the final permit of provisions reflecting the outcome of the consultation that EPA determines are appropriate. Specifically, Permit Condition 28 has been added (text underlined) to the permit and it states:

28. Endangered Species Act. This permit shall not become effective until: 1) EPA has completed its consultation obligations required under the Endangered Species Act with respect to the polar bear and the Shell Kulluk Drilling Unit OCS Permit No: R10OCS-AK-07-01 (Revised) and 2) the Permittee has amended its application and/or the EPA has amended the OCS permit terms to address any alternatives, conservation measures, reasonable and prudent measures, or terms and conditions deemed by EPA to be appropriate as a result of the consultation.

In light of this condition, EPA has ensured that no irreversible or irretrievable commitments of resources can occur prior to conclusion of the ESA process. EPA has also specifically retained authority to ensure inclusion in the permit of appropriate additional provisions addressing any issues regarding protection of the threatened polar bear species that may be identified during the ESA process. *See Indeck-Elwood* slip op. at 111 (upholding a process in which changes to final permit may be implemented “if FWS recommends any changes to the permit during the consultation process or, alternatively, if EPA decides to add or amend permit conditions based on any information or findings that arise during the ESA consultation process”). In light of this final permit condition delaying permit effectiveness (and thus prohibiting any project activity) until completion of the ESA process and also allowing for amendment of the permit terms as appropriate to address the findings of that process, EPA believes that issuance of the final permit is consistent with ESA requirements, including the provisions of section 7(d) of the ESA. 16 U.S.C. § 1536(d); 50 C.F.R. § 402.09.

Category 2: General Comments in Support

COMMENT

The U.S. Mineral Management Service (MMS), the Alaska Oil and Gas Association (AOGA) and ASRC Energy Services (AES) all support EPA’s issuance of a minor air quality permit for Shell’s proposed exploratory drilling activities in the Beaufort Sea. More specifically, the AOGA and AES supports EPA’s conclusion that the stationary source subject to permitting should be defined as those activities associated with each individual planned well. They further state that the air pollution impacts from permitting under a minor air quality permit are likely to be less than those permitted under a major

permit. In addition, AOGA suggests that minor source permitting can reduce the administrative and regulatory burdens on EPA and the regulated industry and will facilitate efficient and effective permitting of future OCS sources.

EPA RESPONSE

EPA agrees with the comments supporting its determination to issue a minor air quality permit for Shell's exploratory drilling activities through its determination that the stationary source is defined as each planned well and any associated replacement or relief well. However, EPA has not determined whether or not a minor permit strategy will result in less overall air pollution impacts or will result in more efficient and effective permitting for future OSC activities than if the activity was permitted under a major permit. As explained in Category 5 and 6 below, a BACT analysis has not been conducted and therefore it is not possible to know what controls or emissions limits would be required under a major permit.

Category 3: General Comments Requesting Permit Denial

COMMENT

The Inupiat Community of the Arctic Slope (ISAC), the North Slope Borough (NSB), the Northern Alaska Environmental Council (NAEC) and a number of individuals oppose EPA's intent to issue Shell a minor air quality permit for exploratory drilling activities in the Beaufort Sea. The NSB further states that EPA should instead issue a major air quality permit for this activity because EPA has not provided an adequate explanation of its rationale for its determination of a stationary source. They also state that the 2008 permit revision does not represent a significant reduction in emissions from the 2007 permit, nor does it adequately address concerns raised in 2007.

EPA RESPONSE

We believe that our existing record fully supports our decision to issue Shell a minor air quality permit for exploratory drilling activities in the Beaufort Sea, as well as our determination that each planned well site constitutes a separate stationary source for purposes of determining New Source Review applicability. See Category 13 below for EPA's response to the comments regarding the Stationary Source Determination.

With regard to emissions reduction comment, such reductions are not required between the original permit action in 2007 and this 2008 revised permit action.

COMMENT

The NSB comments that they were concerned that Shell was proposing to use outdated and inadequate control technology to perform its drilling and related support activities

and that this will unlawfully degrade air quality and threaten the health of communities and fish and wildlife habitats on the North Slope.

EPA RESPONSE

Issues related to alleged degradation of air quality, health of North Slope communities, wildlife habitat and age or level of control technology are beyond the scope of the EAB remand and therefore no response is necessary. Nevertheless, concerns related to the National Ambient Air Quality Standards (NAAQS) and public health are discussed in Categories 12 and 15 below.

COMMENT

NAEC commented that if EPA permits the Kulluk as a minor source at each planned well, EPA must evaluate each planned well under separate minor source permits and issue a separate minor air quality permit for each. EPA may not issue an individual minor permit until each well location has been identified and then evaluate on a case-by-case basis whether properties in and around that location constitutes contiguous or adjacent properties.

EPA RESPONSE

A single minor permit may authorize pollutant-emitting activities be undertaken across multiple locations pursuant to the State of Alaska Requirements Applicable to OCS Sources. Specifically, 18 AAC 50.502 states that a separate minor permit is not required before relocation if the portable source is already allowed by permit to operate at the new location. In this case, the permit authorizes oil and gas exploration activities at any Drill Site within a Beaufort Sea OCS lease block authorized by the MMS within 25 miles of the State of Alaska's seaward boundary.

Applying the relevant regulations and guidance to a common set of facts, EPA is determining which groupings of activities would collectively be considered a separate stationary source. The stationary source is the Exploratory Operation that occurs for each individual Planned Well and any associated Replacement or Relief Well. Therefore, EPA is not accepting this comment. See discussion within Category 13 of this document for a complete explanation of EPA's separate stationary source determination and consideration of adjacency in formulating its decision.

COMMENT

The NSB commented that issuance of a minor permit ignores cumulative impacts caused by early shutdown of operations to stay within the NO_x cap. NSB disagrees with statements made at the March 25-27, 2008 public meetings that less pollution would be emitted under a minor permit and comments that best achievable control technology would reduce NO_x pollution by at least 30% from the Kulluk engines. NSB explains that under a minor permit if during a given year Shell approaches the 245 TPY NO_x cap, it may have to plug the well and return the next season resulting in inefficient operation and

causing more pollution as they access the same site twice, re-open the well and causes additional disturbance to marine mammals and subsistence hunters. NSB disagrees with statements Shell made at the public meetings that under a major permit it would not use low sulfur fuel or particulate traps because there is nothing in the record to show that these pollution reduction techniques would not be Best Available Control Technology (BACT).

EPA RESPONSE

EPA has no evidence to support, or deny, the commenters' claim that there could be a net increase in emissions caused by the interruption of Shell's drilling activities to avoid exceeding a minor air permit limit of 245 TPY of NOx. In addition, EPA has not conducted a BACT analysis for this project with which to determine what, if any, emission reductions would result from a BACT determination. This includes, but is not limited to any BACT determination that would require particulate traps or the use of low sulfur fuels.

Whether or not the issuance of a PSD permit (as opposed to a minor permit) would result in emissions increases or decreases is irrelevant to EPA decisionmaking. Shell has satisfied the regulatory requirements necessary for issuance of an ORL, thus making a PSD permit unnecessary. A BACT analysis is not required under a minor permit application and therefore was not required to be submitted by Shell in their application.

It should also be noted that statements made by Shell at public hearings regarding possible differences in pollution emitted by the Kulluk under minor source and PSD permitting are not necessarily those of EPA. EPA does address Shell's oral testimony about BACT in Category 5 of this document. Also see Category 6 for other responses to comments regarding BACT.

Category 4: EPA Application Process

COMMENT

The ICAS commented that Shell's minor air permit application is legally and technically flawed and recommends that Shell be required to submit a major source air permit for the Kulluk exploratory drilling operations.

EPA RESPONSE

The EPA has determined that Shell's application for a minor air quality permit to conduct exploratory drilling in the Beaufort Sea is complete. Following review, EPA determined that the information submitted by Shell is sufficient to issue this minor permit. Shell's application materials are available to the public at EPA's website, and during the public comment period, were available at the repositories listed in the public notice.

Category 5: Major Source General Comments

COMMENT

A common theme among commenters, both in oral testimony and through written comment, was a request that Shell to be required to permit their exploratory drilling operations under a major, not a minor air quality permit. One commenter stated further that under a major air quality permit Shell would be required to install additional air pollution controls under BACT, especially in the main Kulluk engines. Dividing the project into separate minor permits is bad public policy and sets a bad national precedent for avoiding new source review and BACT. During oral testimony, Shell countered saying that a minor permit has emission and operational constraints that a major permit would not have including a requirement to burn low sulfur diesel and a 250 ton per drill site cap. Shell also claimed that because of space limitations on the Kulluk, the BACT review may not even require additional controls.

EPA RESPONSE

As stated above, EPA has no evidence to support, or deny, any commenter's claim that there could be a net increase, or decrease, in emissions if a major permit was issued to Shell instead of a minor permit. Because a BACT analysis is not required for Shell to obtain an ORL under a minor air quality permit, a BACT analysis is not included in Shell's application or the permit record. Only after a BACT analysis is submitted and reviewed can EPA make a BACT determination as to what constitutes the appropriate level of emission controls. Because this is not part of the permit record, it is impossible to know whether or not any additional controls would be required under the BACT. Hence, all claims regarding and/or comparing emissions generated under minor or major permitting scenarios are irrelevant. This includes, but is not limited to, claims regarding space constraints aboard vessels, particulate traps, or the use of low sulfur diesel fuels.

Also see Category 6 of this document regarding BACT.

COMMENT

One commenter stated that using a minor permit approach ignores the fact that the Kulluk is a large drillship that will be used to drill multiple wells under the same SIC code, using the same equipment and crew for the same company in the same drilling season. They further state that the Kulluk should be treated as a single stationary source at all times it is attached to the seabed within 25 miles of the coast. EPA is segmenting its permitting process allowing Shell to avoid major new source review by suspending its efforts to issue a permit to the Frontier Discoverer and by segmenting the Kulluk operations treating the vessel as a distinct source at each different planned well site irrespective of the interrelation between such wells. This violates the terms and contravenes the basic purpose of the Clean Air Act.

EPA RESPONSE

An owner may request limits on its air pollution emissions to avoid applicability of many federal program requirements, including major new source review. This "synthetic minor" permitting practice is well established and is allowed under the provisions of the CAA and the applicable Alaska regulations at 18 AAC 50.508(5). In this case, Shell has requested a synthetic minor permit to avoid requirements of major new source review permitting. EPA finds that issuance of an ORL in a minor permit neither violates nor contravenes the basic purpose of the Clean Air Act, the OCS Air Regulations at 40 C.F.R. Part 55, or the applicable Alaska regulations. Given our determination that each Exploratory Operation is a separate stationary source, EPA's determination to recognize Shell's Beaufort Sea exploration activity as a series of minor sources is largely based on the minor permit containing adequate emissions monitoring and Shell's capability to comply with the synthetic minor emissions cap.

In Category 13 of this document EPA provides detailed response to comments regarding how EPA has determined that each planned well site is considered an independent source for the purpose of issuing a minor air permit.

COMMENT

The NSB commented that the proposed permit is internally inconsistent on the timeframe for computing emissions (calendar vs. 52 week rolling). The permit requires a rolling 52-week rolling period rather than a calendar year to be used to determine the application of PSD to operations at a particular well. But, for the purposes of determining whether the wells are adjacent, EPA focuses on the emissions that occur during a given calendar year. So commenter asserts if EPA is to use a rolling 52-week period for applying PSD, it should do the same for determining whether the wells are adjacent.

EPA RESPONSE

Contrary to the comment, the EPA did not focus on emissions to determine whether wells are adjacent. Rather as further explained in Category 13 below, to determine adjacency, EPA considered a number of facts including interdependence and proximity. However, for internal consistency, EPA has revised Permit Condition 16 from a calendar year to a rolling 52-week period. See subcategory 13-4.

COMMENT

EPA combines all the air pollution impact for all the wells for the purpose of meeting the NAAQS and sets a 160-day combined operating limit on all of the wells drilled by the Kulluk in each year. Thus, EPA recognizes the emissions are interdependent and cumulative for purposes of NAAQS but refuses to view Shell's operations as interdependent and cumulative for purposes of determining whether best available control technology is needed under PSD.

EPA RESPONSE

Shell modeled and considered the cumulative impacts resulting from two drill sites in the same season in order to fulfill its obligations outlined in EPA's Guideline on Air Quality Models. Modeling is based on an annual average as further explained in Category 9. The manner in which Shell conducted its ambient impact analysis is separate from EPA's separate stationary source determination.

Please see Category 13 of this document for an explanation for our separate stationary source determination.

Category 6: BACT Analysis Requested

COMMENT

NSB requests EPA to work with Shell to complete a best available control technology (BACT) review.

EPA RESPONSE

The commenter's request for Shell to complete a BACT review is unrelated to the stationary source determination, revised modeling analysis or modified portions of the permit, and as such is beyond the scope of the remand and need not be addressed. Nevertheless, EPA offers the following response.

As EPA stated in its February 2008 Fact Sheet that accompanied the Proposed Permit and Supplemental Statement of Basis,

Shell applied for "minor" permits and requested that NO_x emissions be limited to less than 245 tons per year at each drill site. With these limits, Shell was not required to go through the more rigorous "major" PSD permitting process. The PSD process includes a review of best available control technology.

As detailed in Category 13, EPA has determined that each Exploratory Operation is a separate stationary source, and EPA is limiting emissions from each stationary source to less than the "major" source threshold level. Therefore, PSD review is unnecessary and Shell is not required to submit a BACT analysis.

Category 7: Eighty Day Operating Limit Not Supported

COMMENT

The NSB states that neither EPA nor Shell computed the air pollution associated with drilling a relief well and replacement well when computing the total air pollution from this project. Neither EPA nor Shell provided any information to show how an

exploration well, replacement well, and relief well could all be drilled, one after another, within 80 days. Adequate time must be allocated for air pollution associated with a relief well, since this is a necessity in the event of a blowout. Given that it takes approximately 47 days to drill a Relief Well in the Beaufort Sea, EPA must amend the permit to limit to 33 days (80 - 47) the collective time that Shell is allowed to drill a Planned Well and Replacement Well for any given Exploratory Operation.

EPA RESPONSE

Pursuant to 18 AAC 50.542(f)(1)(B), EPA will deny a minor permit application if it shows that the source will cause or contribute to a NAAQS violation. Shell submitted a modeling analysis to demonstrate that a NAAQS violation would not occur. As part of its analysis, Shell found it necessary to restrict its operations so as to demonstrate compliance with the NAAQS. Pursuant to 18 AAC 50.544(c)(1), EPA included these operating limits in the permit. See Conditions 15 through 20 of the final permit. One of the operating limits requested by Shell to ensure protection of the NO₂ and SO₂ annual NAAQS was an 80-day limit associated with a single Exploratory Operation. Thus, as provided in Permit Condition 15, the Kulluk may not occupy drill sites associated with the same operation more than 80 calendar days in aggregate during a rolling 52-week period.

It was not necessary for Shell to demonstrate its ability to collectively drill within the 80-day period a Planned Well, Replacement Well, and Relief Well. Shell simply needed to demonstrate its ability to comply with NAAQS assuming compliance with the operational restrictions. It did that. The resultant permit contains adequate monitoring, recordkeeping and reporting to document compliance with the 80-day limit and applicable emission limits. See Conditions 15.1 and 15.3 of the permit. No permit amendments, including those recommended by NSB, are necessary to assure compliance with the NAAQS or the 245 tpy NO_x limit.

Category 8: Kulluk Relief Well Capability

COMMENT

NSB indicates that the permit application did not provide technical information illustrating the Kulluk's ability to drill its own relief well. If the Kulluk is damaged during a blowout, a second rig would be needed to drill the relief well. The proposed permit does not authorize a second rig to drill the relief well. If the permit is to remain a minor source permit, the Kulluk's ability to drill its own relief well should be examined.

EPA RESPONSE

The ability to drill a relief well, with either two ships or one, is a technical issue unrelated to the stationary source determination, revised modeling analysis or modified portions of the permit, and as such is beyond the scope of the remand and need not be addressed. Nevertheless, EPA offers the following response.

In June 2007, EPA issued two permits to Shell to conduct exploratory drilling activity in the Beaufort Sea. One authorized the use of the Kulluk and the other the use of the Frontier Discoverer. Although the permits enabled Shell to utilize both drill rigs in the same season, Shell was not required to have both drill rigs in the area as a precondition for drilling.

There exists a need for contingency planning given that between 1992 and 2006, approximately one in every 298 exploratory wells drilled on the United States OCS experienced a blowout.⁵ Shell's asset manager for Alaska, Rick Fox, explained,

Were the containment provided by the blowout preventer to fail, Shell might have to drill a relief well into the out-of-control well, to plug the well up. The floating drilling vessel could reposition to drill that relief well, or Shell could bring in its second drilling vessel to drill a relief well, Fox said. September 2, 2007 Petroleum News, p. 9.

In its Blowout Control / Relief Well Plan presented to the MMS, Shell discusses under what circumstances it may become necessary to have a second rig drill the relief well. Shell states,

In the scenario developed for this contingency plan, the drilling vessel originally on site attempts to stop (or slow) the blowout by pumping mud and/or concrete downhole. Should these efforts fail, the drilling vessel pulls away from the blowout location in order to support safe recovery operations from a relief well site. As a precautionary measure, relief well preparation operations are initiated in parallel with the implementation of surface control methods. Unless it is damaged, this same drilling vessel will then commence relief well drilling. Where the original on site rig is damaged, Shell's second rig will be used to drill the relief well. January 2007 Beaufort Sea Regional Exploration Oil Discharge Prevention and Contingency Plan (ODPCP), p. 1-22.⁶

Shell, determined that it can conduct safe exploratory drilling operations in the Beaufort Sea utilizing a single drill rig. Shell states,

Given the relatively benign anticipated well conditions and subsurface well control at the Beaufort Sea locations covered by this plan, and given the risk reduction actions in place (See

⁵ David Izon, E.P. Danenberger, Melinda Mayes. Absence of Fatalities in Blowouts Encouraging in MMS Study of OCS Incidents 1992 - 2006. Drilling Contractor. July/August 2007.

⁶ See additional statements from Shell in October 1, 2007 weekly edition of Oil and Gas Journal.

Section 2.1.8), Shell believes that a prudent operator could conduct a Beaufort drilling campaign using a single drilling rig. January 2007 Beaufort Sea Regional Exploration ODPCP, p. 1-23.

The federal agency responsible for determining whether Shell is capable of conducting safe exploratory operations in the Beaufort Sea utilizing a single drill rig is the MMS. The MMS appears to agree with Shell on this count as evidenced by MMS's February 15, 2007 approval of Shell's contingency plan. In its four-page approval letter to Shell, MMS stipulates that its approval is contingent upon Shell satisfying a number of conditions. Not one condition requires Shell to maintain two drill rigs in the area at the same time.

EPA is relying upon MMS's determination in this regard.

Category 9: Modeling Analysis

Subcategory 9-1: Meteorological Data used in Modeling

COMMENT

The NSB asserts that EPA regulations require Shell to collect one year of meteorological variable data in the Beaufort Sea to support the ambient air quality impact analysis and cites a subsection of 40 C.F.R. § 52.21 as the basis for this requirement.

EPA RESPONSE

40 C.F.R. § 52.21 contains the federal Prevention of Significant Deterioration (PSD) regulations that apply to a new major stationary source or a major modification at a stationary source. The language cited by the commenter is found in 40 C.F.R. § 52.21(m)(1)(b)(iv) and applies to air quality monitoring data and not to meteorological variable data. Furthermore, the proposed Shell drilling project is not subject to the PSD regulations because it is being permitted as individual minor sources.

The requirements and guidance for collecting meteorological variable data and using such data in regulatory applications can be found in Appendix W of 40 C.F.R. Part 51, otherwise known as the Guideline on Air Quality Models (GAQM). Paragraph 8.3.1.2(b) of the GAQM state that five years of representative data or at least one year of site specific data is required for use in EPA refined or preferred air quality models. The air quality models include the AMS/EPA Regulatory Model (AERMOD) and the Offshore and Coastal Dispersion (OCD) Model. In general, the models, techniques and procedures detailed in the GAQM should be utilized in an ambient air quality analysis to support State Implementation Plan (SIP) revisions, major new source review (NSR), and minor air permit applications. For refined models, one year of site-specific data, or five years of representative data is used.

In this instance, Shell used ISC-Prime with screening meteorology, which showed no NAAQS violations. Therefore, site-specific data was not required. (See responses in Subcategory 9-3 below.)

COMMENT

The NSB comments that there are no site specific data to compare with the screening data to determine if the ambient air pollutants concentrations predicted by modeling are conservative.

EPA RESPONSE

EPA determined that the screening meteorology will give concentrations that will be equal to, or greater than, the concentrations obtained using site specific representative meteorology used in a refined or preferred model. The meteorological variable data used in a screening model consists of wind speed, wind direction, stability class, mixing height, and ambient temperature with specifically;

- Wind speeds that range from 1.0 meter per second (m/sec) to 20 m/sec.
- Wind direction that can be a single direction, or a range of directions.
- Six stability classes that are used in the screening modeling to simulate how much dispersion or mixing is occurring in the atmosphere. Atmospheric stability is dependent upon the heating of the ground (which produces thermally induced turbulence), wind speed and surface characteristics (which produce mechanically induced turbulence), and the change in temperature with height. During the daytime, the atmosphere is generally either unstable (Stability Class 1-3) or neutral (Stability Class 4). At night, the atmosphere is generally stable (Stability Class 5 or 6) or neutral (Stability Class 4).
- Mixing heights during the unstable and neutral conditions that are calculated for each hour while the mixing height during stable conditions is not defined and is therefore set to a large value in the model.
- A default average ambient temperature that is 293° Kelvin (K) (or approximately 20 degrees Celsius or 68 degrees Fahrenheit), or it can be specified.

Using these six meteorological variables, a data set consisting of fifty-four (54) combinations or hours was generated by Shell consistent with EPA requirements to calculate the highest ground level concentration impact in a screening model.⁷ These combinations appear in the screening meteorological variable data set because they are believed to encompass the entire range of meteorological conditions that would actually

⁷ See ASC O_Screen and Screen 3 users guide, 1995, page 45

occur. These are valid combinations which could appear in a site specific or representative meteorological data set. When these combinations are used in a screening model, EPA expects the resulting maximum concentrations to be equal to or greater than what would be predicted if site specific or representative meteorology were used in a refined air quality model. Therefore, EPA determined that the screening meteorology data was sufficient and produced conservative results.

For the proposed Shell drilling project, wind directions range from five degrees to 360 degrees at five degree increments. The default ambient temperature (68° F) was used rather than a representative ambient temperature. Sections 1.0 and 1.4 in the Staff Air Ambient Quality Impact Analysis Report (AQIA) dated February 13, 2008, provide a discussion of the meteorological variable data set.

Subcategory 9-2: Emission Data used in Modeling

COMMENT

A comment is made that although there is a permit condition that requires drill sites (i.e., emissions from the Kulluk during drilling) to be separated by 1000 meters to ensure compliance with the NAAQS, support vessels are much larger emitters that could remain at the one location, and in doing so cause the NAAQS to be exceeded.

EPA RESPONSE

With respect to support vessels, the oil spill response (OSR) vessels and ice breakers were treated as area sources for the purposes of modeling, with the OSR fleet operating in a 1-km by 1-km square area and the ice breakers operating in a 3-km by 3-km square area. All the support vessels were assumed to be emitting at their maximum potential to emit for 80 days even though that emission rate would have far surpassed the 245 ton per year limit of the minor permit. For the purposes of modeling worse-case operation emissions that result in maximum predicted concentration, both of these area source grids were placed upwind of the Kulluk. The modeling shows that even although the support vessels are large emitters, when compared to the Kulluk, they actually contribute very little to the maximum downwind ambient concentration from the project. Instead, the majority of emissions causing the maximum ambient concentration are from the smaller emissions sources located on the Kulluk drilling rig and from the downwash effects of its hull. Modeling data indicates that the ice breakers and oil response vessels contribute less than ten percent (10%) of the maximum NO_x concentration.

Subcategory 9-3: Model Selection

COMMENT

A comment is made that EPA's preferred OCD Model with site specific meteorology should have been employed to obtain "more accurate" concentration impact predictions in the area. Furthermore, the record does not provide support for the exclusion of the OCD Model.

EPA RESPONSE

Paragraphs 2.2 and 2.3 in the GAQM identify and discuss two levels of models that can be used in an ambient air quality impact analysis. The two levels are screening models and refined models.

Screening models use simplified calculation methodologies and a complete range of hourly meteorological variable data to estimate a worst case concentration impact from a stationary source (see explanation in Subcategory 9-1 above). If the screening model does not predict a violation of the NAAQS, further analysis is not required. However, if a violation is predicted using a screening model, a more refined model that uses representative or site specific meteorological variable data may be employed to obtain a less conservative (i.e., more accurate) predicted concentration impact.

Shell used the ISC-PRIME model with screening meteorology from the Screen 3 model (worst-case hourly meteorological variable data set) to determine the project's compliance with the NAAQS. The results of applying the screening model are provided in Table 5 of the AQIA and show that the worst-case drilling scenario, as determined by Shell, does not violate the NAAQS. Since the total air quality concentration impacts for sulfur dioxide, nitrogen dioxide and particulate matter equal or less than 10 microns (PM₁₀) did not result in an exceedance of the NAAQS, EPA determined that a refined analysis using OCD or other equivalent refined model was not required. EPA acknowledges that ISC-Prime is not a preferred guideline model. However, EPA approved its use in this case to account for downwash, wake cavity and arctic conditions. (See AQIA page 2.) In this case, the use of site-specific meteorology would not be expected to result in higher concentration impact predictions.

It should be noted that Shell used the default temperature of 293° K which added conservatism to its model predictions, rather than a representative temperature of 262° K. The effects of using the 262° K with the stack parameters shown in Table 2 of the AQIA would be:

- A greater difference between the ambient and stack gas exit temperatures.
- A higher calculated exhaust gas plume rise before reaching equilibrium with ambient conditions.
- More transport and dispersion of the gaseous and particulate air pollutants because of

the greater plume height.

- o Lower (less conservative) predicted concentration impacts.

In addition, EPA required Shell to use the upper range of the scaling factors to obtain 3-hour, 24-hour and annual average concentration impacts from a 1-hour screening model prediction. The table below shows the generally used average scaling factors and the scaling factors used by Shell.

Averaging Time	Scaling Factors	
	Average	Shell
3-Hour	0.90	1.00
24-Hour	0.40	0.60
Annual	0.08	0.10

The ambient temperature and scaling factors are discussed in Section 1.4 and Section 1.10 of the AQIA.

COMMENT

Reference is made to a State of Alaska letter stating that air quality model improvements are needed to adequately address Arctic issues including boundary layer conditions, location, health impacts, chemical transformation, and deposition.

EPA RESPONSE

Appendix A to the GAQM contains a list of six (6) EPA preferred or refined air quality models that are available to address a wide variety of sources types and modeling situations. Two of the most commonly used models are AERMOD and CALPUFF. On a case-by-case basis, Alternative Models are also available for use in regulatory applications. There are seventeen (17) listed Alternative Models. Appendix A Models and Alternative Models can be found on EPA's web site.

AERMOD replaced the Industrial Source Complex 3 (ISC3) Model in December 2006 as the preferred air quality model to predict concentration impacts and compliance with NAAQS. It is primarily used to determine nonreactive and toxic concentration impacts (a) from point, area and volume sources, (b) in rural and urban dispersion situations, (c) in simple and complex terrain, (d) under a building wake effect case, (e) at distances less than 50-kilometers (km), and (f) for the 1-hour, 3-hour, 8-hour, 24-hour and annual average periods. The model also contains algorithms to evaluate dry and wet deposition for gases and particles. However, it does not contain any chemical mechanisms to specifically address pollutant transformation. AERMOD has been tested in the Arctic region using data from a tracer gas study. Details of the test can be found in the document entitled "AERMOD: Latest Features and Evaluation Results", EPA-454/R-03-003 dated June 2003.

CALPUFF Version 5.8 is the preferred model to predict concentration impacts at downwind distances greater than 50-km. Version 5.8 has been designed to predict concentration impacts from point, volume, area and line sources. It is commonly used to determine visibility impacts and deposition at mandatory federal Class I areas. CALPUFF contains a very simple chemistry mechanism that can be used to address secondary formation of air pollutants. EPA is not aware of Version 5.8 ever being tested in the Arctic region.

In early 2006, the Mineral Management Service (MMS) completed the development of a new, over water air quality model for sources proposing to locate in the outer continental shelf (OCS) of the United States as a possible replacement for OCD. Called CALPUFF Version 6, this model contains the most recent science as it applies to over water dispersion and transport. Version 6 also contains many of the same features as Version 5.8 described above.

Sensitivity analyses and performance evaluations have been performed on Version 6 using data sets off the coast of California, Gulf of Mexico and Denmark/Sweden by the MMS. EPA is in the process of conducting its own independent performance evaluations and sensitivity analyses to determine if Version 6 can be designated a preferred model for use in over water air quality modeling analysis such as in the Beaufort Sea. These EPA evaluations and tests could take at least a year to complete, and until then Version 6 is not a preferred model.

Category 10: Owner Requested Limit (ORL)

Subcategory 10-1: ORL General

COMMENT

The way the emissions are inventoried at this time there leaves little room for error if the wells take longer to drill due to unpredicted circumstances.”

EPA RESPONSE

The Kulluk permit limits NO_x emissions from each Exploratory Operation to less than 245 tons over each rolling 52-week period so as to make PSD review unnecessary. See Permit Condition 8. To remain in compliance with this limit, we recognize that it may become necessary for Shell to vacate a well prior to achieving all of its information gathering objectives. Shell may choose to revisit the well at a later date, however, given the nature of the rolling 52-week NO_x emissions limit. Permit Condition 8 requires Shell to monitor and record these NO_x emissions on a regular and frequent basis. Thus, Shell will possess the knowledge to adjust its activities to remain in compliance with the emissions limit.

Subcategory 10-2: Completeness of Emissions Inventory

COMMENT

If the permit is to remain a minor source permit, the emissions associated with a relief well should be considered.

EPA RESPONSE

Pursuant to the OCS definition, source activities include, but are not limited to, drilling an exploration well and its associated relief well. Pursuant to 18 AAC 50.542(f)(8)(A), EPA will approve an ORL if the stationary source is capable of complying with the limit. As EPA stated in its June 12, 2007 Response to Comments, "Under the operating circumstances and ice conditions anticipated by Shell and presented in the application, Shell is capable of complying with the 245 tpy emissions cap. EPA has no information suggesting that Shell's predictions are unreasonable."

The issue that the NSB now raises for the first time was readily ascertainable at the time of the original permit issuance. Although changes to the permit now clarify that an exploration well and its associated relief well are one source, the possibility of needing a relief well existed in the original permit. The requirement that Shell demonstrate its ability to comply with 245 ton-per-year NO_x emissions limit at each planned well site has not changed. As the issue is unrelated to the stationary source determination, revised modeling analysis or modified portions of the permit, it is beyond the scope of the remand and need not be addressed. Nevertheless, EPA offers the following response.

Shell has submitted to EPA information to support its ORL request pursuant to 18 AAC 50.225(b)(2) – (7). Among the information submitted to EPA, Shell provided (a) a reasonable projection of actual emissions, and (b) a statement that the owner or operator of the stationary source will be able to comply with the limit⁸. To track compliance with the limit, the permit contains numerous emissions monitoring requirements. Given this set of facts, EPA has determined that it is appropriate to issue a minor permit establishing the ORL pursuant to 18 AAC 18.50.542(f)(8).

EPA may approve an ORL if it finds that "the stationary source is capable of complying with the limit" pursuant to 18 AAC 50.542(f)(8)(A). Drilling a Relief Well is only necessary under infrequent and unusual conditions.⁹ Shell indicates, "[T]he probability that the Kulluk might need to drill a relief well for any given Planned Well is

⁸ June 5, 2007 email from Susan Childs (Shell) to Dan Meyer (EPA)

⁹ According to a November 6, 1998 report for BP entitled, "Blowout and Spill Probability Assessment for the Northstar and Liberty Oil Development Projects in the Alaskan North Slope," United States OCS exploratory wells drilled between 1971 and 1990 experienced blowouts at a rate of 6 for every 1,000 wells drilled. See Table B.1 of the report.

approximately 1 in 5,960.”¹⁰ Indeed, Shell may never drill a Relief Well during exploratory drilling in the Beaufort Sea. Although emissions resulting from drilling a Relief Well shall still be considered a part of the stationary source, given the infrequent need for relief wells, EPA has determined that Shell is not required to submit further information related to relief well emissions prior to issuance of the minor source permit. The ORL request submission requirements of 18 AAC 50.225(b)(2) through (7) have already been satisfied.

COMMENT

The NSB comments that air pollution associated with drilling a relief well and replacement well have not been computed.

EPA RESPONSE

Shell specifically requested that the permit limit its NO_x emissions to less than 245 tons per year making PSD review unnecessary. In particular, Shell has provided a list of all emission units at the stationary source pursuant to 18 AAC 50.225(b)(2). Given that the same drilling rig, the Kulluk, would be responsible for drilling the planned wells, the relief wells, and the replacement wells, there is no need to require a more expansive list. The list of emission units and the emission inventory is complete.

With respect to Shell's calculation of each Exploratory Operation's potential to emit, Shell has requested that EPA limit its emissions to less than the PSD major source threshold level. The permit requires Shell to limit emissions from each Exploratory Operation to less than 245 tons per year, including emissions from relief wells and replacement wells. EPA has determined that Shell's calculation of its potential to emit is satisfactory. As the EAB stated in its September 14, 2008 order,

In this case, the Permits [Kulluk and Frontier Discoverer permits] include an ORL limiting the sources' NO_x emissions to 245 tpy, below the major source threshold of 250 tpy. Shell's PTE calculation properly took this limitation into consideration. While NSB may have preferred that the Region require a calculation of Shell's maximum capacity to emit NO_x absent federally enforceable limitations, neither the Act nor the applicable regulatory provisions require such a calculation. Rather, Shell was required to calculate the sources' maximum capacity to emit a pollutant taking into consideration “[a]ny [federally enforceable] physical or operational limitation on the capacity of the source to emit a

¹⁰May 6, 2008 Memorandum from Paul Smith (Shell) to Susan Childs (Shell) entitled, “Kulluk OCS Air Permits Questions.”

pollutant.” 40 C.F.R. §52.21(4). This is precisely what occurred in this case.

EPA has determined that because relief well emissions would be generated by the same equipment already included in the inventory and is subject to the monitoring, recordkeeping and reporting requirements, as well as the 245 ton per year NOX emission limit, the application is complete, and no further emissions calculations are required. Emissions generated during relief well drilling will be evaluated in accordance with EPA's excess emissions policy¹¹.

COMMENT

NAEC comments that EPA should evaluate emissions that may be produced during critical curtailment when the Kulluk may need to suspend drilling and/or move off the site due to ice, wind, or other conditions which exceed operating limitations of the drilling technology.

EPA RESPONSE

Given the equipment and general location (Beaufort Sea) Shell has chosen, EPA is aware that drilling may be suspended due to weather or ice conditions.¹² During such periods of time, the Kulluk may spend a number of days away from the Drill Site. These time periods are referred to as “critical curtailment periods.” Emissions generated by the Kulluk and its support vessels occurring within 25 miles of a Drill Site are counted as Exploratory Operation emissions. See 42 U.S.C. §7627(a)(4)(C) (stating that the direct emissions of an OCS source shall include those from support vessels within 25 miles of the source). This includes emissions generated during a critical curtailment so long as the particular vessel remains within 25 miles of the Drill Site. The permit requires Shell to monitor and count these emissions in assessing compliance with the 245 ton-per-year NO_x emission limit.

With respect to Shell's calculation of each Exploratory Operation's potential to emit, Shell has requested EPA to limit its emissions to less than the PSD major source threshold level. The permit requires Shell to limit emissions from each Exploratory Operation to less 245 tons per year, including emissions during critical curtailment. Shell's calculation of its potential to emit is satisfactory.

¹¹ See e.g., September 28, 1982 Policy on Excess Emissions During Startup, Shutdown, Maintenance, and Malfunctions; January 28, 1993 Automatic or Blanket Exemptions During Startup and Shutdown Under PSD; September 20, 1999 State Implementation Plans: Policy Regarding Excess Emissions During Malfunctions, Startup, and Shutdown, and November 17, 1998 Guidance on the Appropriate Injunctive Relief for Violations of Major New Source Review Requirements.

¹²James B. Regg, R. Yilmaz Kuranel, Jolin Breitmeier, Rodney Smith, and Jeff Walker (MMS). Operating Requirements for and Historical Operations of Arctic Offshore Drilling Systems in the United States. Hydrotechnical Construction. Vol. 28. No.3. 1994.

The application is complete, and no further emissions calculations are required.

COMMENT

NSB submitted a comment stating that Condition 8.1 of the proposed permit should be amended. EPA did not include 100% of the air pollution emitted during transit to and from a drill site in the emission calculation for PSD applicability purposes in violation of 40 CFR § 55.2. More specifically, NSB contends that proposed Condition 8.1 includes only half of the transit emissions and that each stationary source should be burdened with the full impact of the transit emissions generated within a 25-mile radius.

EPA RESPONSE

Condition 8.1 states,

When the Kulluk and its support vessels are in transit to or from a Drill Site associated with another Exploratory Operation less than 25 miles away, attribute the emissions as follows:

- a. *Half of the transit emissions shall be attributed to one of the two Exploratory Operations, and*
- b. *The other half of the transit emissions shall be attributed to the other Exploratory Operation.*

Condition 8.1 of the permit assures that there will be no double-counting of vessel emissions generated while in transit from one Drill Site to another. In assessing compliance with the 245 ton per year NO_x emissions limit, half of a vessel's transit emissions are attributed to the Exploratory Operation just having been completed while the other half is attributed to the Exploratory Operation just beginning. This is consistent with 40 C.F.R. Part 55 as evidenced by EPA statements within the preamble to the final OCS Air Regulations rulemaking. 57 Fed. Reg. 40791 (September 4, 1992)

All vessel emissions related to OCS activity will be accounted for by including vessel emissions in the "potential to emit" of an OCS source. Emissions from vessels that service more than one OCS facility will be allocated among all OCS facilities that the vessel services, to ensure that there is no double-counting of emissions.

57 Fed. Reg. at 40794

Thus, Condition 8.1 of the permit is consistent with the underlying OCS regulations. EPA is not amending the permit condition as requested.

COMMENT

Two commenters contend that emissions from flaring or venting formation gas were not included in the application. Shell's application states it does not intend to flare but this is inconsistent with other applications where use of a flare is included to combust gas produced during drilling and testing operations. Shell needs to explain how it plans to safely handle gas produced during drilling and testing if it does not intend to flare it.

EPA should request information from Shell about the presence of a flare on the Kulluk and how formation gas would be handled. If formation gas is to be handled in some other way, then EPA should add a permit condition preventing flare use.

On May 6, 2008, Shell responded to the aforementioned comments by stating,

As stated in the application, Shell does not plan to flare any gas. Gaseous hydrocarbons under pressure may be dissolved in the drilling mud that is piped to the surface during the drilling process. These gaseous hydrocarbons may be released when the drilling mud is vented to atmospheric pressure. The majority of any potential gaseous hydrocarbons are methane and ethane, both of which are excluded from regulation as volatile organic compounds and are otherwise not subject to emissions limitations. See 18 AAC 50.990(121) and 40 CFR 51.100(s)(1). Any potential release of these gaseous hydrocarbons would be very small, intermittent, fugitive, and unquantifiable and, as such, would not need to be permitted under 18 AAC 50.502 (minor permits for air quality protection).

EPA RESPONSE

With regard to emissions from venting and flaring, neither Shell's application, the potential to emit calculation, the modeling analysis nor the proposed permit's approach has changed since the 2007 permit. A concern regarding venting and flaring was raised previously by ADEC during the public comment period for the 2007 Kulluk permit. In response, EPA stated,

A May 24, 2007 e-mail from Shell states, "There will be no oil or gas flares or crude oil vents, and none are listed in the draft permits." Thus there are no emissions sources that vent directly to the atmosphere that need to be in the emission inventory.

(2007 Response to Comments p. 41)

In response to the comments however EPA re-evaluated Shell's application and the information in the record regarding venting and flaring.

Flaring Formation Gas

Shell has not requested authorization from either EPA or MMS to flare any gas, and EPA's permit does not authorize Shell to employ a flare. Note the absence of a flare in Table 1 of the permit, and Shell's potential to emit calculation assumes no emissions from gas flaring. Shell intends to fulfill its information gathering objectives by carrying out wireline logging and core sampling, and not well testing.¹³ During drillstem testing for instance, formation fluids flow into and up the drillstem. If gas is present, it will flow up the drillstem and onto the surface where it is measured and flared (burned).¹⁴ By refraining from such testing, Shell avoids generating gas that may be required to be flared.

Diverting Shallow Gas

Shell cannot, however, refrain from venting shallow gas to atmosphere when encountering such gas during the course of drilling a well.¹⁵ Shallow gas refers to gaseous hydrocarbons encountered at shallow depths below the seabed prior to casing being run and blowout preventer being installed. Preventing the gas from escaping the well under these circumstances may result in an underground blowout given the uncertain strength of shallow structures to hold the gas. Thus, the shallow gas must be allowed to escape to maintain safe operations. Kulluk's diverter system is designed to route the gas away from the rig as a critical and necessary safety measure.

Although these events may be rare, such activity would be a part of the stationary source. The constituents and quantity of the shallow gas stream is unknown, however, the record suggests that the VOC emissions would not likely approach the major source threshold level. See June 12, 2008 EPA Memorandum entitled, "Volatile Organic Compound Emissions Associated with Shallow Gas Diversions and Drilling Mud Returns – Kulluk Drilling Rig."

Drilling Mud System

Although EPA cannot predict with certainty the extent of VOC emissions that would be associated with a Beaufort Sea drilling mud system, the record suggests that the emissions would not approach the major source threshold level. The record suggests that VOC emissions would likely be on the order of a few pounds a day. See June 12, 2008 EPA Memorandum entitled, "Volatile Organic Compound Emissions Associated with Shallow Gas Diversions and Drilling Mud Returns – Kulluk Drilling Rig."

¹³ See "Drilling Process" in Shell's July 20, 2007 Application for Permit to Drill submitted to MMS.

¹⁴ Nontechnical Guide to Petroleum Geology, Exploration, Drilling, and Production, 2nd Edition, Norman J. Hyne, Ph.D. PennWell Corporation. 2001. P. 330.

¹⁵ MMS requires the following of OCS drilling operations, "You must install a diverter system before you drill a conductor or surface hole... You must design, install, use, maintain, and test the diverter system to ensure proper diversion of gases, water, drilling fluid, and other materials away from facilities and personnel." 30 CFR 250.430.

Changes to Permit

The permit authorizes Shell to mobilize, operate, and demobilize the Kulluk at certain Drill Sites. Consistent with Condition 4 of the permit, "The emissions units listed in Table 1 are collectively referred to as the Kulluk." Table 1 of the proposed permit failed to identify either the Kulluk's Drilling Mud System or its Shallow Gas Diverter System. To rectify this omission, Table 1 of the permit is amended as follows (added text underlined):

Table 1 – Kulluk Emission Units				
Unit ID	Source Group	Unit Description	Make/Model	Rating
<u>K-23</u>	<u>M</u>	<u>Drilling Mud System</u>		
<u>K-24</u>	<u>D</u>	<u>Shallow Gas Diverter System</u>		

In order for EPA to better understand the potential for VOC emissions resulting from shallow gas diversions, EPA is requiring Shell to record the frequency and duration of such events. Condition 27 of the permit is created as follows (added text underlined):

27. Shallow Gas Diversions

27.1 The permittee shall record the frequency and duration of each shallow gas diversion.

27.2 The permittee shall 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.

Subcategory 10-3: Stack Testing and Use of AP-42 Emission Factors

COMMENT

The NSB comments that in 2007, Shell conducted stack testing to determine NO_x emission rates for thirteen engines on the Kulluk, Vladimir Ignatjuk, and Tor Viking II. The 2007 permit required that these engines be tested to improve the NO_x emission factors. While Shell has obtained test data to more accurately estimate NO_x emissions, it did not use this data in its revised 2008 application, specifically in support of its NO_x ORL. NSB requests EPA obtain the 2007 NO_x stack test results from Shell, and require Shell to revise the permit application as related to the NO_x ORL to reflect this source-specific test data. EPA and ADEC have always required an operator to use the best

emission data available to ensure permit accuracy. The revised permit, based on this more accurate test data, should be provided for public review and comment.

EPA RESPONSE

As discussed in Category 11, and contrary to the comment, Shell indicates that stack test data is not available in their May 6, 2008 letter to EPA.

COMMENT

EPA's use of AP-42 NO_x emission estimates for these thirteen engines on the Kulluk, Vladimir Ignatjuk, and Tor Viking II when source-specific test data is available would contradict EPA policy on AP-42 factors. EPA's AP-42 document states,

Use of [AP-42] factors as source-specific permit limits and/or as emission regulation compliance determinations is not recommended by EPA...[A] permit limit using an AP-42 emission factor would result in half of the sources being in noncompliance... source-specific tests or continuous emission monitors can determine the actual pollutant contribution from an existing source better than can emission factors...when such information is not available, use of emissions factors may be necessary as a last resort.

Given the availability of stack testing data, EPA should not allow the permit to be based on AP-42 factors.

EPA RESPONSE

As discussed in Category 11, and contrary to the comment, Shell indicates that stack test data is not available in their May 6, 2008 letter to EPA.

Although emission factors appear in Table 4 of the proposed permit for these thirteen engines, only the Vladimir Ignatjuk emission factors were derived from AP-42. (The emission factors for the Kulluk and Tor Viking II engines to be tested are based upon data provided by the vendor of the equipment.)

After consideration of the comment and other available information, EPA decided to re-evaluate the factors for the Vladimir Ignatjuk emission units VI-1, VI-2, VI-3, VI-4, VI-5, and VI-6. Based upon that re-evaluation, EPA is amending Table 4 of the permit so as to reflect a more conservative emission factor that is just less than two times greater than those used in the 2007 permit for the six Vladimir Ignatjuk engines.

EPA arrived at the new emission factor after reviewing (a) the document upon which the AP-42 factor was based¹⁶, and (b) documents appearing in Section I of the original administrative record for the 2007 permit. After comparing this new emission factor with emissions from other vessels of varying ages and conditions, EPA is confident that use of the revised emission factors (based upon an emission rate of 18.8 grams NO_x per hp-hr) will provide an emissions estimate that is greater than the Valdimir Ignatjuk engines' actual emissions.¹⁷

Table 4 of the permit is amended as follows (added text underlined; deleted text in strikethrough):

Source Group Description	Source Group	EF ₁ (lb NO _x / gal)	EF ₂ (lb NO _x / Kw-hr)
Kulluk electrical generator engines	A1	0.293	0.0219
Vladimir Ignatjuk main propulsion engines	B1	0.455 <u>0.811</u>	0.0340 <u>0.056</u>
Vladimir Ignatjuk main generator engines	B2	0.455 <u>0.811</u>	0.0340 <u>0.056</u>
Tor Viking II main propulsion engines / generators	C1	0.111 / 0.389 ⁵	0.00828 / 0.0290 ⁵

COMMENT

The 2008 permit is based on the assumption that Shell can operate below 250 tons per year of NO_x. Shell proposes to emit 245 tons of NO_x at each drill site, based on NO_x emissions calculated using inaccurate AP-42 emission factors. The NO_x limit of 245 tons per year equates to only a 2% margin of error. AP-42 emission factors are not accurate within 2%; therefore, EPA has not demonstrated that the proposed permit can achieve compliance with a NO_x emission cap of 250 tons.

EPA's own literature warns air quality engineers about the limitations of AP-42 data:

[S]ome emission factors are derived from tests that may vary by an order of magnitude or more. Even when the major process variables are accounted for, the emission factors developed may be the result of averaging source tests that differ by factors of five or more.

¹⁶ Standards Support and Environmental Impact Statement Volume I: Proposed Standards of Performance for Stationary Internal Combustion Engines, EPA, July 1979. EPA-450/2-78-125a.

¹⁷ June 12, 2008 Region 10 memorandum entitled, "NO_x Emission Factor for Vladimir Ignatjuk Propulsion Engines and Electric Generator Engines"

Before simply applying AP-42 emission factors to predict emissions from new or proposed sources, or to make other source-specific emission assessments, the use should review the latest literature and technology to be aware of circumstances that might cause such source to exhibit emission characteristics different from those of other, typical existing sources.

EPA RESPONSE

As noted above, the emission factors for the engines on the Kulluk and Tor Viking II to be tested are not based upon AP-42 estimates, but rather emissions data provided by the equipment vendor. Pursuant to Condition 9.2.a of the permit, stack tests will be conducted on these engines within 24 days of initial operation at the first Drill Site. The emissions factors in the proposed permit for the engines on the Vladimir Ignatjuk to be tested were based upon AP-42 emission factors, and as explained above, EPA has decided to amend, and nearly double, these emission factors in the permit. See Table 4 discussed above.

Category 11: Changes to Emission Inventory

COMMENT

Excluding one of the two Thrustmaster Caterpillar engines from the modeling analysis may ignore emissions during important kinds of operations, especially since the Kulluk has not been operated for drilling since these engines were installed.

EPA RESPONSE

Pursuant to Condition 19.1, Shell "shall not operate Units K-11 and K-12 [Thrustmaster engines] simultaneously while the Kulluk is occupying a Drill Site." Because the requirement to demonstrate compliance with the NAAQS only applies for those occasions while the Kulluk is an OCS source, and because the permit prohibits Shell from operating the Thrustmaster concurrently during such time periods, Shell has satisfied the requirement of 18 AAC 50.540(c)(2). Shell is not required to demonstrate compliance with the NAAQS while the Kulluk is a mobile source and capable of operating both Thrustmaster engines concurrently.

As Shell's January 8, 2008 submittal states:

One of the two Thrustmasters (K-11) will perform a dual function of propulsion while a mobile source, and hydraulic powering of the air compressors while a stationary source, during drilling (an ORL). Both Thrustmasters will be capable of this dual function, but the hydraulics can be connected to only one Thrustmaster at any one time. So, the emissions of only one Thrustmaster are modeled. p. 3

Pursuant to 18 AAC 50.540(c)(2), Shell's application was required to have included a "demonstration the proposed potential emissions from the stationary source will not interfere with the attainment or maintenance of the ambient air quality standards..." The Kulluk is an OCS source only when it becomes "permanently or temporarily attached to the seabed and erected thereon and used for the purpose of exploring, developing or producing resources therefrom." In this case, the Kulluk is "permanently or temporarily attached to the seabed" while the Kulluk is attached to at least one anchor that is also attached to the seabed. See Permit Condition 1.4

It is during this period of time when the Kulluk is an OCS source that it "will be subject to regulation as a stationary source..."¹⁸ Thus, the requirement to demonstrate compliance with the NAAQS applies while the Kulluk is occupying a Drill Site.

COMMENT

The NSB comments that most of the equipment covered by this permit is old. Age, maintenance, repair and operating history influence engines actual emissions. Stack testing is available for the older units, and the stack test data should be used in the modeling analysis.

EPA RESPONSE

Contrary to the comment, Shell indicates that stack test data is not available. As Shell stated in its May 6, 2008 letter to EPA,

Shell conducted preliminary stack testing of a number of sources on the Kulluk and its support fleet in Summer 2007, but did not complete the testing or validate the results because the EAB remanded the Kulluk (and Frontier Discoverer) permit to Region 10, the results of which could change the permit and stack testing requirements. Shell May 6, 2008 letter to EPA, Air Sciences Technical Memorandum, p. 1

Shell asserts that the 2007 stack test information is preliminary and unvalidated and has not been submitted to EPA. Further, the permit requires Shell to monitor and record its NO_x emissions to track compliance with the NO_x emission limit. Permit Condition 9.2 requires Shell to conduct stack testing within 24 days of initial operation at the Kulluk's first Drill Site, and the permit requires that this data be used to determine compliance with the NO_x emissions limit. The stack test data then may be used to revise the emission factors as appropriate. Table 4 of the permit lists the class of engines Shell is required to stack test along with initial emission factors.

Shell is required to conduct stack testing on:

¹⁸ EPA OCS Air Regulations, 44 Fed. Reg. 63777 (December 5, 1991)

- At least one of the three electrical generator engines on the Kulluk; K-1, K-2 or K-3,
- At least one of the four main propulsion engines on the Vladimir Ignatjuk; VI-1, VI-2, VI-3 and VI-4,
- At least one of two main generator engines on the Vladimir Ignatjuk; VI-5 and VI-6, and
- At least one of the four main propulsion/generator engines on the Tor Viking II; TV-1, TV-2, TV-3, and TV-4. (If just one unit is tested, TV-1 or TV-2 shall be selected.)

In all, EPA is requiring that stack testing be performed to determine new emission factors for thirteen engines. These thirteen engines are expected to account for approximately 95% of emissions generated during the course of an exploratory operation.¹⁹

Shell is required to submit the stack test data to EPA within 30 days of completing the testing. See Permit Condition 9.2.b. Upon receipt of the data, EPA staff can analyze the data and remodel emissions for the classes of engines for which stack testing was conducted in order to verify that the permit restrains Shell's operations so as to remain protective of the NAAQS.²⁰ If new results show otherwise, EPA may reopen the permit for material cause and revise the permit conditions as appropriate.

COMMENT

Shell's NO₂ NAAQS analysis is invalid given the use of NO_x AP-42 emission factors to estimate emissions for certain engines on the Kulluk, Vladimir Ignatjuk, and Tor Viking II that the permit requires Shell to stack test. Historically EPA and ADEC have always required an operator to use the best emission data available to ensure permit accuracy. Use of AP-42 emission estimates when source-specific data is available contradicts EPA policy on AP-42 factors saying among other things that emission factors may be necessary as a last resort.

EPA RESPONSE

As explained in the response to the previous comment, Shell has not submitted to EPA stack test results for testing conducted in 2007.

EPA acknowledges that there is a certain level of uncertainty associated with the use of AP-42 emissions factors used at the time of permit issuance to estimate emissions. This is often true of any permit, however, because permits are typically issued before a source begins operations. Until initial operation is achieved, the source cannot provide source-specific information. Still, EPA has elected to address the commenter's concern by reanalyzing the AP-42 emission factor employed to estimate the Vladimir Ignatjuk's NO_x

¹⁹ EPA March 30, 2007 Statement of Basis, page 13.

²⁰ Assuming the data supports EPA approval of a new emission factor, the data will also be utilized to determine compliance with the 245 ton-per-year NO_x emission limit. See Permit Condition 9.1b (ii).

emissions. In the interest of erring on the side of conservatism (overestimating emissions), EPA has decided to revise our estimate of the maximum NO_x emission rates generated by the Vladimir Ignatjuk main propulsion engines and main generator engines.²¹ The new emission rates are based upon the results of a search for the "worst-case" emission factor ever published in a technical document for remotely similar engines.²² Because the original (unrevised) AP-42 emission rates were employed in the NO₂ ambient impact analysis, EPA has performed additional modeling analysis²³

Re-evaluation of the impacts resulting from six large engines on the Vladimir Ignatjuk using the highest observed emission rates results in a conservative emission estimate and a conservative impact analysis. The revised emission factor EPA utilized was not an average emission factor but rather a "worst-case" emission factor. Utilizing this conservative emission factor for the six engines on the Vladimir Ignatjuk to be tested, the project's impact at the previously identified point of maximum impact increased from 83.6 µg/m³ to 87.6 µg/m³, and the corresponding cumulative impact increased from 86.6 µg/m³ to 90.6 µg/m³ taking into consideration existing air quality. The result is that even assuming higher emission factors for these engines, the NO₂ NAAQS remains protected by a margin of 9 percent. Accordingly, the permit terms have not changed.

COMMENT

The modeling results indicate a 13% compliance margin. Given this margin for compliance and the uncertainty associated with the use of AP-42 emission factors for certain engines on the Kulluk, Vladimir Ignatjuk, and Tor Viking II that the permit requires to be stack tested, Shell has failed to demonstrate that the NO₂ NAAQS will remain protected. Shell should be required to revise its modeling analysis to incorporate 2007 source specific stack test results, and EPA should provide the public an opportunity to review the review modeling analysis before making a final decisionmaking.

EPA RESPONSE

See response to comments above. The NO₂ NAAQS still remains protected by a margin of 9 percent assuming "worst-case" emissions from the Vladimir Ignatjuk.

²¹ EPA has increased the corresponding initial source group emission factors listed in Table 4 of the permit. See Permit Condition 9.1b.(i). However, each Exploratory Operation's potential to emit NO_x has not increased given that the 245 ton-per-year NO_x emission limit remains unchanged. See Permit Condition 8.

²² June 12, 2008 Region 10 memorandum entitled, "NO_x Emission Factor for Vladimir Ignatjuk Propulsion Engines and Electric Generator Engines"

²³ May 9 and May 12, 2008 EPA emails; Re: Request to determine impact of increasing emissions of the Vladimir Ignatjuk icebreaker.

Category 12: National Ambient Air Quality Standards and Cumulative Effects

COMMENT

A number of comments were made that EPA did not consider cumulative effects and their health impacts on humans and on wildlife.

EPA RESPONSE

Because of the conservative approach used to estimate the impact of the Shell exploratory operation, the analysis submitted by Shell only determined the cumulative impacts at the point of highest concentrations. These highest concentrations were predicted to occur over water near the hull of the Kulluk drill ship. The Shell analysis did not estimate the cumulative impacts onshore, nor did it need to under the OCS permitting rules, since the analysis demonstrated that the highest concentration that would be expected to occur anywhere would comply with the NAAQS.

Since the Shell analysis did not evaluate the onshore impacts of the Shell exploratory operations, EPA undertook its own analysis. Tables 5, 6 and 7 of the AQIA show the results of this analysis. The tables show the predicted impact of the Shell exploratory operations onshore as well as the total cumulative impact based on representative onshore monitored ambient air quality levels. As shown in the tables, the predicted cumulative impacts of the Shell exploratory activities and current onshore sources are well below the NAAQS, and are therefore protective of human health and wildlife.

COMMENT

Some commented that communities are being affected by the cumulative impacts of oil and gas industries that are nearby, or that will likely be developed.

EPA RESPONSE

Air permit applications are processed on a first-come first-served basis. Shell's application has been received, and EPA is acting upon it. Future applicants intending to conduct air pollutant emitting activities in the area (onshore and offshore) must consider impacts authorized by the Kulluk permit when developing their applications pursuant to the GAQM. The Kulluk permit is effective throughout the Beaufort Sea OCS, and some lease blocks are as close as 3 miles from shore.

COMMENT

Two commenters pointed out that there is a global accumulation effect in the region referred to as "arctic haze" and that this phenomenon needs to be considered in EPA's impact analysis.

EPA RESPONSE

While the term Arctic Haze is not used specifically in regulation, it is understood that Arctic Haze is comprised of fine particulate, and possibly gasses such as NO₂ and SO₂, which are regulated and are the subject of this permitting action. Therefore, contributions from Arctic Haze are included in the estimates of background concentrations in this analysis, which were based on Badami and Nuiqsut air quality measurements. Through this analysis a demonstration has been made that emissions from the project combined with existing background concentrations, including Arctic Haze, will not contribute to a NAAQS violation, and ambient air quality standards will remain protected so long as Shell complies with the resultant permit.

COMMENT

A comment is made that EPA has not rectified the data gaps found by the National Research Council including air quality trends, identification of local emission sources, contribution of long range transported emissions, and the interaction of local and transported emissions.

EPA RESPONSE

Air quality trends, analyzing and completing other agency air quality studies, and the interaction of local emissions and transported emissions for a specific area or region are special studies and are not required under the 18 AAC 50.540(c)(2).

COMMENT

A comment is made that EPA continues to use out-dated and inadequate baseline data, and old wind roses.

EPA RESPONSE

For the Shell air quality impact analysis, EPA approved the use of background air quality data measured at Badami to demonstrate compliance with the NAAQS. The approval was based on the data meeting EPA's representativeness criteria and was discussed in Section 1.9 of the AQIA.

EPA did not rely on any wind roses during its review of Shell's Modified Impacts Analysis Report (MIAR) or during the preparation of the AQIA.

Category 13: Definition of a Separate Stationary Source

Subcategory 13-1: General

COMMENT

Commenters disagree with our conclusion that each planned well site constitutes a separate source.

EPA RESPONSE

We believe that our existing record fully supports our determination that each planned well site constitutes a separate stationary source for purposes of determining New Source Review applicability. In the Supplemental Statement of Basis that accompanied the proposed permit, we examined the specific facts of this case in light of the Clean Air Act, applicable regulations and relevant agency guidance regarding source determination to conclude that each drill site represented an Exploratory Operation that was operationally independent from other sites and that the various sites were "not close enough in proximity to one another to be considered adjacent." SSOB at 16. As we explain below, we do not believe that the additional information and perspectives submitted by Commenters necessitates a change in this determination.

Subcategory 13-2: Proximity**COMMENT**

NAEC claim that our conclusion that planned well sites are not proximate is patently arbitrary because we rely on an unexplained 1000 meter separation distance and NSB suggests instead that closely situated wells should be considered "proximate" and regulated as a single source. The NSB claims that EPA may not rely on compliance with the NAAQS as a basis for determining that planned well sites 1000 meters apart are not proximate. Commenters also raise concerns that our rationale that each site is located to collect a distinct piece of information does not ensure that drill sites will be separated by any distance at all. Commenters assert that the Jan 12, 2007 Oil and Gas Memorandum from EPA Acting Assistant Administrator William Wehrum (Wehrum Oil and Gas Memo) is inapplicable to this situation because it addresses aggregation of wells with downstream processing plant, and that any reliance on a ¼ mile distance used by some States would be inconsistent with our past policy memos that require decisions to be made on a case-by-case basis. Commenters note that Shell intends to drill wells within .8 to 3.3 miles apart which is within the range we have found emissions producing activities to be part of a single stationary source in other source determinations.

EPA RESPONSE

The permit prohibits drilling activities within 1000 meters of another Drill Site due to air quality concerns. Accordingly, EPA used this distance as the starting point to determine if exploratory drilling sites beyond 1000 meters should be aggregated. In making its determination, EPA evaluated proximity as "the most informative factor" consistent with the Wehrum Oil and Gas Memorandum. As stated in the Wehrum Oil and Gas Memorandum, EPA does not believe that it is reasonable to aggregate geographically dispersed activities because doing so defies the concept of contiguous and adjacent. Several factors unique to this situation that defy the concept of contiguous and adjacent are: (1) Shell does not control the open waters between the exploratory drilling sites; (2) there are no physical connections that bridge the gap in distance between the exploratory drilling sites; and (3) Shell chooses the site locations such that the distance is far enough apart to have distinct information gathering value.

Commenters incorrectly assert that Shell's selection of the drill sites in order to gather distinct information does not ensure any separation of sites. However, EPA considered Shell's overall drilling plan in the context of selecting a drilling site and found that "Planned Wells must be located sufficiently far apart so as to collect different pieces of discrete information about the prospect." SSOB at 12. The very nature of this underlying information gathering leads to a reasonable determination that each Exploratory Operation, i.e., drill site, is a separate source. This determination is even more reasonable in light of the fact that the permit already ensures that there will be at least 1000 meters of separation between the exploratory drilling sites. See Permit Condition 16. . While some of EPA's prior source determinations may have found that sources separated by distances of more than 1000 meters should be aggregated, as discussed more fully in the SSOB (see pages 12-16) and Response 13-3 below, those prior determinations considered interdependence rather than proximity to be the key factor in making the source determination, so the exact distances separating the interdependent sources were not necessarily relevant to the source aggregation decision. Moreover, those determinations involved neither the unique circumstances found in the oil and gas industries nor the specific circumstances encountered by this OCS permitting.

As stated before, EPA relied on the Wehrum Oil and Gas Memorandum in determining that proximity was the key factor in making this source determination. EPA issued this Memorandum to assist permitting authorities in making stationary source determinations for the oil and gas industry, which includes operations on the Outer Continental Shelf, in part to be consistent with the Congressional recognition in other CAA programs that the oil and gas industry has unique geographic attributes that should be considered when determining what qualifies as a major source. Specifically, Section 112(n)(4) of the air toxics program stated that oil and gas exploration or production wells "shall not be aggregated for any purpose" under the program, including source determinations and permitting. The Wehrum Oil and Gas Memorandum suggests that permitting agencies begin a source determination analysis by looking at a single "surface site" as defined in CAA Section 112. In the guidance, EPA stated that permitting authorities should aggregate two or more sites only if the sites are under common control and are located in close proximity to each other.

Moreover, the Wehrum Oil and Gas Memorandum provides that it is not reasonable to aggregate well site activities, and other production field activities that occur over large geographic distances, with the down stream processing plant into a single stationary source. The Commenters use this statement as the basis for claiming that the Wehrum Oil and Gas Memorandum is inapplicable. While there are not processing plants involved in this permitting action, the Memorandum still provides EPA guidance for aggregation for "oil and gas operations on land, in state waters, and on the federal Outer Continental Shelf (OCS)," and it instructed that aggregation decisions should be based on "a case-by-case [analysis] considering the factors relevant to the specific circumstances." Wehrum Oil and Gas Memorandum at 1 (emphasis added) and 5, respectively.

In this case, we examined the specific circumstances of Shell's exploratory drilling operation – including the required separation of at least 1000 meters of open water between drill sites associated with different exploratory operations and the need to

located sites far enough apart to have distinct information gathering value – and reasonably concluded that the individual well sites were not proximate under the common sense notion of a “plant,” thus should not be aggregated for source determination.

Subcategory 13-3: Operational Reliance

COMMENT

Commenters believe that multiple planned wells on a single prospect are interdependent in several important ways that should lead us to conclude that the wells should be aggregated into one source. Specifically, commenters claim that delineating the extent of hydrocarbon reservoir so that a production platform can be properly constructed are not independent and unrelated exploration wells. Commenters assert that information will be shared between well sites and that it is absurd for Shell to claim otherwise. NSB's comments included a declaration describing how information will be exchanged between drilling operations, and note that a single integrated, exploration team located at Shell's headquarters will oversee all these wells during the exploration season. They request EPA obtain additional information to support the proposition that the separate exploratory wells in the same prospect are unrelated and not used for the common purpose of developing a plan for that prospect. Commenters point out that Shell and the MMS continually refer to all of the exploratory drilling activity on the Sivulliq Prospect as a single project. Commenters also challenge our statements finding operational independence between sites as they contend that like other source determinations we have made, each well provides an intermediate product that requires further processing. Finally, Commenters claim that we can not ignore the possibility that Shell will bring the *Frontier Discoverer* in to drill in the same season.

RESPONSE

As explained above, EPA looked to the proximity of the exploration drill sites to determine whether the emissions from the exploratory drilling should be aggregated for purposes of NSR applicability. EPA relied on the guidance in the Wehrum Oil and Gas Memorandum in making its determination. EPA's decision was also informed by the 1000 meter distance requirement placed in the permit for air quality concerns. EPA believes that the information in the record on these two points supports the finding that each exploratory drill site is a separate source for purposes of NSR applicability.

However, EPA also went beyond mere lack of proximity between the individual planned drill sites and examined whether case-specific factors indicated an operational dependence that would make the sites “contiguous or adjacent” for purposes of aggregation. Operational dependence is found when each activity relies on the other for its operation- i.e., the activities at one facility are required to support the operation at the other. Based on the case-specific nature of the facts key to determining operational dependence, the distances between sources can, and has, varied in those situations where EPA has aggregated sources based on their operational dependence.

In situations where aggregation was based on an operational dependence, EPA found that the distance between the units, if any, was not so far as to defy the common sense of a plant. For example, in the aggregation determinations for Great Salt Lake Minerals, Asco, Anheuser-Busch, and Acme Steel, EPA primarily based the single source recommendations on a finding that one facility served as a support facility for the other. Having found this operational dependence, EPA then found that the extended distance between the facilities was not so far that it would defy the common sense notion of a plant to treat the two facilities as a single source. In addition, the source determinations cited in the comments primarily dealt with manufacturing operations that produced tangible products, functioned with integrated material transport operations, and/or were connected physically. In each determination, EPA found activities at one site so operationally dependent on the other as to qualify the one location as a support facility.

In the case of exploratory wells, we do not believe that there is sufficient operational reliance between locations to support an operational dependence relationship for several reasons. First, there is no tangible product produced by one well and then used by another. Second, the planned drill sites are sequential- there are no simultaneous or integrated operations between the locations as one location does not exist at the same time of operation of another. While each planned well may be drilled by the same crew using the same equipment, there is not an ongoing exchange of crew and equipment between sites. Third, there is no physical connection between the two exploratory well sites (such as a railroad line or a pipeline).

EPA does not believe that the planned exploratory wells qualify as support facilities for one another. The interdependent nature of the wells as alluded to by the commenters is not an operational dependence. One well is not dependent on another well to operate. Having a common operational goal, such as delineating the extent of the hydrocarbon reservoir, is not the same as having operational dependence. Furthermore, contrary to the commenters claim, sharing information between wells is not an operational dependence, because each individual well site can still be drilled regardless of whether it receives information shared from another site. While EPA realizes that Shell will most likely use information collected at one well to refine its exploratory drilling plans for other locations, we are not persuaded that this sharing of information necessitates a finding that these wells are all a single stationary source. Therefore, additional information is not necessary in this regard. We find that this type of information sharing occurs in the course of normal operations for almost any business venture serving or operating in multiple locations. We decline to make interlinked computer systems and information sharing a basis for making a source determination, because such criteria could be applied broadly to find operational dependence in virtually any business operation. And finally, the interdependence cited by the commenters via the use of a single management team at headquarters does not equate to operational dependence. Accordingly, commenters' reliance on Shell's statements regarding integrated operations and citations to Shell's website do not change this source determination. See NAEC comments at 5-6 and internal citations and links. Such statements are evidence of a common business practice, not operational dependence. If any of these bases for claims asserted by the commenters

were valid, EPA would have to aggregate, for example, multiple facilities owned by the same company across various portions of the country.

In all of EPA's source aggregation determinations, EPA has strived to follow the overarching principles provided by the court in *Alabama Power* regarding aggregation- i.e., (1) EPA must maintain the common sense notion of a plant and (2) EPA cannot aggregate continuous and commonly owned units as a single source unless they fit within the four permissible statutory terms of building, structure, facility or installation. As explained in our SSOB and in the responses above, the determination in this case is guided by these same requirements.

Commenter's concern that the *Frontier Discoverer* may be brought in to drill in the same season is unfounded. This permit action only authorizes the *Kulluk* and its support vessels. A separate permit would be required for the *Frontier Discoverer*. Operations associated with the *Frontier Discoverer* would be evaluated at that time.

In sum, Commenters' perspectives highlight the complexity of operational relationships in this industry and do not provide a clearly objective criterion for distinguishing when operational relationships move from independent to dependent status. The mere existence of some relationship between sites is not unequivocal evidence that the sites must be one stationary source. Given the specific facts of this permitting action – the individual well sites will collect discrete exploratory information, the collection of which is not operationally dependent on the collection of information at other sites – it was reasonable for EPA to determine that the sites should not be aggregated into a single source.²⁴

Subcategory 13-4: Subsequent Seasons

COMMENT

Commenters noted that EPA failed to consider whether planned wells that are drilled in successive seasons, but within a one-year rolling time period are interdependent. The NSB comments that under the proposed permit terms drill sites could be less than 1000 meters apart if the previously occupied drill site was last occupied in a different calendar year.

EPA RESPONSE

²⁴ On the other hand, a relief well or replacement well is operationally dependent on its associated planned well and therefore is viewed as a single Exploratory Operation and is considered a single stationary source.

As noted above we began our examination of proximity at 1000 meters due to the NAAQS considerations. However, commenters correctly note that the 1000 meter restriction for NAAQS purposes occurs only within a calendar year (see proposed permit condition 16.1), while NSR applicability is determined using emissions calculated on a rolling 52-week basis. Thus, in order to maintain the starting point upon which our proximity analysis for the NSR source determination was based, we are revising the permit to restrict Shell from drilling any two Exploratory Operations within 1000 meters of one another in any consecutive rolling 52-week period. Accordingly, as mentioned in Category 1 above, Permit Condition 16.1 is revised as follows (added text underlined; deleted text in strikethrough):

16.1 The permittee shall not have the Kulluk occupy a Drill Site within 1,000 meters of another Drill Site occupied less than 52 weeks prior, unless the Drill Sites are associated with the same Exploratory Operation. ~~+~~

~~The Drill Sites are associated with the same Exploratory Operation, or~~

~~16.2 The previously occupied Drill Site was last occupied in a different calendar year.~~

Subcategory 13-5: Support Information Not Available to Public

COMMENT

NSB claims that in the Statement of Basis, EPA cited a comment from Shell stating that "Shell's drill site locations are not chosen so that operations at those separate locations can be integrated." Shell also states that each site has value as a "potential source of information on what is thought to be an individual oil accumulation." EPA cites SSOB Attachment 25 at 22 for these quotations; however, they are not at that location. NSB asks that EPA clarify where this original information can be found in the record.

EPA RESPONSE

The information can be found in SSOB Attachment 25, but on page 24, not 22. EPA apologizes for referencing the wrong page number.

COMMENT

NSB comments that in the Statement of Basis, EPA cited a comment from Shell stating that "Shell's drill site locations are not chosen so that operations at those separate locations can be integrated." Shell also states that each site has value as a "potential source of information on what is thought to be an individual oil accumulation." NSB claims that the record does not support these assertions, however, and the confidential nature of the exploration business does not allow the public access to exploration data and plans to verify Shell's claims. A separate plan was not submitted for each well, nor was a separate state consistency review done for each well. By locating the wells to

investigate the same prospect, in close geographic proximity, Shell appears to be planning to use the resulting data to develop a production scenario for a single petroleum reserve.

EPA RESPONSE

EPA acknowledges that certain geological and geophysical information about the Sivulliq and Olympia prospects was not included in EPA's copy of Shell's Beaufort Sea Outer Continental Shelf Lease Exploration Plan.²⁵ Shell claims that the geological and geophysical data contains confidential business information (CBI).

Although the January 2007 Exploration Plan did not include site-specific plans for any prospective wells, EPA did request and has received from Shell a copy of its three applications for permits to drill (APD) into the Sivulliq prospect.²⁶ Pursuant to 40 C.F.R. Part 2, EPA has not included in the public portion of the administrative record the portions of each APD that Shell claims as CBI²⁷. The portions claimed as CBI include specific seismic and geological data that, as described by Shell, can be used to assess the area's geologic age and potential for economic quantities of oil or gas.

However, contrary to the Commenter's concerns it is not necessary to verify whether each Planned Well is a "potential source of information on what is thought to be an individual oil accumulation." As explained above, EPA's "stationary source" determination does not hinge upon each Planned Well being associated with a separate oil accumulation. Moreover, the lateral extent of an oil accumulation (formation, reservoir, prospect or some other feature associated with an oil accumulation) is subject to interpretation of technical data by petroleum engineers or experts typically outside the capacity of an air permitting authority. Given that the information Shell is claiming to be CBI is not necessary for EPA's "stationary source" determination, the information is not included in the public portion of the Administrative Record.

Category 14: Geographic Scope/Permit Duration

COMMENT

A number of commenters stated their concerns about the permit having no expiration date and that the permit allows Shell to drill an unlimited number of exploratory wells.

²⁵ MMS provided EPA a copy of the Exploration Plan in January 2007, and the document is available to the public for review as part of EPA's Administrative Record for this permitting decision.

²⁶ Prospective wells are identified in Appendices A and B of the Exploration Plan. A copy of each July 20, 2007 APD (minus the information Shell claims as CBI) is available to the public for review as part of EPA's Administrative Record for this permitting decision.

²⁷ See EPA's January 11, 2008 letter to Shell requesting CBI substantiation and Shell's subsequent CBI substantiation letter to EPA dated February 4, 2008. As of the date of this document, EPA had not made a final confidentiality determination on this material.

Because the permit has no expiration date, there would be no opportunity in the future for EPA, or the public, to review and reapprove the permit and if appropriate at that time require, Shell to use newer equipment and more advanced technology. The thought being that applying better equipment and technology in the future could lower air pollution emissions and reduce the overall risks to the environment from Shell's offshore exploratory drilling operations. Some commenters mentioned the fact that the Kulluk and some of the support vessels are already old and thereby Shell will be using outdated equipment at the onset of the project.

The ICAS letter of April 1, 2008 captured these concerns well saying;

"Indefinite" period is unreasonable. With the lack of information regarding what the air emission impacts will be for a single season, let alone multiple years is another reason why EPA should not issue an Air Quality Permit to Shell for their Kulluk Drilling Operations. Insufficient information regarding the nature of the operations and also of environmental impacts to the people and the natural resources should be considered by EPA as a strong aspect of denial of the permit."

Similarly, the April 1, 2008 NAEC letter states;

Permit should limit the duration by providing a termination on a date certain. Permit should not be effective beyond the anticipated duration of Shell's exploration drilling program. EPA should not issue a permit that remains effective indefinitely and may allow Shell to drill an indeterminate number of wells over an indefinite time frame.

EPA RESPONSE

The permit authorizes exploratory drilling at any drill site within Beaufort Sea outer continental shelf lease blocks authorized by the MMS within 25 miles of the state of Alaska seaward boundary. The commenters are correct that the permit does not have an expiration date and the number of drill sites allowed under this permit is unlimited. However, the permit conditions regarding scope and duration are unchanged from the 2007 permit. Accordingly, these comments are beyond the scope of the remand and a response to the comments is not necessary.

Category 15: Health Impacts

COMMENT

Numerous comments were received regarding the potential health impacts from the proposed drilling activity with the concern expressed that the permit does not adequately analyze the health impacts nor do the permit limits adequately protect the public health. Oceana comments that each of the pollutants Shell proposes to emit have significant health effects on the people who live in the Arctic and depend on it for their survival s

will bear these effects disproportionately. (Oceana p. 1) Commenters request that EPA further investigate health impacts of the proposed permit on Inupiaq communities. NAEC comments that Shell is unlawfully degrading the air quality, threatening human health, and not protecting fish and wildlife habitat. ICAS comments that EPA states that there will be no adverse effects on public health; however, the World Health Organization defines health as a state of complete physical, emotional, and social well-being, not merely the absence of disease. They comment that these offshore operations will affect the Inupiat people's environment, subsistence lifestyle, increase their health risk and degrade their well-being.

Vulnerable Population NSB and others commented that Inupiaq people are more vulnerable and the health risks deserve a more careful assessment. Referring to Dr Aaron Wernham, commenters state that the NAAQS do not adequately protect the health of the Inupiat people because, they are a more vulnerable population. The comments state that the native population with different health risks such as of chronic pulmonary disease, asthma different lifestyles and diet from other U.S populations may not be adequately protected by the NAAQS and therefore, more analysis should be done on health impacts under Environmental Justice mandates. NSB comments that EPA disregards the health of an isolated and sensitive population that will have to live with the effects of this decision long after drilling is over.

Comments were also made that a daily emission limit is needed rather than the 250 tons per year NO_x limit because the ton per year limit is not adequate to protect the subsistence marine mammals from high short term concentrations of air pollutants and that there is inadequate impact studies on the impact of the pollution on the fish and animals on the North Slope which the Inupiat people use for subsistence foods.

An individual commenter states that in 2003, Shell adopted the World Health Organization standards but Shell is not intending to abide by them in this case.

The NSB states that EPA has not evaluated the health impact from fine particulate.

Some commenters stated that the health assessment is incomplete and incorrect because the information relied on is incomplete. For example, ICAS commented that the lack of information regarding the cumulative effects of all the activities that are occurring in the arctic adds to the scenario of risks and impacts that will continue to occur to the Inupiat people, and their natural resources, and that there are not any health studies in Shell's application. NSB comments that because the air modeling is based on inaccurate AP-42 factors and on meteorological data that is not representative of the Beaufort Sea and based on a model that was not developed for offshore arctic conditions EPA's record on NAAQS compliance is incomplete and EPA's conclusion that Inupiaq human health will be protected is incorrect.

The NSB also commented that research suggests that the proposed permit's standards would not adequately protect NSB residents' health. "EPA has acknowledged that the current NAAQS results in considerable excess mortality compared with more stringent

targets (e.g., 15 vs. 14 ug/m³ PM standard would reduce mortality by nearly 50 %." NSB comments that EPA should explicitly acknowledge the mortality rates recognized in the PM NAAQS the associated risk/benefit data rather than inaccurately stating that compliance with the NAAQS protects a public health.

Hazardous Air Pollutants. NSB and some individuals commented that EPA hasn't evaluated health impacts from fine particulate nor the health impacts from hazardous air pollutants (HAPS) and expressed specific concern about malignant tumors and cancer from hazardous pollutants.

EPA RESPONSE

EPA shares the commenters' concerns with the air quality and understands individuals' expressed concerns about the air quality in their communities. Criteria pollutants are those pollutants for which EPA has established NAAQS. Primary NAAQS set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. EPA believes that the project will not have an adverse impact on public health.

The Kulluk drill ship and support vessels were modeled to determine their total air quality concentration impacts on ambient air. As discussed in Category 9 above, the results of the modeling were shown in Table 5 of the AQIA. EPA concluded that the projected air quality impacts of the proposed project plus background measurements are not expected to cause a violation of any NAAQS.

Thus, the proposed project is not expected to cause or contribute to a violation of the health-related air quality standards. Since this project will not cause or contribute to a NAAQS violation and since NAAQS are established to protect public health, the project will not have an adverse impact upon public health.

EPA has not conducted an analysis regarding health impacts of HAP given that there exists no applicable requirement to do so. Shell's commitment to abide by World Health Organization standards is beyond the scope of this permit. Commenters may work directly with Shell regarding this concern.

Category 16: Subsistence and Traditional Use

COMMENT

A number of written and oral comments were received expressing concerns about the offshore drilling activities potential impact on the natural resources that the Inupiat people and North Slope communities rely on for subsistence and traditional use. Comments assert that subsistence hunters and the animals will be affected by activities, in the offshore waters and expressed concern about the animals, their migration routes, and the impact of the future availability of the subsistence food supply.

NAEC expressed concern that this source of air pollution will degrade vital habitats for migrating and feeding bowhead whales, polar bear denning, feeding, and migration, migratory birds; and harm subsistence hunting and fishing grounds and human health in coastal communities.

Comments were made expressing concern about the loss of subsistence food supply included concern about leaks (assume oils and other contaminants), about animals getting sick as they use them for subsistence food, about the loss of subsistence foods because the native people cannot live off or chicken and beef. Additional concerns were expressed about the air quality health impacts on the seals, birds and other animals the Inupiat people depend on for a subsistence hunting lifestyle.

Commenters also stated that the oil and gas industry has been encroaching on Nuiqsut over the years and this permit would further encroach upon our subsistence activities in the Beaufort Sea. Exploratory drilling will lead to extraction developments and long term disruptions to whaling in the region. Comments expressed concerns about the long term social impacts caused from lifestyle changes that would occur if drilling is allowed.

Many commenters opposed the permit because it will allow drilling in the Beaufort Sea and that will negatively affect the subsistence lifestyle of our people by impacting our sea life. We have already observed degrading air quality from oil and gas operation that are located relatively close to Nuiqsut. An individual expressed concerns that the Kulluk rig can withstand the high winds and seas in the Beaufort Sea and an accident would be disastrous.

Additionally, comments expressed concerns about the about cumulative effects of the drilling operation including air, water, and impact on animals that are used to support their subsistence lifestyle and protected under the Endangered Species Act. A whaling captain expressed concerns about the impact on whaling and the effectiveness of drilling deferment agreements, and commented that increasing levels of offshore oil and gas activity is making whales more nervous and skittish. This results in traditional subsistence whaling becoming more dangerous and could even result in casualties for native whalers because the whales are harder to locate and are unpredictable during the hunt.

ICAS commented that impacts on subsistence resources has negative effect on Inupiat people ". Impacts to subsistence resources have a negative effect on the Inupiat peoples. This creates stress to manifest, either because of the thought of not being able to harvest the resources, or down to having to travel further distances, which causes the need for larger amounts of funds to be spent on fuels to travel to the resources. It is a known fact that the price for fuel (gas or diesel) is very high in the north-slope of Alaska. The negative health effects range from: food insecurity and hunger, metabolic disorders (including diabetes, obesity, hypertension, and hyperlipidemia), cardiovascular disease, increased injury, and psychological and social problems. Subsistence foods have been estimated to provide as much as 50% of the nutritional intake in the North Slope villages. The events and activities that are involved with the harvest of our "foods" are not only

cultural and traditional, but also spiritual. These negative health effects have a potential to occur if a permit is issued to Shell. Also, the proposed activities not only affect humans, but also the wildlife/natural resources, which could in turn make the "food" taken undesirable due to contamination." ICAS also commented that "Shell's has not done any "human health" studies or analyses in their permit application process. This lack of information will have a direct impact on our coastal communities, our subsistence hunters, and the subsistence resources that may be located downwind of the large industrial pollution source."

EPA RESPONSE

While EPA understands the residents' concerns regarding potential impact from the exploratory oil and gas activity on traditional subsistence resources, wildlife habitat and individual health, EPA has already discussed those issues in its original permit decision. The issues EPA is now addressing, the single stationary source determination, the modeling analysis or modified portions of the permit, do not raise any new issues regarding those previously-discussed concerns and therefore the concerns are beyond the scope of the remand and no further response is necessary. Furthermore, the EAB states that "Issues such as impacts on subsistence hunting and fishing are outside the scope of the PSD program and therefore the Board's jurisdiction." (E.A.B. Slip Op. at 68 FN 6)

Category 17: Environmental Justice

COMMENT

A number of comments were received regarding environmental justice. Specifically, an individual asked why did EPA ignore Executive Order 12898 requiring an environmental justice review? NAEC commented that EPA has not addressed the disproportionate impacts of air pollution to the Alaska native residents as required under E.O 12898. NSB provided oral comments stating EPA is required under Executive Order 12898 to determine if the Inupiat people will bear a disproportionate risk from this project. This determination has not been completed prior to making this permit decision. NSB also submitted a written comment recognizing that the EAB found that EPA had complied with Executive Order 12,898 "Federal Action to Address Environmental Justice", 59 Fed. Reg. 7629, when it issued the 2007 permit. However, in light of the new information that has emerged with respect to the 2008 permit, NSB asks EPA to revisit the issue.

ICAS commented that Executive Order 12898 directs federal agencies to pay particular attention to populations that principally rely on fish and/or wildlife for subsistence. In addition ICAS commented that the Inupiat people are a minority population amongst society as a whole because of their low income households. EPA should comply with this with an analysis.

EPA RESPONSE

In the EAB's September 14, 2007 Remand Order, the EAB determined that the Region had considered the North Slope Borough's concerns regarding environmental justice and that the Region had concluded that the permits would not have an adverse impact on minority or low income populations. (E.A.B. Slip op. at 66) Furthermore the Board was not convinced that the Region's determination was clearly erroneous and denied review on this issue. (E.A.B. Slip op. at 67) Accordingly, the Regions' environmental justice analysis is not subject to review and, the comments regarding environmental justice are beyond the scope of the remand.

Category 18: Permit Terms and Conditions related to Alaska Emission Standards

COMMENT

Sulfur Dioxide, Visible Emissions and Particulate emissions

NAEC commented that there is insufficient rationale for why all of the liquid fuels should not be less than 0.05 by weight. Specifically why is low sulfur required only for emission units K8, K-9, K-10, K-13 and K-14? NAEC also commented that EPA has not considered or analyzed the environmental impacts of the alternative of reducing environmental impact by requiring all lower sulfur fuel for the Kulluk and its support vessels.

EPA RESPONSE

The relevant permit condition(s) and requirement(s) are unchanged from the 2007 permit. Accordingly, the comments regarding these permit conditions are beyond the scope of the remand and a response to the comment is not necessary.

COMMENT

Visible Emission Performance Test

NAEC commented that a visible emission performance test should be required at greater intervals, including within 8 hours of completion of anchoring at a Drill site; within the first 24 hours of drilling operations and once a week during drilling operations. See permit Condition 12.1.

EPA RESPONSE

This requirement is unchanged from the 2007 permit. Accordingly, the comments regarding these permit conditions are beyond the scope of the remand and a response to the comment is not necessary.

COMMENT

NAEC commented that performance test should be required at each drill site- monitoring should not be waived for subsequent exploratory wells per permit Condition 12.1.a, especially because drilling may occur under different locations with different dispersion characteristics that effect visibility, are closer to sensitive areas and because certain factor may mask deterioration in visibility and the operator could select those time to conduct the performance test and thereby skew the results. Also Shell should be required to report any visible plume observed from the Kulluk source.

EPA RESPONSE

This requirement is unchanged from the 2007 permit. Accordingly, the comments regarding these permit conditions are beyond the scope of the remand and a response to the comment is not necessary.

Category 19: Permit Expiration and Extension

COMMENT

NSB references 40 C.F.R. 55.6(b)(4) and states that the permit must clarify that EPA's permit will become invalid if construction is not commenced within 18 months of permit issuance, or if construction is discontinued for a period of 18 months or more. Given that EPA is proposing to define each "Exploratory Operation" as a separate stationary source, not only must Shell commence construction of its first exploration well within 18 months of permit issuance, it must construct any additional wells within 18 months to prevent the permit from becoming invalid.

NSB requests EPA to clarify that any permit extension granted under 40 C.F.R. § 55.6(b)(4) would require an application to be submitted and a formal public review and comment period. NSB also requests that EPA explain what would constitute a satisfactory showing that an extension is justified.

EPA RESPONSE

The relevant permit condition in the proposed permit, see Permit Condition 25, and requirement(s) applicable to the Kulluk permit, including the permit expiration and extension requirements in 40 C.F.R. § 55.6(b)(4), are unchanged from the 2007 permit.²⁸ Accordingly, the comments regarding these permit conditions are beyond the scope of the remand.

Nonetheless, we agree with the commenter who asserts that section 55.6(b)(4) governs the timeframe for commencing and continuing construction of planned wells under the permit. Notably, however, this permit provides both an approval to construct and requirements for continued operation after construction commences. Accordingly, while

²⁸ Permit Condition 25 in the final permit has been changed for internal consistency purposes. See Subcategory 1-2 for specific textual changes to Permit Condition 25.

the approval to construct could expire if Shell does not begin construction of a planned well within 18 months from the effective date of the permit, or if construction is discontinued for a period of 18 months, the permit will remain in effect to govern operations of the Kulluk at any planned well for which construction commenced under the approval to construct authorized by this permit.

The applicable regulation also specify Shell may request an extension of the approval to construct and that EPA may grant this upon a showing by Shell that the extension is justified. Section 55.6(b)(4) also provides that sources obtaining an extension are subject to all new or interim requirements and a reassessment of applicable control technology when the extension is granted. 40 C.F.R. §55.6(b)(4). Therefore, any request for extension of this permit will be evaluated in accordance with the regulations applicable at the time of the request.

Category 20: Public Comment/Public Hearing Process

Subcategory 20-1: Public Comment Period

COMMENT

The NSB requested that EPA address NSB concerns and reissue the permit for a 60-day public comment period that appropriately considers public input and public health, and is based on timely and accurate data.

EPA RESPONSE

The EPA provided a 36-day public comment period for this permit action. This is longer than the 30-day public comment period required in accordance with 40 C.F.R. Part 124. EPA believes that the 36-day comment period provided adequate time for public comment. In addition, EPA is confident that it has appropriately considered public health issues associated with this permit action, to the extent allowed under applicable regulations. On January 9, EPA determined that it had received a complete application for the revised air quality permit from Shell and therefore feels that its permit decision is based on both timely and accurate data.

COMMENT

In a letter dated March 18, 2008, the NSB formally requested that EPA extend the public comment period by an additional 30 days because of the public's limited time to consider issues following EPA's informational meetings and public hearings held in three North Slope communities during the period of March 25 to 27, 2008. During a March 25, 2008, government-to-government tribal consultation meeting between ICAS and EPA in Barrow, Alaska, EPA received a verbal request from ICAS to extend the public comment

period by an additional 30 days. Similar to the NSB request, the basis for ICAS's request for an extension was that the established public comment period allowed only two working days after the completion of the last public hearing on the North Slope for submittal of comments, and that the public needed additional time to consider the information presented by EPA during their meetings.

EPA RESPONSE

EPA denied NSB's request to extend the public comment period in a letter to the NSB, dated March 20, 2008. Similarly, EPA denied ICAS's request to extend the public comment period in a letter to ICAS dated April 1, 2008. EPA established a 36-day public comment period for this preliminary permit action. This public comment period lasted from February 25 to April 1, 2008. In doing so, EPA provided a public comment period six days longer than the mandatory 30-day public comment period prescribed in 40 C.F.R. Part 124 – EPA Procedures for Decisionmaking. As required under Part 124, on February 21, 2008, EPA published a public notice in the Anchorage Daily News. This publication included notice of the 36-day public comment period, and the dates, times and locations of three scheduled public hearings on the North Slope. In addition, EPA distributed copies of the public notice and an associated fact sheet to interested parties by email, standard mail and on the EPA website at: <http://yosemite.epa.gov/R10/AIRPAGE.NSF/Permits/OCS>.

The following provides a chronological outline of actions taken by EPA as part of this public involvement process. This extensive public involvement effort by EPA exceeded the mandated public involvement requirements of 40 C.F.R. Part 124.

Weeks of January 14, 21 and 28, 2008

EPA Region 10 staff made telephone calls to city and tribal representatives in the North Slope communities of Barrow, Atkasuk, Anaktuvuk Pass, Nuiqsut, Kaktovik, Wainwright, Point Hope, Point Lay and the Inupiat Community of the Arctic Slope. The calls were used to assess public interest in the Shell OCS proposed revised permit action, so that EPA could make an informed decision on whether to hold informational meetings and/or public hearings in those communities. If there appeared to be significant interest, meeting facilities were identified based on availability and accommodation. The telephone calls also helped identify appropriate repositories for public access and review of the proposed revised permit and selected support materials.

Weeks of February 4 and 11, 2008

After identifying significant public interest in the communities of Barrow, Kaktovik and Nuiqsut, telephone calls and faxes were used to confirm dates and locations of informational meetings and public hearings in these communities.

February 21, 2008

On February 21, 2008, formal public notice was published in the Anchorage Daily News which is considered to be widely available and in general circulation throughout the state of Alaska, including the North Slope.

Week of February 25, 2008

EPA emailed the public notice and a supplemental fact sheet to a variety of interested parties including; 103 non-EPA government agency contacts, 39 tribal entity contacts, 32 oil and gas business contacts and 12 environmental organizations. In addition, EPA sent, via regular mail, the public notice and fact sheet to 28 non-EPA government agency contacts, 36 tribal entity contacts, 33 oil and gas business contacts, 6 environmental organizations, and 45 private citizens.

A press release on the proposed revised Shell OCS air quality permit was sent to Petroleum News, Seattle Times, Fairbanks Daily News – Miner, Anchorage Daily News and The Arctic Sounder. The press release explained that a revised permit was proposed for Shell's exploratory oil and gas operation in the Beaufort Sea, explained that information regarding the proposal was available at eight locations on the North Slope and at EPA offices in Anchorage and Seattle, on EPA's website, and notified the public of the public hearings and the opportunity to submit comments.

February 25 – April 1, 2008

The public comment period ran from February 25, 2008 through April 1, 2008 (36-days). During this period copies of Shell's application, the supplemental statement of basis and the proposed revised permit were available for public review at the following repository locations.

Tuzzy Consortium Library, Barrow, Alaska

Kaktovik City Office, Kaktovik, Alaska

Nuiqsut City Office, Nuiqsut, Alaska

Wainwright City Office, Wainwright, Alaska

Point Hope City Office, Point Hope, Alaska

Atqasuk City Office, Atqasuk, Alaska

Anaktuvuk Pass City Office, Anaktuvuk Pass, Alaska

Kali School Library, Point Lay, Alaska

EPA Region 10 - Alaska Operations Office, Anchorage, Alaska

EPA's website at: <http://Yosemite.epa.gov/R10/AIRPAGE.NSF/Permits/OCS>

EPA Region 10 Library, Seattle, Washington (this document repository included the entire record related to this permit action).

Weeks of March 3 and 10, 2008

Informational notices were published in the following periodicals.

Petroleum News -- Published in the March 9 and March 16 weekly editions

Fairbanks Daily News Miner -- Published daily, March 2 through March 7

Anchorage Daily News - Published daily, March 1 through March 5

The Arctic Sounder -- Published for one day on March 13

Oil and Gas Journal - Published in the March 10 weekly edition.

Week of March 17, 2008

On March 21 a voice mail was left with Barrow Cable TV requesting that they run a scrolling notice of the scheduled North Slope meetings and hearings. After receiving a positive telephone reply, the request was supplemented by a March 23 email to Barrow Cable that included recommended scroll text as follows.

Public meetings on EPA's air quality permit for Shell Offshore Inc. to conduct exploratory drilling in the Beaufort Sea OCS, March 25 Barrow in the Barrow City Chambers-3 pm Informational and 7 pm Public Hearing, March 26 Kaktovik in the Kaktovik City Office-5 pm Informational Meeting and 7 pm Public Hearing, March 27 Nuiqsut in the Kisik Community Center-3 pm Informational Meeting and 7 pm Public Hearing.

EPA Region 10 staff made telephone calls to village coordinators requesting that they post meeting/hearing notices in the communities of Barrow, Kaktovik and Nuiqsut.

EPA Region 10 staff set up and informed the North Slope villages of Wainwright, Point Hope and Point Lay that the Barrow meeting/hearing would be accessible via teleconference. This was followed up with a letter sent to the NSB and copied to the outlying villages providing the call-in number and code. Unfortunately, although the teleconference call-in number did not work in Barrow and ad-hoc efforts to notify outlying parties that an alternative call-in number had been activated, it is possible that some individuals were unable to call in.

The Week of March 24, 2008 – Public Information Meetings and Public Hearings

EPA held public informational meetings and public hearings in three North Slope communities as follows:

March 25, 2008 at the Barrow City Chambers, Barrow, Alaska
3:00 p.m., Public Informational Meeting, 7:00 p.m. Public Hearing

March 26, 2008 at the Kaktovik City Office, Kaktovik Alaska
5:00 p.m., Public Informational Meeting, 7:00 p.m. Public Hearing

March 27, 2008 at the Kisik Community Center, Nuiqsut, Alaska
3:00 p.m., Public Informational Meeting, 7:00 p.m. Public Hearing

Of all the federally recognized tribal entities notified, government-to-government tribal consultation meetings were requested by and held between EPA and the following tribal entities;

Inupiat Community of the Arctic Slope (ICAS)
March 25, 2008 in the ICAS office located in Barrow, Alaska

Native Village of Nuiqsut
March 27, 2008 in the Native Village of Nuiqsut office in Nuiqsut, Alaska

Federal requirements for EPA's formal decision making process are listed in 40 C.F.R. Part 124. In relation to the proposed Shell OCS air quality permit action, the

requirements include opening a 30-day public comment period and holding public hearings if there is significant public interest in the proposed action. In addition, EPA must publish notice of the public comment period, and a 30-day advanced notice of the location and times of the scheduled public hearings. The activities described above demonstrate that EPA fulfilled its public involvement requirements of 40 C.F.R. Part 124 and made additional efforts to encourage North Slope communities to be engaged in the process.

Subcategory 20-2: Lack of Public Participation in Hearings

COMMENT

The NSB commented that EPA's public hearings on the North Slope had communication and coordination problems that adversely impacted public turnout and participation. They state further that the public meeting in Barrow had low participation because the Elder & Youth Conference took place that same week. They also indicate that key persons from out-lying villages may not have been able to participate due to their participation in the Elder & Youth conference in Barrow. Elders are a vital component of acquiring comments for public hearings since they are keen to the many changes that have occurred in such a short period since oil and gas development activities have been happening in the north-slope/arctic region. It is also important that youth are involved with the public hearing process since they will be the future leaders in the villages. The youth that were most likely participating in the Elder & Youth Conference in Barrow were probably the youth that would most likely have participated in the three public hearings.

EPA RESPONSE

EPA understands that there are unique challenges with regard to scheduling, coordinating and advertizing public hearings in villages located on the North Slope of Alaska. Nonetheless, all the obligations for public involvement were met in its permit decision-making process in accordance with the requirements of 40 C.F.R. Part 124. As detailed in the response to Subcategory 20-1 above, EPA undertook efforts beyond the requirements in Part 124 to let interested parties know about the hearing and to facilitate participation. This included running display notices, issuing a press release and talking directly with tribal-entity presidents, native village coordinators and city officials from communities throughout the North Slope. In addition, EPA made a diligent effort to facilitate teleconferencing opportunities for the public hearing in Barrow on March 25. And, although teleconferencing during the meeting had its technical challenges, there was participation through this method.

In a March 3, 2008 letter from the NSB to the EPA, the NSB was agreeable to scheduling the Shell OCS meeting/hearing in the Barrow City Chambers on March 25. Subsequent informal discussions with community representatives in Barrow indicated that the Elders & Youth Conference was scheduled during that same week and there was some concern about the overlap. The organizers of the Elders & Youth Conference were notified of

EPA's meeting/hearing, and by invitation EPA representatives visited the Elders & Youth Conference, but were not requested to speak. Although the overlap of these two events created challenges, EPA believed that there was a potential for mutual participation in both events. Unfortunately, low public turnout at EPA's public meeting/hearing indicated that the overlap did not necessarily result in mutual participation. EPA will take this into account when scheduling future public meetings and hearings on the North Slope, and make an effort to avoid overlapping events.

It should be noted that on May 8, 2007, EPA held a public hearing in Nuiqsut regarding the original Shell OCS air permit. Unfortunately, the whaling season had begun in early April resulting in public outcry that EPA was holding their hearing during this important Inupiat community season. When scheduling this year's meetings/hearings, EPA was more sensitive to this issue and consequently made a diligent effort to hold its meetings/hearings in advance of the April whaling season. Given that Shell's complete application was received by EPA on February 9, 2008, EPA had a limited window of time to schedule the meetings/hearings, and at the same time hold its commitment to avoid the whaling season while ensuring the required 30-day public comment period was appropriately accommodated. Having the meetings/hearings in the communities of Barrow, Kaktovik and Nuiqsut during the week of March 24, 2008 facilitated this goal.

COMMENT

NSB states that the notice of the public meeting and hearing was only published for a single day in the Anchorage Daily news which is not widely available or read on the North Slope. Also, these events were not announced on the radio or posted on village bulletin boards. Kaktovik and Nuiqsut Mayor's offices were not aware of the scheduled hearing in the respective villages until the NSB Planning Department contacted them on March 26. NSB tried to spread the word about the hearing but there was confusion about it in the communities.

EPA RESPONSE

EPA provided notice in a manner reasonably calculated to reach interested parties. The requirement for public involvement does not specify multiple publications of the public notice and therefore, EPA met its obligation for publication under 40 C.F.R. Part 124 with a single day publication notice in the Anchorage Daily News. The EPA understands that the Anchorage Daily News is a publication of general circulation throughout Alaska including on the North Slope. It should be noted that EPA also ran display notices in several other publications to make sure that the information was widely distributed. Additionally, as described above, information regarding the proposed permit and public comment period was mailed to numerous parties and provided to a number of public information repositories and posted on EPA's website.

EPA did contact the KBRW AM/FM in Barrow, Alaska both by email and by telephone and they did not respond to our request to air an announcement of the EPA meetings/hearings. These events were posted on village bulletin boards at the city offices in Kaktovik and Nuiqsut. EPA did contact tribal presidents, village coordinators, city

mayors and city coordinators from Kaktovik and Nuiqsut. The presidents and mayors were contacted earlier in the process to find out what interest the community had in holding meetings/hearings regarding the proposed revised air permit for Shell. Once interest was confirmed, EPA worked with tribal and city coordinators to ensure that rooms were reserved, notices were posted and that the times and dates of the scheduled meeting/hearings did not unreasonably conflict with other events in the village. EPA personnel noted the presence of the notices displayed on the bulletin boards in the respective offices when they were on the North Slope.

Although EPA met its legal obligation for public involvement in this particular permit action, EPA acknowledges that there are opportunities for improvement in how it interacts and coordinates with North Slopes communities and the agency is committed to improving this process. The EPA would like to thank the NSB for its interest in providing constructive guidance in this regard, and the agency looks forward to working with the Borough when scheduling future events on the North Slope.

Subcategory 20-3: Teleconferencing Challenges

COMMENT

The NSB suggested in a letter dated March 1, 2008, that EPA use the NSB teleconferencing capabilities to allow people that cannot attend the March 25 public hearing in Barrow to participate by phone. EPA agreed and in its March 18, 2008 reply letter to the NSB, provided a telephone number and teleconference code for the event. Unfortunately, the call-in line did not work in Barrow and EPA had to work with officials at the Barrow city offices to provide an alternative call-in option. This created considerable confusion and delay and negatively impacted participation from interested parties located in villages outside of Barrow.

EPA RESPONSE

EPA acknowledges that teleconferencing of the Barrow public hearing did not go as planned. EPA had intended to use the NSB's teleconferencing equipment but could not because their equipment did not work at the City of Barrow offices. EPA could not move the hearing because, in accordance with 40 C.F.R. Part 124, the time and location of the hearing were noticed to the public at least 30 days in advance. During the hearing EPA was able to setup an alternative call in number and some members of the public were able to participate by telephone using this alternative teleconferencing option.

The EPA recognizes the advantages of using teleconferencing to enhance community participation on the North Slope and looks forward to resolving some of its challenges so that teleconferencing can be employed at future meetings and hearings.

Subcategory 20-4: Translator Challenges

COMMENT

Two commenters pointed out that EPA had no official Inupiat translator for the Kaktovik public hearing. This resulted in a lack of communication with the elders and lack of opportunity for the elders to provide comment. They also pointed out the fact that due to the lack of simultaneous translation equipment, the Nuiqsut hearing was quite long and extended late into the evening.

EPA RESPONSE

EPA acknowledges the need to have translators that are acceptable to each community and worked with each community to secure acceptable translators. EPA had translators for both the Barrow and Nuiqsut public hearings, however, there was no official translator hired by EPA available at the Kaktovik public hearing. EPA contacted Kaktovik city officials prior to the meeting in Kaktovik and arranged for a translator to be available at the hearing. Unfortunately, the translator was unable to facilitate translation.

The lengthy public hearing in Nuiqsut was due in part to the lack of simultaneous translation equipment and the fact that there was extensive public testimony. It is true that simultaneous translation equipment would have saved time, and EPA will try to remedy this situation in the future. EPA will consider these issues more thoroughly when planning future public meetings on the North Slope. EPA understands the need for simultaneous translation at the meetings/hearings and, in the future, will plan on hiring translators that are available for this task.

Subcategory 20-5: Information was Too Technical

COMMENT

The NSB and an individual commented that information presented regarding the Shell minor air permit was too technical. It includes a lot of technical jargon, acronyms and permitting terms that are confusing and that the material should have been presented in laymen's terms.

EPA RESPONSE

The EPA acknowledges that permitting issues related to this project are relatively complex and it is challenging to present the relevant issues to the public in a non-technical manner. EPA did make a concerted effort to present this material in a way that was understandable to the public and EPA representatives at the meetings became progressively better at accomplishing this goal. EPA hopes to improve its communications methods and skills during future North Slope meetings.

Subcategory 20-6: Communications Protocol for the North Slope

COMMENT

In 2007, EPA promised to develop a communication protocol for improving its coordination and communication with North Slope communities. This document was to be reviewed with the North Slope Borough. If this document had been developed and utilized during the 2008 Shell air permit action, public involvement would have been improved.

EPA RESPONSE

EPA Region 10 continues its interest in improving coordination and communication efforts with North Slope communities. Its experiences gained during the 2007 and 2008 Shell OCS air permit actions have provided ample opportunity for the agency to learn and improve its public involvement process. If EPA Region 10 develops a written community involvement protocol for the North Slope, it would be happy to provide a copy to the NSB and other community representatives.

Category 21: Clean Water Act

COMMENT

A few individuals commented that they were concerned about drilling mud, cuttings and grey water discharges to the ocean from Shell's proposed exploratory drilling program in Beaufort Sea.

EPA RESPONSE

EPA understands that water quality impacts from oil and gas drilling operations, especially when conducted in the offshore waters, are important to the people of the North Slope. However, this permit action is related to air quality and therefore water quality issues are outside the scope of this air permit action.

That being said, EPA Region 10 does have responsibility with regard to protecting water quality in the Beaufort Sea from oil and gas operations through its wastewater discharge permit program. The following provides some background information on this program and the proper contact information at EPA on water quality issues. This information was provided in the form of a fact sheet during the air quality permit public hearings held on the North Slope in March 2008.

A National Pollutant Discharge Elimination System (NPDES) permit regulates wastewater discharges into waters of the United States pursuant to the federal Clean Water Act. There are two types of NPDES permits: individual and general. An individual permit is for a specific facility. A general permit is for many facilities that

have similar discharges (i.e., oil and gas exploration facilities). If a company wants to be covered under a general permit, it must submit a Notice of Intent (NOI). EPA Region 10 reviews the NOI to ensure that the proposed action meets the conditions for obtaining coverage under the general permit. If it does, EPA authorizes the company to discharge under the permit.

On May 16, 2006, EPA Region 10 issued a general permit for oil and gas exploration activities, known hereafter as the Arctic GP. The Arctic GP became effective on June 26, 2006. The Arctic GP will expire on June 26, 2011. The permit limits the types and amounts of pollutants that can be discharged in the Beaufort Sea, Chukchi Sea, Hope Basin and Northern Norton Basin. The Arctic GP allows for the following discharges to waters of the United States associated with oil and gas exploration activities: drilling fluids and drilling cuttings, deck drainage, sanitary wastes, domestic wastes, desalination unit wastes, blowout preventer fluid, boiler blowdown, fire control system test water, non-contact cooling water, uncontaminated ballast water, bilge water, excess cement slurry, mud, cuttings, and cement at seafloor and test fluids. The permit restricts the seasons of operation, discharge depths, and areas of operation and has monitoring requirements and other conditions.

On January 12, 2007, Shell submitted two NOIs for coverage under the Arctic GP. Shell requested authorization to employ the Kulluk floating drilling rig and Frontier Discoverer drill ship to conduct oil and gas exploration activities on the OCS in the vicinity of Camden Bay. Shell requested authorization for all of the above mentioned discharges except for discharges related to test fluids. EPA determined that Shell had satisfied the requirements of the general NPDES permit, and on July 19, 2007, EPA approved Shell for coverage under the Arctic GP. These authorizations expire on June 26, 2011.

To learn more about the Arctic GP and EPA Region 10's subsequent site-specific authorizations, contact: Sonia Porter at (206) 553-1019 or porter.sonia@epa.gov. Or, visit EPA's website at <http://epa.gov/r10earth/waterpermits.htm>.

Category 22: Oil Spill Response Plan

COMMENT

There were a number of comments provided in oral testimony regarding the threat of an oil spill on the ocean resources in the Beaufort Sea. One commenter was concerned about the age of the Kulluk and its ability to withstand high winds and other extreme conditions in the arctic sea. Another commenter stated that there is no technology available to clean up oil spills in broken ice conditions. Another commenter pointed out that we are still cleaning up oil twenty years after the Exxon Valdez spill.

In the ICAS comment letter dated April 1, 2008 they are concerned that an oil spill would destroy the Inupiat way of life and provides the following quotes in there letter.

"The Chukchi Sea is our garden. We've hunted and fished in the ocean for thousands of years. The ocean is what our history and culture is based on. We can't afford to stop our religious, cultural and subsistence activities that depend on the ocean. One oil spill could destroy our way of life." Jack Schaefer, ICAS Tribal Council Member – Point Hope, Alaska

"The Inupiat Community of the Arctic Slope is a regional tribal government for eight villages on the North Slope. We have the responsibility to our people to stand up against threats to our whaling culture and to protect our way of life. An oil spill in the Chukchi Sea could devastate the bowhead whale migration and other animals we have subsisted on for thousands of years. The federal government continues to ignore our concerns. The elders have spoken and told us to fight this and we will do so." George Edwardson, ICAS President Tribal Council – Barrow, Alaska

EPA RESPONSE

EPA acknowledges the North Slope communities' religious, cultural and subsistence-related reliance on the ocean, however, this issue is not related to the single stationary source determination, the modeling analysis or modified portions of the permit and is beyond the scope of the remand and a response to the comments is not necessary.

Category 23: Global Warming/Climate Change

COMMENT

A number of comments were received about global climate change that would occur due to greenhouse gas emissions from the project. Commenters were especially concerned about the cumulative effects that global warming was having on the arctic region. NAEC states that neither MMS or EPA have adequately evaluated human health impacts or cumulative effects of greenhouse gases nor important changes caused by global climate change, which may effect the modeling analysis and air pollution impacts on human and natural environment. Oceana indicates in their letter that the criteria air pollutants of NO_x and PM₁₀ contribute to the problem and impacts are occurring more quickly and dramatically in the arctic, and that these impacts in an arctic environment are poorly understood.

EPA RESPONSE

EPA recognizes commenters' concerns regarding global warming and climate change; however, these concerns do not arise from the changes in the single stationary source determination, the modeling analysis or modified portions of the permit. Accordingly, they are beyond the scope of the remand and a response to the comments is not necessary.

Category 24: National Environmental Policy Act

COMMENT

The NAEC and one individual presented comment related to the National Environmental Policy Act (NEPA). One commenter stated that the NEPA document did not adequately address the projects impact on health and the ocean resources that the Inupiat people depend on for their subsistence way of life. The other commenter implied that EPA needs to comply with NEPA.

EPA RESPONSE

This issue is not related to the single stationary source determination, the modeling analysis or modified portions of the permit and is beyond the scope of the remand. Therefore, a response to the comments is not necessary.

Never-the-less it is useful to note that Congress specifically exempted actions under the CAA from the requirement that an EIS be prepared for the permit. The statute, 15 U.S.C. § 793(c), provides:

No action taken under the CAA shall be deemed a major federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969.

Section 7(c) of the Energy Supply and Environmental Coordination Act of 1974 (15 U.S.C. § 793(c)(1)) exempts actions under the CAA from the requirements of NEPA.

Category 25: 9th Circuit Court Enjoins Drilling

COMMENT

NAEC commented that EPA should not issue a permit for exploratory drilling activities that are enjoined by the Ninth Circuit.

EPA RESPONSE

EPA recognizes that the United States Court of Appeals for the Ninth Circuit has enjoined Shells' drilling activity in the Beaufort Sea pending the resolution of the lawsuit challenging the Mineral Management Service's Exploration Plan approval (Alaska Wilderness et. al., v. Kempthorn et. al., No. 07-71457 (9th Cir. Aug. 15, 2007)). EPA has determined it is appropriate to have the air permit in place if or when the injunction is lifted. However, because this permit allows the exploratory drilling only on the lease blocks authorized by the MMS, drilling may not occur until and unless it is allowed when the Ninth Circuit resolves the case.

Conclusion

Based on our review of the application, supporting materials and the comments received, EPA Region 10 determines that the Clean Air Act requirements are satisfied and that the NAAQS will not be exceeded as a result of this project. EPA determines that there is a rational basis for the stationary source determination relied on to issue this synthetic minor permit. None of the issues raised by the commenters present a sound basis to change that determination or to deny permit issuance. In light of these findings, EPA grants approval to conduct exploratory drilling with the Kulluk and its support vessels in the Beaufort Sea, within an outer continental shelf lease block authorized by the MMS within 25 miles of the State of Alaska's seaward boundary. This approval is subject to the terms and conditions set forth in Air Quality Control Minor Permit No. R10OCS-AK-07-01 (Revised).