



Alaska Eskimo Whaling Commission
P.O. Box 570
Barrow, AK 99723



Inupiat Community of the Arctic Slope
P.O. Box 934
Barrow, AK 99723



North Slope Borough
P.O. Box 69
Barrow, AK 99723

June 15, 2011

VIA ELECTRONIC MAIL

Doug Hardesty
Air Permits Project Manager
hardesty.doug@cpa.gov

Suzanne Skadowski
Community Involvement
skadowski.suzanne@cpa.gov
Region 10 EPA
1200 Sixth Avenue, Suite 900
Seattle, WA 98101

Re: Request for Region 10 to not hold overlapping written comment periods for OCS Air Permits.

Dear Mr. Hardesty & Mrs. Skadowski,

Thank you for providing our communities with information on the up-coming public notice and comment periods Region 10 intends to provide on air permits for oil and gas activities in the Outer Continental Shelf (OCS). While we appreciate this advance notice, we are extremely concerned about Region 10's intent to accept comments on four air permits during the same time-period.


Region 10 has indicated that it intends to accept public comment on a revised major source OCS PSD permit for Shell for the Beaufort Sea in early July. Region 10 has further indicated that it intends to accept public comment on a revised major source OCS PSD permit for Shell for the Chukchi Sea also in early July.¹ Additionally, Region 10 has indicated that it intends to accept comment on a synthetic minor source air permit and a Title V permit for Shell for the Kulluk and the Beaufort Sea in mid-July. Finally, Region 10 has indicated that it also intends to accept public comment on a Title V permit for ConocoPhillips for the Chukchi Sea in mid-July.


¹ We note that previously Region 10 held entirely separate public notice and comment periods on these air permits.


We support Region 10 hosting public meetings to collectively address these air permits, but it is infeasible for us to provide meaningful written comments on *four air permits* at the same time. Each permit application is hundreds of pages long as are the draft permits and statements of basis that accompany the draft permits. In addition, the administrative record that accompanies each permit is voluminous. Reading through, processing, and commenting on these permits, therefore, takes a significant amount of time. Having sufficient time to review and provide written comment on these permits is critical because they pertain to new sources of air pollution that will forever alter the air quality in our region.

Unless Region 10 provides separate public notice and comment opportunities on each air permit without overlap and at least 45 days for written comment on each draft permit, we will not be able to provide meaningful written comments or otherwise adequately participate in the public process. Please feel free to contact us with any questions about this request and we look forward to receiving your response.

Sincerely,


Harry Brower
AEWC
Chairman


Dereen Lampe
ICAS V.P.
President
George Olemann


Edward S. Itta
North Slope Borough
Mayor



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

JUL 21 2011

OFFICE OF
AIR, WASTE AND TOXICS

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Harry Brower
Chairman
Alaska Eskimo Whaling Commission
P.O. Box 570
Barrow, Alaska 99723

Doreen Lampe
President
Inupiat Community of the Arctic Slope
P.O. Box 934
Barrow, Alaska 99723

Edward S. Itta
Mayor
North Slope Borough
P.O. Box 69
Barrow, Alaska 99723

Dear Chairman Brower and Mayor Itta and President Lampe:

Thank you for your June 15, 2011, letter requesting that the U.S. Environmental Protection Agency not hold overlapping comment periods as planned for the Outer Continental Shelf (OCS) exploratory drilling air projects (Shell Discoverer, Shell Kulluk, and ConocoPhillips) that are currently being processed. We appreciate your desire to participate in our permitting process and understand your interest in providing comments on the permits. We are doing our best to balance interests and have stepped up our outreach efforts in a way that we hope will ensure meaningful participation and better permits. At the same time, we have determined that we must adhere to a schedule with some overlap in comment periods in order to fulfill our responsibility for issuing timely permits.

It is unusual for the EPA to be processing three OCS projects (four air permits) simultaneously. Because all three projects plan to drill only during open water seasons, a short delay in permit issuance can result in a long delay in exploration, into the next season. We also have mandatory deadlines that we must meet. For these reasons, the EPA is making an effort to adhere to our original schedule, with increased outreach.

The EPA is committed to continually improving participation in our permitting process. To that end, we are employing unique approaches for these projects. In June 2011, the EPA held public meetings on the North Slope to describe the projects and our process as well as to present our anticipated timing for the permits so communities would know what to expect during the permit comment periods. We are staggering the comment periods somewhat, with the two Shell Discoverer permits available for

comment for 30 days, from July 6th to August 5th, and the other two permits (Shell Kulluk and ConocoPhillips) available for 45 days from later in July to early September (final dates are still pending).

The two Shell Discoverer major source permits issued last year were remanded to the EPA to address specific concerns. The EPA has revised the Shell Discoverer permits to address those concerns. Because only the changes to the permits are open for comment, we are holding a 30-day comment period. To assist reviewers, we are making redline-strikeout versions of the revised draft permits available. We also explain the permit changes in the Supplemental Statement of Basis for the two permits, as we committed to in the North Slope meetings.

Because the other two permits are for new minor source projects, we think it is appropriate to hold 45-day comment periods. This way, we are also able to offset to a greater extent the comment periods for the two new projects from the comment period for the Shell Discoverer revised permits. As minor source permits, the two new permits will have many similarities. In response to a request during our June informational meeting in Barrow, we plan to create a roadmap for navigating the new permits to highlight for reviewers the structure and components of the permits.

We are aware that holding many separate meetings can be difficult for communities. We will use these meetings to provide information that will help reviewers compare and contrast all four permits simultaneously. We plan to hold public meetings in early August in Barrow and possibly other locations to discuss all four permits. These meetings will give us a chance to explain the differences between the permits and to walk through the roadmap for the two new permits.

Finally, we plan to schedule a government to government consultation meeting with the Inupiat Community of the Arctic Slope in early August. We look forward to hearing ICAS's concerns and advice. We would also welcome an opportunity to meet with the Alaska Eskimo Whaling Commission and the North Slope Borough while we are in Barrow or at another time via teleconference.

Doug Hardesty is the project manager for all four permits. If you have any questions about the projects, please feel free to contact Doug at (208) 378-5759 or by email hardesty.doug@epa.gov. If you have any additional concerns, please feel free to contact me by phone at (206) 553-1847.

Sincerely,



Richard Albright, Director
Office of Air, Waste and Toxics

Cc: Catherine Villa, Tribal Coordinator
Tami Fordham, Alaska Resource Extraction Tribal Policy Advisor
Doug Hardesty, Project Manager, Arctic Air Permits
Emma Pokon, North Slope Borough Law Department - via email: Emma.Pokon@north-slope.org



Alaska Eskimo Whaling Commission
P.O. Box 570
Barrow, AK 99723



Inupiat Community of the Arctic Slope
P.O. Box 934
Barrow, AK 99723



North Slope Borough
P.O. Box 69
Barrow, AK 99723

June 15, 2011

VIA ELECTRONIC MAIL

Doug Hardesty
Air Permits Project Manager
hardesty.doug@cpa.gov

Suzanne Skadowski
Community Involvement
skadowski.suzanne@cpa.gov
Region 10 EPA
1200 Sixth Avenue, Suite 900
Seattle, WA 98101

Re: Request for Region 10 to not hold overlapping written comment periods for OCS Air Permits.

Dear Mr. Hardesty & Mrs. Skadowski,

Thank you for providing our communities with information on the up-coming public notice and comment periods Region 10 intends to provide on air permits for oil and gas activities in the Outer Continental Shelf (OCS). While we appreciate this advance notice, we are extremely concerned about Region 10's intent to accept comments on four air permits during the same time-period.


Region 10 has indicated that it intends to accept public comment on a revised major source OCS PSD permit for Shell for the Beaufort Sea in early July. Region 10 has further indicated that it intends to accept public comment on a revised major source OCS PSD permit for Shell for the Chukchi Sea also in early July.¹ Additionally, Region 10 has indicated that it intends to accept comment on a synthetic minor source air permit and a Title V permit for Shell for the Kulluk and the Beaufort Sea in mid-July. Finally, Region 10 has indicated that it also intends to accept public comment on a Title V permit for ConocoPhillips for the Chukchi Sea in mid-July.


¹ We note that previously Region 10 held entirely separate public notice and comment periods on these air permits.


We support Region 10 hosting public meetings to collectively address these air permits, but it is infeasible for us to provide meaningful written comments on *four air permits* at the same time. Each permit application is hundreds of pages long as are the draft permits and statements of basis that accompany the draft permits. In addition, the administrative record that accompanies each permit is voluminous. Reading through, processing, and commenting on these permits, therefore, takes a significant amount of time. Having sufficient time to review and provide written comment on these permits is critical because they pertain to new sources of air pollution that will forever alter the air quality in our region.

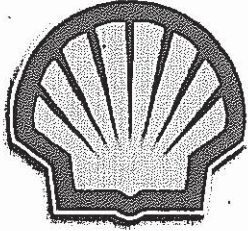
Unless Region 10 provides separate public notice and comment opportunities on each air permit without overlap and at least 45 days for written comment on each draft permit, we will not be able to provide meaningful written comments or otherwise adequately participate in the public process. Please feel free to contact us with any questions about this request and we look forward to receiving your response.

Sincerely,


Harry Brower
AEWC
Chairman


Dereen Lampe
ICAS
President V.P.
George OLEMAN


Edward S. Itta
North Slope Borough
Mayor



PUBLIC INFORMATION

Revised Outer Continental Shelf Lease Exploration Plan Camden Bay, Beaufort Sea, Alaska

**Flaxman Island Blocks 6559, 6610 & 6658
Beaufort Sea Lease Sales 195 & 202**

May 2011

Submitted to:

**U.S. Department of the Interior
Bureau of Ocean Energy Management, Regulation and Enforcement
Alaska OCS Region**

Prepared by:

**Shell Offshore Inc.
3601 C Street, Suite 1000
Anchorage, AK 99503**

Table 1 Comparison of Shell's Initial Camden Bay EP and the Revised Camden Bay EP

Parameter	Initial Camden Bay EP (2010)	Revised Camden Bay EP (2012 planned start)
		tug to store the waste streams • Additional OSV for offshore supply
Oil Spill Response	Oil Spill Response (OSR) Tug and Barge; OSR Vessel, Arctic Tanker	OSR Tug and Barge; Arctic Tanker, OSR barge carrying containment system
Air permit	<i>Discoverer</i> – Prevention of Significant Deterioration (PSD) permit authorization R10OCS/PSD-AK-2010-01	<i>Discoverer</i> – PSD permit authorization R10OCS/PSD-AK-2010-01 <i>Kulluk</i> – Minor Source Permit application for Beaufort Sea submitted February 28, 2011

As required by 30 Code of Federal Regulations (CFR) 250.212-228, details of the planned exploration drilling program are provided in the following sections and accompanying appendix material. While Shell has made this submission as a plan revision, it acknowledges that, pursuant to 30 CFR 250.285(c), the impacts previously identified and evaluated in Shell's initial Camden Bay EP and BOEMRE's October 2009 EA and FONSI are different than the impacts potentially resulting from the plan revision, and that this plan revision is subject to all of the procedures under 30 CFR 250.231 through 30 CFR 250.235.

a) Description, Objectives and Schedule for the Exploration Drilling Program

The leases listed in this revised Camden Bay EP were acquired at Beaufort Sea Oil and Gas Lease Sales 195 (March 2005) and 202 (April 2007). The four drill sites identified in this revised Camden Bay EP are listed below in Table 1.a-1.

Table 1.a-1 Camden Bay Drill Sites

Drill Site	Lease File Number	NR06-04 Flaxman Island Lease Block No.	Surface Location (NAD 83)*		Distance to Mainland Shore mi (km)
			Latitude (N)	Longitude (W)	
Sivulliq G	OCS-Y 1805	6658	70° 23' 46.82"	146° 01' 03.46"	16.6 (26.7)
Sivulliq N**	OCS-Y 1805	6658	70° 23' 29.58"	145° 58' 52.53"	16.2 (26.1)
Torpedo H**	OCS-Y 1941	6610	70° 27' 01.62"	145° 49' 32.07"	20.8 (33.5)
Torpedo J	OCS-Y 1936	6559	70° 28' 56.94"	145° 53' 47.15"	23.1 (37.2)

*North American Datum 1983

**Drill sites from approved Camden Bay EP

Shell plans to drill four wells (Table 1.a-1) to objective depth pursuant to the revised Camden Bay EP. As with any Arctic exploration drilling program, weather and ice conditions, among other factors, will dictate actual sequence in which the wells are drilled. All wells are planned to be vertical. Bottomhole locations will have the same latitude and longitude as surface locations.

This plan also contemplates a situation where a well that is started must be temporarily suspended due to ice, weather, or other conditions, and finished at a later date. Any well on which drilling is suspended will be secured in compliance with BOEMRE regulations and with the approval of the Regional Supervisor/Field Operations (RF/SO), whether it is permanently abandoned (30 CFR 250.1710 through 1717) or temporarily abandoned (30 CFR 250.1721-1723).

Shell may conduct a geophysical survey referred to as zero-offset vertical seismic profile (ZVSP) at each drill site where a well is drilled. Once the objective intervals are fully evaluated, each exploration well will be plugged and abandoned in compliance with BOEMRE regulation.

During exploration drilling operations, the drilling vessel (hereafter drilling vessel refers to either the *Kulluk* or *Discoverer*) will be attended by a minimum of 11 vessels that will be used for ice management, anchor handling/ice management, OSR, refueling, resupply, waste removal, and servicing of the drilling operations (see Table 1.a-2).

Table 1.a-2 Planned Support Vessels for the *Kulluk* or *Discoverer*

Support Vessel(or similar)	<i>Kulluk</i> or <i>Discoverer</i>
Primary Ice Management	<i>Nordica</i> *
Secondary Ice Management / Anchor Handling	Hull 247* (also acts as tow vessel for the <i>Kulluk</i> and a berthing vessel for OSR)
Shallow water resupply	<i>Arctic Seal</i> *
Offshore Resupply Vessel (OSV)	<i>Harvey Explorer</i> *
Waste Streams Transfer Vessel	<i>Carol Chouest</i> *
Waste Streams Temporary Storage and Transit to Disposal Facility (deck barge and tug; deck barge)	<i>Southeast Provider</i> * and <i>Ocean Ranger</i> *
Waste storage barge and tug (waste barge)	TBD
Primary Oil Spill Response (OSR)	<i>Point Oliktok</i> * Tug and <i>Endeavor Barge</i> *
OSR Liquid Storage and Refuel Supply Vessel	<i>Mikhail Ulyanov</i> *
OSR Containment System	Invader Class tug* and barge
Anchor Handler – support for the Containment System Barge	TBD

*or equivalent vessel

TBD = Vessel role is included, vessel not yet named.

By agreement with the local communities, during exploration drilling activities contemplated by the revised Camden Bay EP, Shell will not discharge selected waste streams during routine drilling operations, even though the waste streams are allowable discharges under the current United States (U.S.) Environmental Protection Agency (EPA) administered Arctic National Pollutant Discharge Elimination System (NPDES) General Permit (GP) AKG-28-0000. Shell will not discharge treated sanitary waste (black water), domestic waste (gray water), bilge water and ballast water at any time and drilling mud and cuttings with adhered drilling mud below the depth of the 20-in. conductor shoe. These wastes will be collected and stored on a deck barge and waste barge and transported and disposed of at an approved and licensed facility. The following licensed facilities have been identified as potential sites for disposal of those waste streams collected during exploration drilling operations:

- Waste Management Inc. (Arlington, Oregon) – water based mud, cuttings with adhered mud, non hazardous trash and debris, treated sanitary waste, treated domestic waste, uncontaminated ballast water, treated bilge water, hazardous waste, used oil
- Emerald Services Inc. (Palmer, Alaska and Seattle, Washington) – hazardous waste, used oil

Cuttings generated while drilling the mudline cellar, the 36- and 26-in. hole sections (all drilled with seawater and viscous sweeps only) plus cement discharged while cementing the 30- and 20-in. casing strings will be discharged on the surface of the seafloor under provisions of the previously mentioned NPDES GP.

Table 2.g-2 Relief Well Drilling Information

Secondary Relief Well Drilling Vessel	Location at time of blowout	Time to Arrive at Relief Well Drill Site	Days to Drill a Relief Well
<i>Discoverer</i>	Chukchi Sea	9 days (3 days for well suspension and mooring retrieval; 6 days transit)	20 days (Sivulliq N or G) 25 days (Torpedo H or J)
<i>Kulluk</i>	Dutch Harbor	18 days transit	20 days (Sivulliq N or G) 25 days (Torpedo H or J)

Drilling Vessel Constraints

The *Kulluk* has an Arctic Class IV hull design and has successfully and safely drilled several wells in the arctic environment. The *Discoverer* has an ice-strengthened hull. Either vessel will be inspected by DNV and the USCG prior to mobilizing to Camden Bay. Final inspection reports will be submitted to BOEMRE when they are available.

Time to Drill a Relief Well

Once onsite, the *Kulluk* or *Discoverer* can drill a relief well for either the Sivulliq G or N well in 20 days and the Torpedo H or J well in 25 days. For the *Kulluk* as secondary relief well drilling vessel, total time from the blowout to completing the relief well is estimated to be 38 days for the Sivulliq wells and 43 days for the Torpedo wells. For the *Discoverer* as secondary relief well drilling vessel, total time from the blowout to completing the relief well is estimated to be 29 days for the Sivulliq wells and 34 days for the Torpedo wells.

h) Contact Information

Contact Susan Childs, Alaska Venture Support Integrator Manager, at telephone number 907-646-7112, fax 907-646-7145, or e-mail at susan.childs@shell.com.

SECTION 8.0 OIL SPILL RESPONSE PLANNING

a) Oil Spill Response Planning

Shell's Beaufort Sea Regional Exploration ODPCP was unconditionally approved on 11 March 2010 and is a fundamental component for the planned exploration drilling program. The latest revision (ODPCP Revision 1) has been submitted to BOEMRE as a separate document and the full text version is not included in this EP. Revision 1 reflects the inclusion of using either the *Kulluk* or the *Discoverer* as the drilling vessel and updates the WCD information and the oil spill response based on the new WCD.

BOEMRE has revised and increased the requirements for WCD scenario calculations through NTL No. 2010-N06. Lessees are now required to incorporate all potential hydrocarbon-bearing intervals in each open hole section into the WCD volume calculation. The hole section with the highest uncontrolled flow scenario is to be considered the basis of the WCD scenario. Shell has revised the ODPCP to address this increase in the WCD volume. The ODPCP is a regional oil spill response plan that demonstrates Shell's capabilities to prevent or rapidly and effectively manage oil spills that may result from exploration drilling operations. Despite the very low likelihood of a large oil spill event, Shell has designed their response program based upon a regional capability of responding to an increasing range of spill volumes, from small operational spills up to and including the WCD from an exploration well blowout. Shell's program is based upon a WCD planning scenario that meets the response planning requirements of the state and federal oil spill planning regulations.

The ODPCP includes information regarding Shell's regional oil spill organization and dedicated response assets, potential spill risks, and local environmental sensitivities. Details of Shell's spill prevention programs, including personnel training and the procedures and management practices to prevent discharges are also provided. The ODPCP's response information addresses personnel and equipment mobilization from various locations, equipment operating characteristics, and the availability of additional response resources both on and off site.

b) Location of Primary Oil Spill Equipment Base and Staging Area

Shell is planning to conduct an exploration drilling program located north of Point Thomson in the Camden Bay area. The *Discoverer* or *Kulluk* is expected to transit into Camden Bay and begin exploration drilling approximately July 10. During the planned exploration drilling program, the *Kulluk* or *Discoverer* will be accompanied by an ice management vessel, an anchor handler, and other support vessels that include two oil spill response (OSR) barges with associated tugs. One OSR barge and tug will provide the primary oil spill response platform along with the assistance of the anchor handler, and one Offshore Supply Vessel (OSV) as Vessel of Opportunity Skimming Systems (VOSS). Ice conditions will determine the proximity of the OSR vessels to the *Kulluk* or *Discoverer*. Shell will station and maintain its OSR vessels to ensure timely response to any spill event.

The dedicated OSR barge, VOSS, and other equipped support vessels would possess sufficient onboard storage capacity to provide containment, recovery, and storage for the initial 42-hour operational period. An Arctic OST would be staged within 240 mi (384 km) of the Camden Bay drill sites and would arrive at the recovery site within 24 hours of departure from its staging location. At hour 42, the Chukchi OSR barge and OSR vessel, or a similar vessels, would be available to relieve the on-site OSR barge and OSR vessels to lighter their recovered fluids to the OST. The two OSR barges, VOSS and OSR vessel would work in conjunction to maintain containment and skimming operations and to lighter recovered fluids to the OST for the duration of the response. The OST will possess a minimum liquid storage capacity of 513,000 bbl, sufficient capacity to store all recovered liquids for 20 days of recovery operations. Another

Air Emissions

On April 9, 2010, the EPA issued Shell an OCS PSD Permit to Construct (permit number – R10OCS/PSD-AK-2010-01) for the *Discoverer* to operate in the Camden Bay area. The permit was challenged and the Environmental Appeals Board (EAB) has remanded the permit back to the EPA, where it currently resides. After the EPA addresses the remanded issues, and a final permit is issued to Shell, the *Discoverer* and support vessels air emissions will be monitored in compliance with the permit conditions.

A synthetic minor operating air permit application for the *Kulluk* was submitted to the EPA on February 28, 2011. When a final permit is issued to Shell, the air emissions from the *Kulluk* and its support fleet will be monitored in compliance with the permit conditions.

Ocean Discharges

Authorization for the *Discoverer* to operate under NPDES GP AKG-28-0000 was issued to Shell for lease block 6610 and 6658 on April 20, 2010 (authorization AKG-28-0005). Sivulliq N and G drill sites are located within lease block 6658 and the Torpedo H drill site is located within lease block 6610. On October 12, 2010, Shell submitted a new NOI for the *Discoverer* to discharge waste on lease block 6658, updating the EPA regarding the selected waste streams that would not be discharged, but collected, temporarily stored onsite and then shipped for final disposal at an approved disposal site. Shell submitted a NOI for the *Discoverer* to discharge under GP AKG-28-0000 for lease block 6559 on December 16, 2010. Supplemental NOI information for the *Kulluk* to discharge under GP AKG-28-0000 for lease blocks 6559, 6610 and 6658 was submitted to the EPA on April 8, 2011.

Shell will adhere to the monitoring terms and conditions of the NPDES GP AKG-28-0000. The required waste monitoring equipment will be aboard the drilling vessel and Shell will adhere to its Quality Assurance Plan, which outlines sampling procedures and protocols.

Ice

The Shell Ice and Weather Advisory Center (SIWAC) will be based in Anchorage and will monitor ice and weather conditions for the Camden Bay exploration drilling operations. As stated in the IMP, SIWAC will forecast the arrival of ice hazards based on ice and weather predictions from satellite data combined with observations from vessels supporting the *Kulluk* or *Discoverer*.

Information for developing ice loading predictions is provided through the consideration of actual on-site conditions in conjunction with forecasted weather advisory information from the SIWAC. The IMP outlines how the arrival of ice hazards in particular are predicted, based on observations of ice features by Ice Advisors on support vessels and on the drilling vessel, combined with ice and weather predictions provided by the SIWAC in Anchorage.

Environmental Monitoring at Drill Sites While Drilling

In addition to monitoring of marine mammals, a comprehensive environmental monitoring program will be implemented during exploration drilling operations. A dedicated science vessel staffed by a team of physical and biological oceanographers will be responsible for assessing pre-, during, and post drilling conditions in both biota and water and sediment quality. All drilling locations have been sampled at multiple times during the last three years to provide a baseline understanding of pre-existing conditions and interannual variability at these sites.

Table 1 Comparison and Similarities of Shell's Initial Camden Bay EP and the Revised Camden Bay EP

Parameter	Initial Camden Bay EP (2010)	Revised Camden Bay EP (2012 planned start)
Timing of operations	10 July – 31 October	10 July – 31 October
Prospects and OCS Lease Blocks	Sivulliq and Torpedo Flaxman Island 6610 and 6658	Sivulliq and Torpedo Flaxman Island 6559, 6610, and 6658
Drill site (wells)	Two - Sivulliq N and Torpedo H	Four - Sivulliq N, Torpedo H, Sivulliq G, Torpedo J
Drilling unit	Drillship <i>Discoverer</i>	Drillship <i>Discoverer</i> or the <i>Kulluk</i>
ZVSP	None	Zero offset vertical seismic profile at each drill site
Drilling fluids and cuttings with adhered fluids, Treated domestic waste, Treated sanitary waste; ballast water; Bilge water	Discharged to the ocean as permitted under NPDES Arctic General Permit AKG-28-0000	Collected, stored and then transported to an approved treatment/disposal site (TDS) for disposal
Primary Support Fleet	Anchor handler, Ice management vessel, Offshore supply vessel (OSV), West Dock shuttle	Anchor handler, Ice management vessel, OSV, West Dock shuttle OSV to collect waste streams from the <i>Kulluk</i> Deck barge and tug to store the waste streams (deck barge) Barge and tug to store liquid waste streams (waste barge)
Oil Spill Response (OSR)	OSR barge and tug, OSR vessel, Oil storage tanker (OST)	OSR barge and tug, Oil storage tanker (OST) Containment barge, tug, and anchor handler ¹ for carrying containment equipment
Air permit	<i>Discoverer</i> – Prevention of Significant Deterioration (PSD) permit authorization R10OCS/PSD-AK-2010-01	<i>Discoverer</i> – PSD permit authorization R10OCS/PSD-AK-2010-01 <i>Kulluk</i> – Minor Source Permit application for Beaufort Sea submitted February 28, 2011

Note: ¹ Anchor handler included for planning purposes only, not assumed necessary since it is unlikely the containment barge will be anchored, but as an additional tending option if deemed necessary by Shell.

Based on the comparison provided in Table 1, the components that are in the revised Camden Bay EP that were not in the initial Camden Bay EP, and are assessed below in the Consistency Evaluation and Certification Statement are as follows:

- Two additional wells – Sivulliq G and Torpedo H
- The collection and transport of five waste streams
- Additional support vessels – an OSV, deck barge and tug, waste barge and tug, and a containment barge, tug, and anchor handler¹, and additional OSR vessel.
- ZVSPs – one at each of four drill sites
- Evaluation of the *Kulluk* as the primary drilling vessel as a possible replacement for the *Discoverer*

Note: See ¹ above.

The project elements of the modification in the revised Camden Bay EP are further described below.

Additional Wells

The revised Camden Bay EP includes two additional wells that were not in the initial Camden Bay EP, one each in each of the prospects identified and evaluated in the initial Camden Bay EP and ACMP. The two new drill

Additional Support Vessels

Additional support vessels (Table 3) in the revised Camden Bay EP that were not in the initial Camden Bay EP include a second OSV, a deck barge and tug, a waste barge and tug, and a containment barge/tug/anchor handler. The primary need for these additional vessels is for the handling, storing, and transport of the five collected waste streams. The OSV will transfer the wastes from the drilling vessel to the deck barge or waste barge. The deck barge and waste barge will be stationed approximately 25 mi (40 km) from the drilling vessel and will be used to store the collected wastes, and at the end of the drilling season transport the wastes to a TDS in Oregon. One more OSR vessel is included in the revised Camden Bay EP that was not included in the initial Camden Bay EP (Table 4). The containment barge is part of the well control and OSR response equipment, and will house containment equipment. The tug is required to support the containment barge, whereas the anchor handler is included in this plan only as an additional tending option for the containment barge, if Shell deems it necessary in advance of the season to anchor the containment barge. Shell does not assume the containment barge will be anchored or that the anchor handler is necessary, but includes the option of anchoring the barge and it being also tended by an anchor handler in case that option is chosen.

Table 3 Specifications for Additional Support Vessels (Not Including OSR Vessels) for Revised Camden Bay EP

Specification	Additional Vessels Included Only in Revised Camden Bay EP				
	Harvey Spirit ^{1,2}	Southeast Provider Barge & Ocean Ranger Tug ^{1,3} (Deck barge)		Waste Storage Barge ^{1,3} (Waste barge)	
		Barge	Tug	Barge	Tug
Length	280 ft (85.4 m)	360 ft (110 m)	117 ft (35.7 m)	TBD	TBD
Width	60 ft (18.3 m)	100 ft (30.5 m)	32 ft (.8 m)	TBD	TBD
Draft	16.5 ft (5.0 m)	14 ft	-	TBD	TBD
Berths	26	-	10	TBD	TBD
Maximum Speed	13.5 knots (25 km/hr)	-	10 knots (18.5 km/hr)	TBD	TBD
Fuel Capacity	6,235 bbl (normal)	-	2,381 bbl	TBD	TBD

¹ Or similar vessel applies to all vessels.

² Dutch Harbor supply vessel/Waste removal

³ Storage for drilling vessel resupply and waste streams removed from the drilling vessel

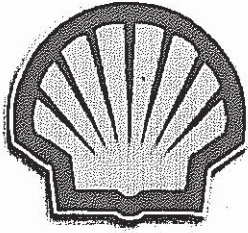
Table 4 Specifications for Additional OSR Vessel

Specification	Vessel Included Only In Revised Camden Bay EP		
	Containment Barge ^{1,2,3}		
	Barge	Tug	Anchor Handler ³
Length	400 ft (122m)	136 ft (36.5 m)	275 ft (83.7 m)
Width	100 ft (30.5 m)	36 ft (11.1 m)	59 ft (18.0 m)
Accommodations	--	10	23
Maximum Speed	--	10 knots	16 knots
Fuel Capacity	--	3,690 bbl	7,484 bbl

¹ Or similar vessel applies to all vessels.

² Based on a standard deck barge, Crowley Invader class ocean going tug, and a *Tor Viking*-style anchor handler

³ Vessel included for planning purposes only, not assumed necessary but as an additional tending option if deemed necessary by Shell.



PUBLIC INFORMATION

Revised Outer Continental Shelf Lease Exploration Plan Chukchi Sea, Alaska

**Burger Prospect: Posey Area Blocks 6714, 6762,
6764, 6812, 6912, 6915
Chukchi Sea Lease Sale 193**

May 2011

Submitted to:

**U.S. Department of the Interior
Bureau of Ocean Energy Management, Regulation and Enforcement
Alaska OCS Region**

Submitted by:

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

this plan revision is subject to all of the procedures under 30 CFR 250.231 through 30 CFR 250.235. The document also meets the requirements of Notice to Lessee (NTL) 2010-06.

a) Description, Objectives, and Schedule for the Exploration Drilling Program

This revised Chukchi Sea EP and appendices, including the comprehensive EIA (Section 16.0 and Appendix F), describe the exploration drilling activities Shell plans to conduct starting in 2012 at six lease blocks within a prospect known as the Burger Prospect for its exploration drilling program in the Chukchi Sea (Table 1.a-1), with a single drill site within each block. Those six lease blocks and possible drill sites are described and analyzed herein. Shallow hazards data have been collected at each of these drill sites and each drill site has been reviewed for potential shallow hazards and archaeological evidence. Formal shallow hazards reports and archaeological assessments have been submitted to the BOEMRE in advance of this submission under separate cover for each of the drill sites.

Table 1.a-1 Shell Lease Blocks Covered in the Revised Chukchi Sea EP for the Exploration Drilling Program Starting in 2012

Prospect	Area	Protraction	Lease Block	Shell Lease
Burger	Posey	NR03-02	6764	OCS-Y-2280
Burger	Posey	NR03-02	6714	OCS-Y-2267
Burger	Posey	NR03-02	6912	OCS-Y-2321
Burger	Posey	NR03-02	6812	OCS-Y-2294
Burger	Posey	NR03-02	6762	OCS-Y-2278
Burger	Posey	NR03-02	6915	OCS-Y-2324

The ice-strengthened drillship *Discoverer* will move through the Bering Strait and into the Chukchi Sea on or about July 1 and then onto the Burger Prospect as soon as ice and weather conditions allow. Exploration drilling activities will continue through October 31, and the drillship and support vessels will exit the Chukchi Sea at the conclusion of the drilling season.

Shell plans to drill an exploration well to a total depth (TD) below objective depth at each of the six possible drill sites. Shell may also elect to construct additional mudline cellars (MLC) or upper hole segments (i.e., "partial holes") depending on the available time remaining through October 31. If the final well in a drilling season cannot reach objective depth by the end of the drilling season, the well will be suspended before penetrating objective hydrocarbon-bearing zones and will be secured in compliance with applicable BOEMRE regulations and with the approval of the Regional Supervisor / Field Operations (RS/FO). The well will either be drilled to TD in the subsequent year or the well will be permanently abandoned. No unfinished wellbore will remain open at the end of the final drilling season except in an emergency. If a hazardous condition requires curtailment of critical operations (or prevents initiating them, depending on the time available) per the provisions of the COCP (Appendix J), the well will either be drilled to objective well depth under a subsequent EP or secured and permanently abandoned prior to lease termination. Any well on which exploration drilling operations are suspended at the end of any drilling season will be secured and permanently abandoned prior to lease termination.

A well may also be started, temporarily abandoned due to ice, weather, or other conditions, and finished later in the same drilling season during the period covered by this revised Chukchi Sea EP. This was an operational reality during the 1989 – 1991 Chukchi Sea exploration drilling campaign. Any well on which drilling is suspended will be secured in compliance with BOEMRE regulations and with the approval of the RS/FO.

The actual number of wells that will be drilled in a season will depend upon ice conditions and the length of time available in each drilling season. The predicted "average" drilling season, constrained by prevailing ice conditions and regulatory restrictions, is long enough for two to three exploration wells to be drilled from spud to proposed total depth (PTD) and possibly construct an additional MLC or drill and secure a partial well. Shell plans to conduct a geophysical survey referred to as a zero-offset vertical seismic profile (ZVSP) at each drill site where a well is drilled. Once the objective intervals are fully evaluated, each exploration well will be plugged and abandoned in compliance with BOEMRE regulations.

Shell plans to drill six exploration wells over the duration of this revised Chukchi Sea EP. All of these six possible drill sites will be permitted for drilling in the initial year to allow for operational flexibility in the event sea ice conditions prevent access to one or more locations. However, Shell expects to drill three wells to PTD below objective depth in the initial drilling season and the remaining wells to a PTD below objective depth in subsequent drilling seasons. Applications for Permits to Drill (APDs) will be submitted to BOEMRE prior to the 2012 drilling season.

b) Location

OCS Lease Sale 193 was held in February 2008 and Shell was subsequently awarded 275 leases (blocks) through a competitive bidding process. The locations of these lease blocks are depicted in Figure 1.b-1. The six blocks in the Burger Prospect that are addressed in this revised Chukchi Sea EP are listed above in Table 1.a-1 and their locations are indicated in Figure 1.b-1. The six possible drill sites identified in these blocks are listed in Table 1.b-1 along with geographical coordinates. Locations of the six drill sites within the blocks are depicted in Figure 1.b-2. Planned drillship anchor locations and bathymetry are indicated for each drill site in Figure 1.b-3 through Figure 1.b-8. The anchor radii indicated in the figures are minimum anchor radii, but any extension would remain within the area surveyed with the fine grid in the shallow hazards surveys. Surface and bottomhole coordinates, OCS Area name and block number, lease number, distance from block line, and other information for each of the drill sites are provided on the respective OCS Plan Information Forms (MMS Form-137) attached to this revised Chukchi Sea EP in Appendix A.

Table 1.b-1 Possible Drill Sites for the Revised Chukchi Sea Exploration Drilling Program, Burger Prospect, Chukchi Sea OCS

Prospect	Well	Area	Block	Lease Number	'Coordinates (m)		Latitude	Longitude
					X	Y		
Burger	A	Posey	6764	OCS-Y-2280	563945.26	7912759.34	N71° 18' 30.92"	W163° 12' 43.17"
Burger	F	Posey	6714	OCS-Y-2267	564063.30	7915956.94	N71° 20' 13.96"	W163° 12' 21.75"
Burger	J	Posey	6912	OCS-Y-2321	555036.01	7897424.42	N71° 10' 24.03"	W163° 28' 18.52"
Burger	R	Posey	6812	OCS-Y-2294	553365.47	7907998.91	N71° 16' 06.57"	W163° 30' 39.44"
Burger	S	Posey	6762	OCS-Y-2278	554390.64	7914198.48	N71° 19' 25.79"	W163° 28' 40.84"
Burger	V	Posey	6915	OCS-Y-2324	569401.40	7898124.84	N71° 10' 33.39"	W163° 04' 21.23"

¹ Coordinate system is North American Datum 1983 (NAD 83) UTM Zone 3

Resupply will be from Dutch Harbor and/or Wainwright using an offshore supply vessel (OSV). Aviation operations will be conducted from Barrow and Wainwright. These are the plans only for the exploration drilling program covered by this revised Chukchi Sea EP, and do not reflect Shell's longer term commitments for shorebases or other facilities needed to support future exploration drilling plans or development of any of its Chukchi Sea prospects.

SECTION 13.0 SUPPORT VESSELS AND AIRCRAFT INFORMATION

a) Planned Chukchi Sea Drillship and Aircraft List

- Drillship - M/V *Noble Discoverer*
- Ice management vessel - M/V *Fennica* (or similar)
- Anchor handler M/V *Tor Viking* (or similar)
- Two offshore supply vessels (OSVs) - for drillship resupply of drilling materials
- OSR vessel M/V *Nanuq* (or similar)
- OSR barge and tug
- Arctic oil storage tanker (OST)
- Containment barge with tug and anchor handler for the containment system
- S-61/S-92/EC225 (or similar) helicopter (1) for search and rescue
- S-92/EC225 (or similar) helicopter (1) for crew rotations
- Fixed wing aircraft (1) for crew transport
- Fixed wing aircraft (1) for MMO flights

Vessels

The drillship *Discoverer* will be supported by an ice management vessel, an anchor handler, and two OSVs. Specifications are provided in Table 13.a-1 for some vessels that may be used. The actual vessels to be used are not yet contracted and may be these vessels or similar vessels. Photographs of some of these vessels are provided below with brief descriptions of their function and use.

Table 13.a-1 Specifications of Support Vessels

Specification	Ice Management Vessel ¹	Anchor Handler ²	OSV ³	OSV ⁴
Length	380 ft 116 m	275 ft 83.7 m	280 ft 85.3 m	280 ft 85.3 m
Width	85 ft 26 m	59 ft 18.0 m	60 ft 18.3 m	60 ft 18.3 m
Draft	27 ft 8.4 m	20 ft 6.0 m	15.9 ft 4.9 m	19 ft 5.8 m
Accommodations	82 berths	64 berths	37 berths	29 berths
Maximum Speed	16 knots	16 knots 30 km/hr	13 knots 24 km/hr	13 knots 24 km/hr
Fuel Storage	11,070 bbl 1,760 m ³	7,484 bbl 1,190 m ³	6,233 bbl 991 m ³	7,217 bbl 1,147 m ³

¹ Based on *Fennica* or similar vessel

² Based on *Tor Viking* or similar vessel

³ Based on the *Harvey Spirit* or similar vessel

⁴ Based on *C-Leader* or similar vessel

Table 13.a-2 Specifications of the Major Oil Spill Response Vessels

Specification	OSR Vessel ^{1,2}	OSR Barge ¹		OST ^{1,4}	Containment Barge ^{1,5}		
		Barge ³	Tug ³		Barge	Tug	Anchor Handler
Length	301 ft (91.9 m)	350 ft (106.7 m)	126 ft (38.4 m)	853 ft (260 m)	400 ft (122 m)	136 ft (36.5 m)	275 ft (83.7 m)
Width	60 ft (18.3 m)	76 ft (23.1 m)	34 ft (10.4 m)	112 ft (34 m)	100 ft (30.5 m)	36 ft (11.1 m)	59 ft (18.0 m)
Fuel Storage	6,867 bbl (1,092 m ³)	390 bbl (62 m ³)	1,786 bbl (284 m ³)	221,408 bbl (35,200 m ³)	--	3,690 bbl (587 m ³)	7,484 bbl (1190 m ³)
Liquid Storage	12,690 bbl (2,017 m ³)	76,900 bbl (12,226 m ³)	--	543,000 bbl (86,328 m ³)	--	--	--
Accommodations	41	--	6	25	--	10	64
Maximum Speed	16 knots	--	5 knots	16 knots	--	10 knots	16 knots
Workboats	(3) 34 ft work boats	(1) skim boat 47 ft (14 m) (3) work boats 34 ft (10 m) (4) mini-barges	--	--	--	--	--

¹ Or similar vessel

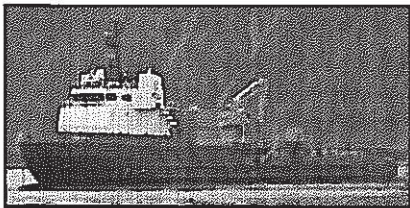
² Based on the *Nanuq*

³ Based on the barge *Klamath* and the tug *Crowley Sea Robin*

⁴ Based on the *Mikhail Ulyanov*, the OST will have a minimum storage capacity of 513,000 bbl

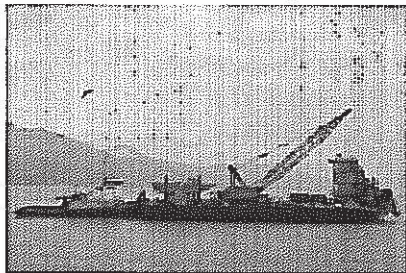
⁵ Based on a standard deck barge, *Crowley Invader* class ocean going tug, and the *Vidar Viking* anchor handler

Photograph 13-5 OSR Vessel



An OSR vessel such as the *Nanuq* (Photograph 13-5) will be staged in the vicinity of the drillship when the *Discoverer* is drilling in liquid hydrocarbon bearing zones to immediately respond to a spill and provide containment, recovery, and storage for the initial operational period following a spill event.

Photograph 13-6 OSR Barge



An OSR barge, such as the *Klamath*, similar to the one in Photograph 13-6, or a similar vessel, and a tug, such as the *Crowley Sea Robin*, will be staged offshore in the vicinity of the drillship. Together with the OSR vessel, it will have sufficient containment, recovery, and storage capacity for the initial operational period in the event of a spill. It will carry a 47-ft (14-m) skimming vessel, three 34-ft (10-m) workboats, four mini-barges, and boom and duplex skimming units for nearshore recovery.

Photograph 13-7 Arctic OST



An OST such as the *Mikhail Ulyanov* (Photograph 13-7) or similar vessel with a minimum liquid storage capacity of 513,000 bbl will be staged such that it would arrive at a recovery site, if needed, within 24 hours of departure from their staging location.

The *Nanuq* or similar vessel will be paired with an OST such as the *Mikhail Ulyanov* and used to assist refueling the *Discoverer* and support vessels, if necessary.



Shell Offshore Inc.
3601 C Street, Suite 1314
Anchorage, AK 99503

April 15, 2011

Mr. Doug Hardesty
OCS/PSD Air Quality Permits
U.S. EPA Region 10
1200 Sixth Avenue, Suite 900, AWT-107
Seattle, WA 98101

Re: Update - Discoverer Drillship

Dear Mr. Hardesty:

Shell is hereby providing additional information regarding the Discoverer Permits to Construct, issued March 2010 (R10OCS/PSD-AK-2009-01) for operation in the Chukchi Sea, and April 2010 (R10OCS/PSD-AK-2010-01) for operation in the Beaufort Sea, and the associated Statements of Basis. The information falls into three categories:

First, enclosed is a copy of Shell's application to the State of Alaska for approval of an Owner Requested Limit (ORL) imposing a limitation on greenhouse gas (GHG) emissions for inclusion in the Beaufort permit. Shell is also requesting that EPA include an identical provision reflecting the same limit in the Chukchi permit, though approval by Alaska is not required for that ORL. EPA's GHG rules are now effective for certain purposes and the requested limit, to be placed in both permits and which Shell can meet, ensures that GHG emissions from the Discoverer drilling program under either permit will be less than the GHG tailoring rule's threshold of 75,000 tons per year. The enclosed attachments to Shell's application, and the March 18, 2011 report¹, together with this letter, meet all of the nine requirements of Alaska 18 AAC 50.225(b) for establishment of an ORL.

Second, Shell has determined that, for reasons of operational risk and efficiency, that the primary resupply option will be a dynamically positioned vessel for the Discoverer. The current permits describe resupply by a powered vessel or a barge that would tie up to the Discoverer. Shell may utilize this approach under some conditions, but Shell has determined that, in general, resupply can be accomplished more efficiently with less risk using a vessel that can hold a position near the Discoverer so that a Discoverer crane can transfer materials on and off that resupply vessel.

Resupply in dynamic positioning (DP) mode would be preferable to the barge tie-up option for material transfer because of the shorter amount of time that the resupply vessel needs to spend positioning itself for transfer and the greater ability to transfer materials in non-ideal sea conditions. Barge tie-up requires additional time and risk in the process of maneuvering the vessel or barge to the side of the Discoverer and securing it prior to material transfer, then the reverse process in disconnecting from the Discoverer. In higher wind and seas conditions, the

¹ Air Sciences Inc., *Discoverer Drillship Impact Evaluation for SO₂ and NO₂ Using AERMOD – Chukchi and Beaufort Seas, Shell Alaska Exploratory Drilling Program*, (March 18, 2011).

Mr. Doug Hardesty
April 15, 2011
Page 2 of 3

barge tie-up option will impose higher personnel risk and a loss of efficiency due to the independent motion of the two vessels during connection.

Emissions associated with the DP resupply method are quantified for purposes of the updated impact modeling in the March 18, 2011 Air Sciences Inc. report Section 2.2 and the emissions are listed in Tables 2-2, through 2-6. Although that report addresses impacts from 24 resupply events and the impacts with 24 were modeled, the permit limits resupply events to 8 per season (condition L.1.3 in both permits) and Shell is not seeking to modify these limits. The updated impact modeling shows that project impacts would continue to meet NAAQS with the supply vessels in DP even with 24 events per season.

Third, The March 18, 2011 report provided an updated maximum impact analysis, using a refined dispersion model in the place of the earlier 2009 permit application screening model. The results of this analysis confirm that the original screening model was conservative with respect to predicting air quality impacts of support vessels operating near the Discoverer. The refined modeling impact analysis demonstrates compliance with the NAAQS for one-hour NO₂ and SO₂ with the associated vessels coming close to the Discoverer even under normal power. This modified associated fleet location is described in Section 3.3.3 of the March 18, 2011 report. In the previous screening analysis, provided in the January 2010 application², these cases of the fleet coming close to the Discoverer were modeled as special cases when the vessels were characterized as being under low power and the permit required that the occurrences of all special cases be documented. Shell is not seeking to revise the provisions of the permits that limit the operations of support vessels in proximity to the Discoverer, but we note that the refined modeling indicates that these limitations are conservative and confirms that the results of the original screening model with respect to air pollutants other than NO₂ and SO₂ remain valid.

If you need additional information or you have questions regarding the attached information, please contact Rodger Steen (303-807-8024), or Pauline Ruddy (907-771-7243).

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.

Sincerely,

Shell Offshore Inc.



Susan Childs
Alaska Venture Support Integrator Manager

Attachments

² Environ International Corporation, *Outer Continental Shelf Pre-Construction Air Permit Application Frontier Discoverer Beaufort Sea Exploration Drilling Program*, (revised January 2010).

ATTACHMENT 3
Discoverer GHG Potential Emissions



Air Sciences Inc.

ENGINEERING CALCULATIONS

PROJECT TITLE: Shell - Exploration Drilling		BY: S. Pryor	
PROJECT NO: 180-20-4	PAGE: 1	OF: 3	SHEET: 3
SUBJECT: Discoverer Beaufort Permit		DATE: April 12, 2011	

DISCOVERER GHG POTENTIAL EMISSIONS - OPERATING MAXIMUMS

Discoverer & Associated Fleet


Source Group	Limit	Limitation
Season maximum drilling duration as an OCS source	2,880 hrs/activity 120 days/activity	Environmental / Ice Conditions
Generators (six units combined) combined production maximum	71% capacity	Drilling load limited
MLC Compressors (2 of 3 units operating)	67% capacity	1 of the 3 units is a spare
Crane (two units combined) maximum	40% capacity	Material movement cycle max
Discoverer Emergency Generator limited to	2 hr/day=hr/month	Maximum exercise
Discoverer Seldom-used units	150 gal/week	System
Associated Fleet Vessels Seldom-used Units	100 gal/week	System
Ice mgmt & AH vessel use within 25 miles	100%	None
Resupply ship transit limited to	1,200 gal/1-way	Maximum consumption
Resupply ship DP limited to	4,800 gal/day	Maximum consumption
Resupply ship DP limited to	24 hr/event=hr/day	Maximum duration
Resupply ship events limited to	24 events/season	Maximum
Offshore vessel p & g aggregate power	2,600 kW	P&G nameplate ratings
OSR vessel p & g aggregate power	7,336 kW	P&G nameplate ratings
OSR work boats	3,789 gallons/week	Maximum exercise

Assumed Control Device Effectiveness	Restriction	Comment	Reference
Discoverer Generator SCR NOx control	0.5 g/kW-hr	50-100% of capacity	D.E.C. Marine AB letter, October 9, 2008, initial stack test and CEM
Discoverer Generator Oxidation Catalyst CO reduction efficiency	80%	50-100% of capacity	D.E.C. Marine AB letter, October 9, 2008, and initial stack test
Discoverer Generator Oxidation Catalyst VOC, HAPs (except metals), Formaldehyde reduction efficiency	70%	50-100% of capacity	D.E.C. Marine AB letter, October 9, 2008
Discoverer Generator Oxidation Catalyst PM reduction efficiency	50%		D.E.C. Marine AB email, February 9, 2009
MLC Compressor Oxidation Catalyst PM reduction efficiency	50%		
MLC Compressor Oxidation Catalyst CO reduction efficiency	47%		
HPU CDPF CO reduction efficiency	80%		
HPU CDPF PM reduction efficiency	85%		
Cranes, C/L, Nanuq CDPF reduction efficiency CO, VOC, HAPs	90%		CleanAIR CDPF guarantee
Cranes, C/L, Nanuq CDPF reduction efficiency	85%		CARB Currently verified, Jan. 2009, CleanAIR Systems PERMIT

Assumptions	Reference
Diesel Engine Thermal Efficiency	7,000 Btu/hp-hr AP42 Table 3.3-1, 10/96
Diesel Heating value	0.1331 MMBtu/gallon Keiser, Ronald email to Chris Tengco, 01/26/09.
Diesel density	7.08 lb/gal SCANRAFF-Vladimir Ignatjuk Certificate of Quality. 09/19/04.

Conversions		
1.34 hp/kW	2,000 lb/ton	32.07 wt S
0.7457 kW / hp	24 hr/day	64.06 wt. SO ₂
1,000,000 Btu/MMBtu	168 hr/wk	2.00 wt. conversion of S to SO ₂
453.592 g/lb		2 one-way trips/ round trip

** seldom-used engines are those running < 4 hr/wk.
blue values are input, black values are calculated or linked

 <p>Air Sciences Inc. ENGINEERING CALCULATIONS</p>	PROJECT TITLE: Shell - Exploration Drilling		BY: S. Pryor	
	PROJECT NO: 180-20-4		PAGE: 2	OF: 3
	SUBJECT: Discoverer Beaufort Permit		DATE: April 12, 2011	

POTENTIAL FUEL USE

Emission Units to permit	Capacity Values	Capacity fuel - hourly		Max fuel - daily		Max fuel - Annual	
		MMBtu/hr	gal/hr	MMBtu	gal	MMBtu	gal
Discoverer							
Generation	7,950 hp	39.51	297	948	7,125	113,793	854,957
MLC Compressor	1,620 hp	7.56	57	181	1,363	21,773	163,585
HPU Engines	500 hp	3.50	26	84	631	10,080	75,734
Cranes	730 hp	2.04	15	49	369	5,887	44,228
Cementing/Logging	0	0.00	0	0	0	0	0
Heaters & Boilers	15.94 MMBtu/hr	15.94	120	383	2,874	45,907	344,913
Seldom-used units	150 gal/wk	0.12	0.89	3	21	342	2,571
Emergency Generator	67 gal/month	4.47	34	9	67	36	269
<i>DISCOVERER - SUBTOTAL</i>					<i>12,450</i>		<i>1,486,257</i>
Primary Ice Management							
Propulsion & Generation	31,200 hp	218.40	1,641	5,242	39,382	628,992	4,725,781
Heaters & Boilers	10 MMBtu/hr	10.00	75	240	1,803	28,800	216,382
Seldom-used units	100 gal/wk	0.08	0.60	2	14	228	1,714
<i>ICE MANAGEMENT - SUBTOTAL</i>					<i>41,199</i>		<i>4,943,877</i>
Secondary Ice Management / Anchor Handler							
Propulsion & Generation	32,160 hp	225.12	1,691	5,403	40,593	648,346	4,871,190
Heaters & Boilers	4 MMBtu/hr	4.00	30	96	721	11,520	86,553
Seldom-used units	100 gal/wk	0.08	0.60	2	14	228	1,714
<i>ANCHOR HANDLER - SUBTOTAL</i>					<i>41,329</i>		<i>4,959,457</i>
Resupply Ship - transit mode							
Propulsion & Generation	12,000 hp	84.00	631	160	1,200	7,666	57,600
Resupply Ship - DP mode							
Propulsion & Generation	12,000 hp	84.00	631	639	4,800	15,333	115,200
<i>RESUPPLY SHIPS - SUBTOTAL</i>					<i>6,000</i>		<i>172,800</i>
Offshore Management / Skimmer vessel							
Propulsion & Generation	3,487 hp	24.41	183	586	4,402	70,301	528,187
Seldom-used units	100 gal/wk	0.08	0.60	2	14	228	1,714
OSR vessel							
Propulsion & Generation	9,838 hp	68.87	517	1,653	12,418	198,340	1,490,177
Seldom-used units	100 gal/wk	0.08	0.60	2	14	228	1,714
OSR work boats							
Work Boats	3,789 gal/wk	3.00	23	72	541	8,646	64,960
<i>OSR SHIPS - SUBTOTAL</i>					<i>17,390</i>		<i>2,086,753</i>
TOTAL					118,368		13,649,144

TOTAL WASTE INCINERATED

Incinerators	Capacity Values	Total		
		lbs/day	lbs/year	tons/year
Discoverer	276 lb/hr	6,624	794,880	397
Ice Management	154 lb/hr	3,696	443,520	222
Anchor Handler	154 lb/hr	3,696	443,520	222
Offshore vessel	125 lb/hr	3,000	360,000	180
OSR vessel	125 lb/hr	3,000	360,000	180
TOTAL		20,016	2,401,920	1,201



Air Sciences Inc.

ENGINEERING CALCULATIONS

PROJECT TITLE: Shell - Exploration Drilling		BY: S. Pryor	
PROJECT NO: 180-20-4		PAGE: 3	OF: 3
SUBJECT: Discoverer Beaufort Permit		DATE: April 12, 2011	

Potential Annual Fuel

Source	MMBtu/year	gallons/year
Discoverer & Associated Fleet	1,816,674	13,649,144

Potential Annual Waste

Source	ton/yr
All Incinerators	1,201

Sulfur Emission Control by Fuel Quality

	% wt	EF	unit	SO ₂	
				ton/year	
Use of 15 ppm (ULSD)	0.0015%	0.0016	lb/MMBtu	1.45	
Use of 100 ppm	0.0100%	0.0106	lb/MMBtu	9.65	
Use of 500 ppm (LSD)	0.050%	0.0531	lb/MMBtu	48.24	
Use of 2500 ppm (0.25%) sulfur (standard)	0.250%	0.2655	lb/MMBtu	241.20	

Discoverer Greenhouse Gas Potential Emissions ^a

CO₂e (CO₂ + CH₄*21 + N₂O*310)

Pollutant	Type	Multiplier	EF	unit	Potential ton/year	Reference
CO ₂	combust	1	73.96	kg/MMBtu	148,108	40 CFR Part 98, Subpart C, Table C-1 (Distillate Fuel Oil No. 2)
CH ₄	combust	21	3.00E-03	kg/MMBtu	126	40 CFR Part 98, Subpart C, Table C-2 (Fuel Type: Petroleum)
N ₂ O	combust	310	6.00E-04	kg/MMBtu	372	40 CFR Part 98, Subpart C, Table C-2 (Fuel Type: Petroleum)
CH ₄	offgas	21	399	lb	4	Methane Mass Calculation.xls October 22,2010
CO ₂	incineration		1970	lb/ton	1,183	AP42 Table 2.1-7, 10/96
Annual CO₂e					149,794	

^a Fluoride is not a listed and quantified trace pollutant from diesel combustion as provided by AP42, so it is assumed to be an extremely small constituent. Furthermore, fluoride is a reduced form of fluorine and diesel combustion is an oxidizing process. Therefore, it is unlikely that it would exist as a combustion bi-product and should be a negligible emission from the project.

**ALASKA WILDERNESS LEAGUE—AUDUBON ALASKA
CENTER FOR BIOLOGICAL DIVERSITY—DEFENDERS OF WILDLIFE
GREENPEACE— EARTHJUSTICE—NATIONAL WILDLIFE FEDERATION
NATIVE VILLAGE OF POINT HOPE
NATURAL RESOURCES DEFENSE COUNCIL
NORTHERN ALASKA ENVIRONMENTAL CENTER—OCEAN CONSERVANCY
OCEANA—PACIFIC ENVIRONMENT—REDOIL—SIERRA CLUB
THE WILDERNESS SOCIETY—WORLD WILDLIFE FUND**

August 5, 2011

VIA EMAIL

Shell Discoverer Air Permits
EPA Region 10
1200 6th Ave., Ste. 900, AWT-107
Seattle, WA 98101
Email: R10ocsairpermits@epa.gov

Re: Revised Draft Air Permits for Shell’s Proposed Oil and Gas Exploration Drilling in the Beaufort Sea and Chukchi Sea, Alaska

Alaska Wilderness League, Audubon Alaska, Center for Biological Diversity, Defenders of Wildlife, Greenpeace, Earthjustice, National Wildlife Federation, Native Village of Point Hope, Natural Resources Defense Council, Northern Alaska Environmental Center, Ocean Conservancy, Oceana, Pacific Environment, REDOIL, Sierra Club, The Wilderness Society, and World Wildlife Fund hereby submit the following comments on U.S. EPA Region 10’s revised draft Outer Continental Shelf (“OCS”) Prevention of Significant Deterioration (“PSD”) Clean Air Act Permits for Shell Gulf of Mexico, Inc. and Shell Offshore Inc. (collectively, “Shell”), authorizing air emissions from Shell’s *Discoverer* drillship and associated vessels for proposed oil and gas exploration drilling operations in the Beaufort Sea and the Chukchi Sea.

Shell proposes to undertake large-scale and long-term industrial operations involving many ships that will emit large amounts of pollution into the environment and create significant amounts of noise that is harmful to Arctic species. Shell’s operations would affect a huge region, all the way from the western Alaskan Beaufort Sea down to the Bering Sea. Further, Shell’s *Discoverer* permit applications are just the beginning of what could become a massive influx of oil company development in the Arctic. Indeed, Region 10 has also received Clean Air Act permit applications from Shell for exploration drilling operations in the Beaufort Sea using the *Kulluk* drill rig and from ConocoPhillips (“Conoco”) for exploration drilling operations in the Chukchi Sea using a jack-up rig. Thus, it is essential that Region 10 exercise extreme diligence and caution in reviewing these first permit applications. The agency’s actions here likely will have consequences beyond the *Discoverer*’s potential operations, and will establish precedents that must provide sufficient protection to the Arctic’s people and environment.

Opinion). Region 10 has construed this as a statement that it possesses “discretion to determine whether a specific standard is ‘applicable’ on remand.” Supp. Statement of Basis at 9. Region 10 misreads the EAB’s order. Region 10 does not have complete discretion, but must exercise “any discretion it has” within the boundaries of applicable law and through the proper processes. *See Shell Gulf of Mexico*, 15 E.A.D. at 24 (Feb. 10, 2011, Opinion).

Shell’s modeling indicates that Shell’s emissions could increase 24-hour PM_{2.5} concentrations in excess of 12 µg/m³. Supp. Statement of Basis at 57-58 (indicating “Shell Only Impacts” of 12.2 µg/m³ for the Beaufort Sea and 12.4 µg/m³ for the Chukchi Sea). This increase easily exceeds EPA’s newly enacted 24-hour PM_{2.5} increment of 9 µg/m³. 75 Fed. Reg. 64,864, 64,865 (Oct. 20, 2010). While the new increment does not become effective for all sources until October 20, 2011, 75 Fed. Reg. at 64,898, Region 10 must nevertheless require Shell to demonstrate compliance.

Region 10 has no discretion to determine whether the new PM_{2.5} increment is an applicable standard because the plain language of section 328 of the Clean Air Act, 42 U.S.C. § 7627(a)(1), defines which standards apply. Section 328 states that “[n]ew OCS sources shall comply with such requirements on the date of promulgation.” 42 U.S.C. § 7627 (emphasis added). As a “new OCS source” yet to commence operation, Shell’s proposed Arctic drilling operations must comply with all NAAQS and PSD program requirements that pre-date commencement of operations, including the new PM_{2.5} increments. *See* 42 U.S.C. §§ 7411(a)(2), 7475(a), 7627(a)(1) and (a)(4)(D). Moreover, with respect to OCS sources, Congress clearly prohibited grandfathering by directing that even “existing OCS sources shall comply on the date 24 months” after promulgation of standards. 42 U.S.C. § 7627(a)(1).³ EPA may not excuse Shell from the strict requirements of section 328 because it “does not have the power to adopt a policy that directly conflicts with its governing statute.” *Maislin Indus. v. Primary Steel, Inc.*, 497 U.S. 116, 134-35 (1990).

IV. The owner requested limit on Shell’s potential to emit greenhouse gas is unenforceable as a practical matter.

The Clean Air Act requires new major stationary sources to meet BACT requirements to obtain a PSD permit. 42 U.S.C. § 7475(a)(3). Shell’s operations are major sources for NO_x and CO. Shell March 18, 2011, App. at 14. For greenhouse gases, EPA has “tailored” special rules defining when a new source is major for greenhouse gases, and as a result, must meet BACT

³ When Congress adopted the PSD program, it understood that certain sources might get caught by changing permit requirements and it offered “grandfathering” relief only to those sources on which “construction had commenced” before the enactment of the 1977 Clean Air Act Amendments. *See* 42 U.S.C. § 7478(b). Where, as here, Congress has provided express grandfathering exemptions for certain circumstances but not others, EPA may not waive otherwise applicable statutory requirements. *See Andrus v. Glover Constr. Co.*, 446 U.S. 608, 616-17 (1980) (“Where Congress explicitly enumerates certain exceptions to a general prohibition, additional exceptions are not to be implied, in the absence of evidence of a contrary legislative intent.”); *see also Natural Resources Defense Council v. Env’t Prot. Agency*, 489 F.3d 1250, 1259 (D.C. Cir. 2007).

requirements. For a source that is already major for another pollutant, that source will also be subject to regulation for greenhouse gas emissions if it “will emit or will have the potential to emit 75,000 tpy CO₂e or more . . .” 40 C.F.R. § 52.21(b)(49)(iii).⁴

Whether a source is subject to BACT for greenhouse gases depends on the source’s potential to emit. 40 C.F.R. § 52.21(b)(49). A source may reduce its potential to emit by including “physical or operational limitation[s] on the capacity of the source to emit a pollutant . . .” *Id.* § (b)(4). However, the limitations must be both federally and practicably enforceable. *Weiler v. Chatham Forest Prods.*, 392 F.3d 532, 535 (2nd Cir. 2004). The “federally enforceable” component ensures that the limitations are enforceable by EPA and citizens. *See* Memo from John S. Seitz, Director, Office of Air Quality Planning and Standards, *Options for Limiting the Potential to Emit of a Stationary Source under Section 112 and Title V of the Clean Air Act*, at 2 (Jan. 25, 1995). The related, but distinct, “practically enforceable” component ensures that limitations are sufficient to allow effective enforcement. *Id.* at 5.

While Region 10 has placed a limit of 70,000 tpy of CO₂e in the permits, *see, e.g.*, Region 10, Draft Revised Outer Continental Shelf Prevention of Significant Deterioration Permit To Construct for the Beaufort Sea at 27 (2011) (“Draft Revised 2011 Beaufort Sea Permit”), making this owner requested limit federally enforceable, the limit is not practically enforceable because Shell’s methane emissions would be uncontrolled and unmonitored. Shell does not have equipment that will limit these methane emissions, and it could exceed the limit on CO₂e emissions without EPA or the public knowing. In particular, Region 10 assumes that the drilling mud system will vent no more than 0.798 tons per month of methane (17 tons per month of CO₂e). Region 10 makes this assumption based on nothing more than assurances from Shell regarding its “past drilling experience . . .” Supp. Statement of Basis at 30. Remarkably, despite the obvious risk of relying upon Shell’s unsubstantiated appraisal, Region 10 determined that there is no need for Shell to monitor or report these emissions. This lack of monitoring or reporting renders the greenhouse gas owner requested limit unenforceable as a practical matter. *See* Memorandum from Terrell E. Hunt, Associates Enforcement Counsel, Air Enforcement Division, U.S. EPA Office of Enforcement and Compliance Monitoring, and John S. Seitz, *Guidance on Limiting Potential to Emit in New Source Permitting* at 5-6 (Jun. 13, 1989) (stating that some system of verification of compliance is necessary to track compliance with production or operational limits); *see also* 18 A.A.C. 50.225(b)(5) (a request for an owner requested limit shall include “a description of a verifiable method to attain and maintain the limit, including monitoring and recordkeeping requirements”).

Additionally, Region 10’s limit on Shell’s use of fuel is not practically enforceable. The draft permits require Shell to track the use of fuel by associated vessels within 25 miles of the source. Draft Revised 2011 Beaufort Sea Permit at 27-29. However, Shell is only required to record the positions of these associated vessels once per hour. *Id.* at 26. Such infrequent monitoring could result in an underestimation of fuel usage if Shell does not record the position of a vessel until well after it has entered the 25 mile radius.

⁴ CO₂e means carbon dioxide equivalent. It is a standardized measurement for the climate change forcing effect of various greenhouse gases. The CO₂e for a greenhouse gas is the concentration of CO₂ that would cause the same level of radiative forcing.

Thus, the permits' owner requested limits addressing greenhouse gas emissions are not practically enforceable. Region 10 must either calculate the true maximum potential emissions and apply BACT as necessary, or revise the owner requested limits so that they are practically enforceable.

V. Region 10's environmental justice analysis is deficient because it fails to account for Shell's emissions of greenhouse gases and black carbon.

Executive Order 12898 states that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States" *See* Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations, 59 Fed. Reg. 7,629 (Feb. 16, 1994). Region 10's environmental justice analysis fails to meet this standard because it relies entirely on expected NAAQS compliance and does not consider the effect of Shell's greenhouse gas and black carbon emissions on indigenous peoples.

The Arctic is already warming rapidly. Climate models predict that temperatures will increase by as much as 6°F by 2040. *See* Anne E. Gore & Pamela A. Miller, Broken Promises: The Reality of Oil Development in America's Arctic at 41 (Sep. 2009). This warming has resulted in visible changes to Alaska's land, water, wildlife, and people. *Id.* at 40. Perhaps the most dramatic change has been the disappearance of sea ice. "As a result of receding and thinning sea ice scientists have observed polar bears drowning and going hungry, walruses forced onto land, and sharp declines in numbers of ice-dependent sea birds." *Id.* at 41. The warming is also threatening indigenous cultures. Arctic animals and subsistence hunts are central to Alaska Native cultures. Today, subsistence hunters have to travel farther to access animals. *Id.* Also, melting permafrost is accelerating coastal erosion and forcing communities to relocate. *Id.*

Shell stands to contribute to this warming, and resulting harm to indigenous cultures, by emitting greenhouse gases and black carbon. Shell's operations could emit as much as 70,000 tpy of CO₂e. Supp. Statement of Basis at 29. EPA's Administrator has found that greenhouse gases are "reasonably anticipated to endanger public health, for both current and future generations." 74 Fed. Reg. 66,496, 66,524 (Dec. 15, 2009). Further, not all regions are equally vulnerable to the effects of climate change. *Id.* at 66,535. America's Arctic—home to a large population of Alaska Natives—stands to suffer more than other locations due to the effects of high rates of projected regional warming on natural systems. *Id.*; Supplemental Environmental Justice Analysis for Proposed Outer Continental Shelf PSD Permit No. R10OCS/PSD-AK-2010-01 & Permit No. R10OCS/PSD-AK-09-01 at 9 ("Supp. EJ Analysis").

Shell's operations also could emit up to 21 tpy of PM_{2.5}, *see* Technical Supporting Document at 8, a large proportion of which will be black carbon. EPA, Current Policies, Emission Trends and Mitigation Options for Black Carbon in the Arctic Region (EPA Draft White Paper) at 21-22 (April 28, 2009). Black carbon is generally regarded as the second most important driver of Arctic warming. Black carbon contributes to warming by absorbing incoming and outgoing radiation and by darkening snow and ice, "which reduces the reflection of light back to space and

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
SEATTLE, WASHINGTON**

**STATEMENT OF BASIS
FOR DRAFT
OUTER CONTINENTAL SHELF
TITLE V AIR QUALITY OPERATING PERMIT
NO. R10OCS020000**

**CONOCOPHILLIPS COMPANY
JACKUP DRILL RIG
CHUKCHI SEA EXPLORATION DRILLING PROGRAM**

Date of Draft Permit: July 22, 2011

Statement of Basis – Permit No. R10OCS020000
ConocoPhillips Jackup Drill Rig – Chukchi Sea Exploration Drilling Program

A small amount of CH₄ may also be emitted by the Drilling Mud System (DR-14). When wells are drilled through porous, hydrocarbon bearing rock, drilling fluids (mud) circulated through the drill bit can carry gaseous hydrocarbons from the well back to Rig. These gases are typically released as fugitive emissions when the mud is processed for reuse on the Rig and stored temporarily on an OSV; however, some of the emissions pass through a vent. Although fugitive emissions are not counted towards determining whether a source is a major source for PSD applicability for exploratory drill rigs (see 40 CFR § 52.21(b)(1)(iii)), the permittee has agreed to include all of these methane emissions when determining compliance with the PTE limit for GHGs.

Based on past drilling experience, the permittee has estimated a conservative amount of methane gas – 8.7 tons per month – that could be released from the circulated mud. To account for this potential methane release while determining compliance with the GHG PTE limit, the permit assumes 183 tons per month CO₂e emissions (8.7 tons per month of methane) will be released from the drilling mud and requires the permittee to include this amount in the monthly calculation of GHGs. To determine compliance with the 39,800 tpy CO₂e limit, actual GHGs from combustion and incineration are added to the assumed mud emissions each month (183 tons CO₂e) and then added to the previous 11 months of GHG emissions. Given that the PTE limit is less than half than the GHG “subject to regulation” threshold of 100,000 tpy CO₂e and the conservative estimate of maximum GHG from the Drilling Mud System, Region 10 is not including additional conditions for monitoring these minimal GHGs from the drilling mud. Region 10 believes this approach is appropriate for the following reasons:

- The permittee’s assumed a drilling rate of 400 feet of 12 inch diameter hole per 24-hour period, and that the entire length would be hydrocarbon bearing. This is conservative, because the hydrocarbon bearing zone is expected to be limited to a portion of the overall drilling depth.
- The permittee’s estimate assumes 100% of the porous space in the rock drilled in the hydrocarbon bearing zone is filled with hydrocarbon gas which is typically not the case.
- The permittee’s estimate assumes 100% of the gas is methane when actual testing of the muds has documented that the gas is a mix of ethane and methane (only methane is a GHG).

Conditions C.5 and C.6: These conditions include provisions necessary to ensure that the project does not cause or contribute to a violation of any NAAQS under authorized operational scenarios. As discussed in Section 2 above, for a Title V temporary source, the NAAQS are an applicable requirement and the Title V permit must include terms and conditions to ensure compliance with the NAAQS at all locations. See 40 CFR §§ 71.2 (definition of applicable requirement), 71.6(a)(1), and 71.6(e). The air quality modeling analysis submitted as part of the permit application demonstrated initial compliance with the NAAQS. The air quality impact analysis is discussed in Section 4. Emission limitations and operational restrictions have been included to ensure compliance with the hourly NO₂ and the 24-hour PM₁₀ and PM_{2.5} NAAQS. These conditions convert key assumptions that were made by the permittee in the modeling analysis into enforceable permit conditions.

The air quality analysis submitted by the permittee modeled emissions from the Rig beginning 500 meters from the center of the Rig and assumes that the Coast Guard will impose a safety zone of this distance around the Rig to exclude the public from the area in which the main operations will be conducted. Region 10 will include in the permit a requirement that the

**UNITED STATES ENVIRONMENTAL PROTECTION
AGENCY
REGION 10
SEATTLE, WASHINGTON**

**TECHNICAL SUPPORT DOCUMENT
REVIEW OF SHELL'S
SUPPLEMENTAL AMBIENT AIR QUALITY IMPACT ANALYSIS
FOR THE DISCOVERER OCS PERMIT APPLICATIONS
IN THE BEAUFORT AND CHUKCHI SEAS**

June 24, 2011

Table 4. Maximum Daily Emissions Rates (lb/day)

	NO _x (lb/day)	PM _{2.5} (lb/day)	PM ₁₀ (lb/day)	CO (lb/day)	SO ₂ (lb/day)
Discoverer					
Generation	111.4	28.3	28.3	39.9	1.5E+00
MLC	170.6	4.3	4.3	79.3	2.9E-01
HPU	79.0	0.6	0.6	13.8	1.3E-01
Cranes	59.5	0.4	0.4	1.3	3.9E-02
Cementing/Logging	157.3	3.9	3.9	8.8	6.8E-02
Heaters	76.5	9.0	9.0	29.5	6.1E-01
Seldom-used	12.6	0.9	0.9	2.7	4.5E-03
Emergency	39.5	2.8	2.8	8.5	1.4E-02
Incinerator	3.3	4.6	5.3	20.2	1.6E+00
Primary Ice Management					
Propulsion	1576.9	246.4	246.4	712.9	6.7E+00
Heaters	36.1	6.0	6.0	9.0	3.8E-01
Seldom-used	8.4	0.6	0.6	1.8	3.0E-03
Incinerator	9.2	16.8	24.6	554.4	4.6E+00
Secondary Ice Management / Anchor Handler					
Propulsion	1625.4	254.0	254.0	734.8	6.9E+00
Heaters	14.4	2.4	2.4	3.6	1.5E-01
Seldom-used	8.4	0.6	0.6	1.8	3.0E-03
Incinerator	9.2	16.8	24.6	554.4	4.6E+00
Resupply Ship - transit mode					
Propulsion	704.4	18.8	18.8	151.7	2.5E-01
Resupply Ship - DP mode					
Propulsion	2817.4	75.1	75.1	606.9	1.0E+00
Offshore Management / Skimmer vessel					
Propulsion	1192.6	21.4	21.4	316.8	5.9E-01
Seldom-used	8.4	0.6	0.6	1.8	3.0E-03
Incinerator	7.5	13.7	20.0	450.0	3.8E+00
OSR vessel					
Propulsion	1618.6	3.0	3.0	8.7	8.1E-01
Seldom-used	8.4	0.6	0.6	1.8	3.0E-03
Incinerator	7.5	13.7	20.0	450.0	3.8E+00
OSR work boats					
Work	317.7	22.3	22.3	68.4	1.2E-01

D.6.3 Emission Unit Characterization

In addition to providing the model with an emission rate, the release characteristics must be provided in order for the model to estimate how the release disperses over time. The release parameters needed for modeling point sources include stack height, stack gas exit temperature, stack gas exit velocity and inside stack diameter. Modeling polynomial area sources with buoyant exhaust characteristics requires a description of the polynomial (i.e, the corner coordinates), the release height and the initial vertical spread of the exhaust plume (sigma-z). Table 5 provides the modeled point sources parameters. The area

Table 12. Modeled impacts in the Beaufort Sea at the Location of Maximum Impact

Air Pollutant	Averaging Period	Shell Only Impacts ¹ (without background) (µg/m ³)	Background Concentration ² (µg/m ³)	Total Impact Including Background (µg/m ³)	NAAQS (µg/m ³)	Total impact as a % of NAAQS
NO ₂	1-hour	72.3	9.3	81.6	188	43%
	Annual	2.9	1.0	3.9	100	4%
PM _{2.5}	24-hour	12.2	6.0	18.2	35	52%
	Annual	0.5	3.0	3.5	15	23%
PM ₁₀	24-hour	10.7	53.0	63.7	150	42%
SO ₂	1-hour	22	13.0	35.0	196	18%
	3-hour	13.4	11.0	24.4	1300	2%
	24-hour	5.9	4.0	9.9	365	3%
	Annual	1.2	2.0	3.2	80	4%
CO	1-hour	493.9	1742.0	2235.9	40000	6%
	8-hour	352.8	1094.0	1446.8	10000	14%

¹ Modeled Impacts from Tables 3 and 4 in Shell Technical Memorandum "AERMOD AIR QUALITY IMPACT ANALYSIS OF NO₂, SO₂, PM_{2.5}, PM₁₀, CO, AND NH₃ – DISCOVERER DRILLSHIP." May 19,2011

² Background concentrations from June 17 memo from Chris Hall titled "EPA's Determination of Appropriate Background Values for the Chukchi Sea and Beaufort Sea OCS Permits"

Table 13. Modeled impacts in the Chukchi Sea at the Location of Maximum Impact

Air Pollutant	Averaging Period	Shell Only Impacts ¹ (without background) (µg/m ³)	Background Concentration ² (µg/m ³)	Total Impact Including Background (µg/m ³)	NAAQS (µg/m ³)	Total impact as a % of NAAQS
NO ₂	1-hour	160.8	13.2	174.0	188	93%
	Annual	3.3	2.0	5.3	100	5%
PM _{2.5}	24-hour	12.4	11.0	23.4	35	67%
	Annual	0.4	2.0	2.4	15	16%
PM ₁₀	24-hour	11.5	79.0	90.5	150	60%
SO ₂	1-hour	17.3	23.0	40.3	196	21%
	3-hour	13.6	14.0	27.6	1300	2%
	24-hour	8.1	5.0	13.1	365	4%
	Annual	1.4	0.4	1.8	80	2%
CO	1-hour	561.9	959.0	1520.9	40000	4%
	8-hour	328.7	945.0	1273.7	10000	13%

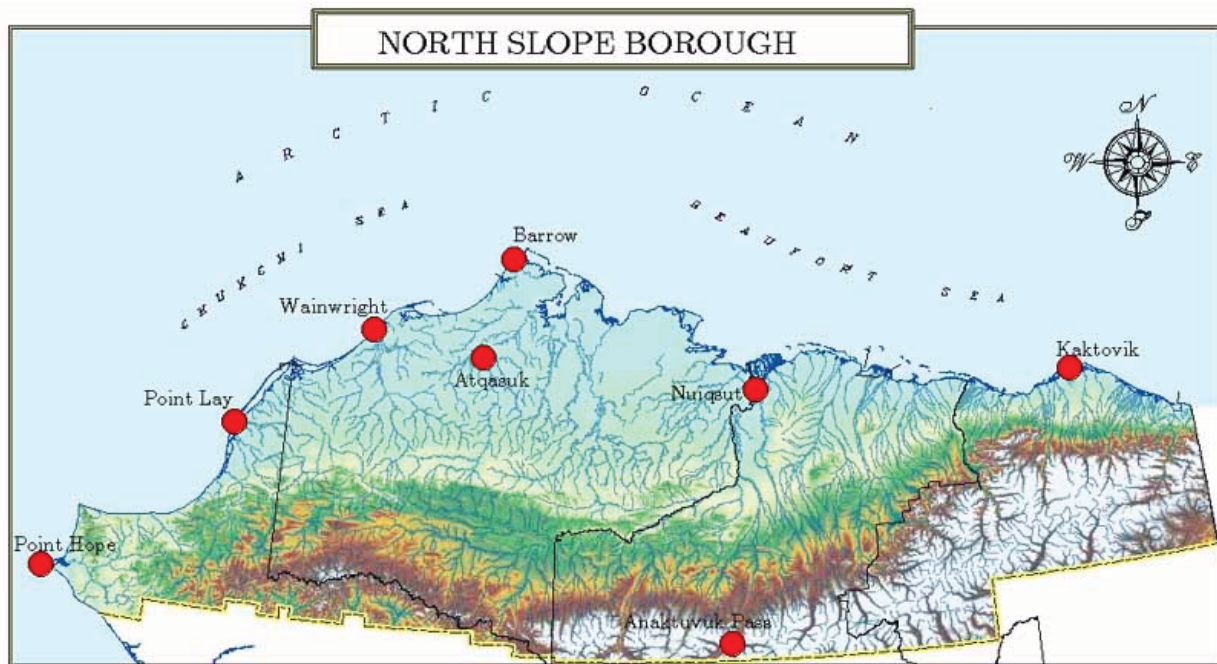
¹ Modeled Impacts from Tables 3 and 4 in Shell Technical Memorandum "AERMOD AIR QUALITY IMPACT ANALYSIS OF NO₂, SO₂, PM_{2.5}, PM₁₀, CO, AND NH₃ – DISCOVERER DRILLSHIP." May 19,2011

² Background concentrations from June 17 memo from Chris Hall titled "EPA's Determination of Appropriate Background Values for the Chukchi Sea and Beaufort Sea OCS Permits"



North Slope Communications Protocol

**Communication Guidelines
to Support Meaningful Involvement
of the North Slope Communities
in EPA Decision-Making**



May 2009

2.0 Communication with North Slope Communities

Region 10 Protocol Statement:

Region 10 will:

- Maintain and improve our working relationships with communities on the North Slope of Alaska,
- Use communication strategies that take into account the cultural context of the North Slope communities,
- Communicate early both internally and with North Slope communities as soon as Region 10 staff learn of a proposed project or issue.

Implementing the Protocol:

Region 10 will use communication strategies that take into account the cultural context of the North Slope communities by adapting our communications to the values and practices of those communities. In this way, Region 10 will practice culturally appropriate communications for each project related to the North Slope. For each project (or project category) related to the North Slope, there must be a deliberate consideration of whether there is a need to prepare and implement a formal communications strategy. If a formal strategy is not deemed necessary, the Protocol must still be implemented by the program.

Communication with North Slope communities can begin as soon as EPA learns of a project (perhaps even before an application is received, for example). This requires EPA program staff to communicate regularly with each other concerning their activities on the North Slope. Development of a communication strategy can also begin as soon as EPA learns of a project. Routine and open communication with the communities is an integral part of the entire project process, beginning at project inception, not from the start of the comment period. The type and frequency of communication will be in alignment with the expressed needs of the communities.

Region 10 will routinely plan for a 60-day window for public comment opportunity. This does not mean we will routinely offer 60-day comment periods. Rather, we will set aside a timeframe of 60 days, to provide for any comment period extension requests, to accommodate any scheduling changes that might be necessary after consideration of the subsistence year activities (described Section 5), or changes due to logistical complications, and to build flexibility into our schedules to account for other unforeseen delays.

Part of conducting meaningful public involvement with communities of the North Slope includes applying cultural competence. Cultural competence refers to the ability to interact effectively with people of different cultures. It is the responsibility of each program to determine specifically how implementation of the Protocol be done for a given project. The Protocol is a guide to considerations that each staff member will confront and provides a general framework

<u>Community</u>	<u>Approximate Population (<i>numbers are changeable</i>)</u>
Point Hope	764
Point Lay	260
Wainwright	556
Barrow	4500
Atkasuk	260
Nuiqsut	416
Kaktovik	286
Anaktuvuk Pass	358

These communities are within a county-level political subdivision called the North Slope Borough (NSB). The NSB covers a very large geographical area and is comparable in size to the state of Minnesota. It is located completely above the Arctic Circle. These communities are remote arctic villages, with no roads between them. Agency access to the villages generally occurs by bush plane.

Cultural Information

These villages are home to native Inupiat residents. About 69 percent of the residents are all or part Alaska native. Whaling is central to the culture.

This is a culture with an oral (spoken) and aural (listening) tradition. Inupiaq is spoken and translation services may be needed in some cases. English is widely spoken, but in many cases it is a second language.

In this traditional society, elders hold special status, as do whaling captains and their wives.

For more detailed discussion about each native village, see Appendix E.

An Example Subsistence Year

The following, adapted from work done by Molly Pederson of the North Slope Borough, is a generalized example of activities that take place throughout the year in the subsistence life of the villagers on the North Slope. This is not a rigid schedule, but is an attempt to put the yearly flow of work and life of the villagers onto the twelve month calendar that we are all familiar with. There is variability from time to time and from village to village, which is one reason that, for us to serve the North Slope communities, it is so important to communicate with the villages to ascertain what is happening and what is anticipated.

As the example on the following page illustrates, there is no perfect, ideal time to begin a community involvement effort. The protocol sets out a process for determining the best way to proceed, working directly with the communities.

An Example Subsistence Year in the North Slope Borough Area

January

- Trapping continues
- Seal hunting
- Seal skins prepared for bleaching
- Polar bear hunting
- Build/repair skin boats

February

- Trapping continues
- Caribou skins drying outside
- Seal and ugruk skins also drying/bleaching
- Continue build/repair skin boats

March

- Some polar bear hunting
- Seal hunting
- Trapping continues for fox, wolf and wolverine
- Women sew ugruk skins for skin boats
- New skins put on boat frames
- Hunting tools repaired
- Female polar bears bring out their young

April

- End of trapping season
- Whaling season begins
- Caribou and ground squirrel hunting inland
- Time to clean cellars if not done during winter
- Birth of young seals

May

- Whaling continues
- Geese/ptarmigan hunting inland
- Duck hunting on ice
- Ice breakup on rivers
- Seals on ice at Qaaktugvik
- Ugruk have their young

June

- Nalukataq in the whaling communities (Kaktovik, Nuiqsut, Barrow, Am, Point Hope)
- Going off to Summer camps
- Fishing on rivers and lakes begins
- Seal hunting
- Fish in Qaaktugvik

July

- Fish continues
- Caribou hunting
- Gathering eggs in Pt. Hope
- Ugruk and walrus hunting
- Drying meat and making seal oil
- Preparing ugruk skins for boats

August

- Caribou hunting by boats, some by snow machines
- Ugruk and aiviq hunting continues
- Ugruk skins prepared for boats/boot bottoms
- Duck hunting at Pigniq
- Boat frames build
- Geese hunting at Wainwright
- Tuktaq making time
- Fish on rivers
- Berry picking inland

September

- Panmaksrak coming through
- Some duck hunting
- Beginning of fall bowhead whale hunt
- Moose hunting
- Whaling in Kaktovik/Nuiqsut/Barrow

October

- Fall whaling continues
- Ice fishing on rivers and lakes
- Caribou hunting first part of the month
- Ice fishing along coastline for cod fish

November

- Polar bear hunting on the coastline
- Seal hunting
- Some hunters still at fish camps
- Traditional Thanksgiving Feast

December

- Trapping season for fox, wolf, wolverine
- Seal hunting
- Polar bear hunting
- Traditional Christmas Feasts
- Traditional games of skill and endurance

Subject: Re: Request for Region 10 Documents Pertaining to Revised OCS Air Permits for Shell
From: Suzanne Skadowski <Skadowski.Suzanne@epamail.epa.gov>
Date: 7/6/2011 4:33 PM
To: tanya@crag.org

Hi Tanya,

Per your request, attached are:

Region 10's Supplemental Environmental Justice Analysis
(See attached file: Undated.c_Supplemental Environmental Justice
Analysis for Proposed Outer Continental Shelf PSD.pdf)

Region 10's Supplemental Air Quality Analysis
(See attached file: 2011-06-24_Review of Shell's Supplemental Ambient
Air Quality Impact Analysis.pdf)

These documents will be posted to our webpages this week, for future
reference.

Thanks!

Suzanne Skadowski
Community Involvement Coordinator
U.S. Environmental Protection Agency, Region 10
206-553-6689

From: Tanya Sanerib <tanya@crag.org>
To: Suzanne Skadowski/R10/USEPA/US@EPA
Date: 07/06/2011 03:57 PM
Subject: Request for Region 10 Documents Pertaining to Revised OCS
Air Permits for Shell

Suzanne --

I am writing to obtain two Region 10 documents related to the recently
revised OCS air permits for Shell. Can you please promptly email me or
make available on line the following documents:

Region 10's Supplemental Environmental Justice Analysis
Region 10's Supplemental Air Quality Analysis

As you know, Region 10 is providing only a limited 30 day comment period
on the permits. Therefore, it is imperative that we obtain these
documents as soon as possible. Because they are documents that are
likely to be frequently requested by other members of the public, I also
suggest that you post them on-line.

Thank you for your attention to this email and I look forward to
receiving the requested records as soon as possible.

Sincerely,
Tanya Sanerib

--
Tanya Sanerib
Crag Law Center
917 SW Oak St., Suite 417
Portland, OR 97205
(503) 525.2722
Fax (503) 296.5454
tanya@crag.org
www.crag.org

Crag is a client-focused law center supporting community efforts to protect and sustain the Pacific Northwest's natural legacy. Help us celebrate our 10-Year Anniversary, find out how at:

<http://crag.org/support-us/crag-events/>

NOTICE: This and any attached documents are intended only for the use of the person to whom this is addressed and may contain information that is privileged, confidential, or work product and exempt from disclosure under applicable law. If you are not the intended recipient, any use, dissemination, distribution, or copying of this communication is strictly prohibited, and you are hereby requested to phone the sender immediately about the error, delete this message and attached documents, and destroy any printed copies.

— Attachments: —

Undated.c_Supplemental Environmental Justice Analysis for Proposed Outer Continental Shelf PSD.pdf	320 KB
2011-06-24_Review of Shell's Supplemental Ambient Air Quality Impact Analysis.pdf	1.1 MB
