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September 6, 2011

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Shell Kulluk Air Permit
EPA Region 10
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r10OCSairpermits@epa.gov

Re: Draft Outer Continental Shelf Title V Clean Air Act Permit for Shell Offshore Inc.'s Exploratory Drilling in the Beaufort Sea with the *Kulluk* drill rig

Dear Mr. Hardesty:

Thank you for the opportunity to comment on the draft Outer Continental Shelf (OCS) Title V Clean Air Act permit for Shell Offshore Inc.'s (Shell's) proposed operation of the *Kulluk* drill rig in the Beaufort Sea. Because of our continuing and unified interest in minimizing the impacts of air pollution in the Arctic, these comments are submitted jointly on behalf of the North Slope Borough (NSB), Alaska Eskimo Whaling Commission (AEWC), and the Iñupiat Community of the Arctic Slope (ICAS). We appreciate Region 10 staff visiting the North Slope and discussing this proposed permit with the community and representatives from each of our organizations. We are encouraged by your efforts and submit these comments to assist you in your ongoing review of Shell's proposed action.

As you know, NSB is the local government for the area onshore from Shell's proposed activities in the Arctic. The protection of the health and welfare of our residents is our most important objective. Shell's activities will inevitably contribute to the contamination and degradation of the natural environment upon which our residents rely. We are concerned about the potential adverse health impacts from air emissions associated with Shell's proposed operations, which may be direct, indirect or cumulative in nature. Because of our concern about the potential adverse effects of industrial air emissions, NSB has developed air quality expertise to facilitate EPA's review of proposed air permits.

AEWC is a non-profit organization representing Iñupiat and Yupik whaling captains in the 11 bowhead whale subsistence hunting villages of Kaktovik, Nuiqsut, Barrow, Wainwright, Point Lay, Point Hope, Kivalina, Little Diomedea, Wales, Gambell, and Savoonga. Its whaling captains and their communities rely upon the health of the Chukchi and Beaufort Sea ecosystems to provide the marine life that sustains the region's Native people and cultures. AEWB works to safeguard the hunt of the bowhead whale and the subsistence way of life that Arctic waters support. Iñupiat and Yupik whaling captains have accumulated thousands of years of traditional and contemporary local knowledge about the Arctic ecosystem. AEWB is also well versed in the current science regarding the health and status of the natural resources of the Arctic.

ICAS is the regional tribal government for eight villages on the North Slope that depend on the marine mammals living in and migrating through Arctic waters. The Chukchi and Beaufort Seas are unique and diverse marine environments that in part define the millennia-old Iñupiat culture. Previous oil and gas activities in the region have caused direct conflicts with subsistence activities and resources. Because offshore oil and gas activities pose risks to the Iñupiat subsistence activities and cultural preservation, they require careful review.

For each of our organizations, the protection of the health and welfare of the residents of the communities they represent is the most important objective.

Given the potential impacts to our communities, we are concerned with the limited period of time allotted for public comment on these permits. As discussed more fully in our comments, the limited time allowed for public comment on this draft permit and new modeling algorithm proved inadequate for the NSB, AEWB, and ICAS to fully evaluate all aspects of the permit. While we do appreciate your visit to Barrow and your availability to discuss the draft permit, these conversations are not a replacement for an adequate opportunity to review the permit, associated documents, and analysis.

We have identified a number of specific areas of concern with the draft *Kulluk* permit. The attached comments detail areas where the draft permit requires revisions to conform to the Clean Air Act and its regulations, where EPA may exercise its regulatory authority and discretion to better protect our residents, or where the permit language could otherwise be improved and clarified. As the attached comments set out in greater detail, these areas of concern include: the ambient air quality boundary, the definition of the OCS "source," application of increments and visibility requirements, enforceability of permit conditions and owner requested limitations, the need for source testing, monitoring and reporting, inadequacies in the modeling analysis, consideration of cumulative impacts, and shortcomings in the environmental justice analysis. Furthermore, there are a number of additional conditions that need to be included in the permit to reflect assumptions in Shell's calculations. And, we ask that EPA take affirmative measures to address our concerns, both through permit conditions and through inspections of the *Kulluk*. A robust inspection program for the *Kulluk* is necessary to ensure that the air emission controls are actually implemented and effective. As of this spring, Shell had not yet installed required emission control and monitoring equipment on the *Kulluk*.


Ultimately, Region 10 needs to seriously consider requiring a major source permit for the *Kulluk*. We ask this for a number of reasons: several permit provisions limiting the *Kulluk's*

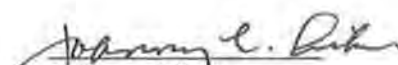
potential to emit (PTE) so the program qualifies for a minor source permit are unenforceable; even as currently drafted, Shell has not sufficiently restricted its emissions to qualify as a minor source; and, as a practical matter, the *Kulluk's* proposed air emissions exceed those of the *Discoverer* – which has applied for a PSD permit.

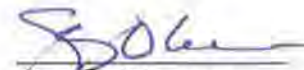
Shell's proposed air emissions pose risks to the environment and our communities that are not limited to the immediate proximity of their offshore sources. In addition to potential impacts to offshore resources and the subsistence activities that target those resources, impacts may be felt onshore. For example, emissions from the ocean-going vessels that Shell is proposing to use include major contributors to global climate change such as carbon dioxide (CO₂) and other greenhouse gases. And, Shell proposes to emit pollutants that are harmful to human health, such as nitrogen oxides (NO_x), sulfur oxides (SO_x), and particulate matter (PM). We hope that you will permit the proposed emissions only when their impact to the health and welfare of our residents is minimized to the greatest extent possible.

Thank you again for the opportunity to comment, and please contact us if you have questions regarding these comments.

Sincerely,


Edward S. Itta
NSB *Acting*
Mayor


Johnny Aiken
AEWC
Executive Director


George Olemaun
ICAS
Vice President

Introduction

These comments are submitted on behalf of the North Slope Borough (NSB), Alaska Eskimo Whaling Commission (AEWC), and the Inupiat Community of the Arctic Slope (ICAS). Our communities have lived in the Arctic for many generations and depend upon the ocean and other natural resources to feed our people and sustain our culture. Our residents are concerned about the impacts of pollution upon their lives, their ability to gather traditional foods from traditional places, and the health and condition of the wildlife resources they gather and consume. We live in isolated areas and enjoy a lifestyle and diet that is radically different from other populations in the United States. The ocean is our garden, our grocery store, and the source of a high percentage of the foods we consume. Operations such as Shell's that pollute the air also may contaminate our food sources and threaten our health.

Our communities also have markedly higher rates of pulmonary disease than the general US population, and may have genetic predispositions to disease that differ from other US populations. Public health data demonstrate that Inupiat are substantially more vulnerable to morbidity and mortality from air pollution than are other Americans. For example, rates of chronic lung disease on the North Slope are dramatically higher than in the general US population. Currently, compared to many areas in the United States, our communities have fewer combustion sources, and although we are recipients of air pollution from other areas, North Slope communities are still relatively pristine. Oil and gas operations have affected and will continue to affect air quality on the North Slope.

Given these issues, we have grave concerns with this third attempt at a minor source air permit for the *Kulluk* drillship. Several of the draft permit provisions that limit Shell's potential to emit to below the major source thresholds are not enforceable. We are also concerned that Shell has not sufficiently restricted its emissions to qualify as a minor source. EPA has long held that to qualify as a synthetic minor source, the permittee must reduce its emissions to at least ten percent below the major source threshold. Shell has failed to do that here. Additionally, the potential to emit for CO₂e must be reduced to below the 75,000 tons per year (tpy) threshold, since this is a synthetic minor source permit for pollutants other than CO₂e. We also have concerns with respect to the compliance with the NAAQS. Considering the margin of error in their calculations, Shell cannot demonstrate compliance with the NAAQS. This is particularly true for the 24-hour PM_{2.5} NAAQS. Region 10 cannot issue a permit that fails to ensure compliance with the NAAQS.

Ultimately, Region 10 should require a major source permit for the *Kulluk*. This makes good sense given the concerns recited above and because, as a practical matter, the *Kulluk*'s proposed air emissions are not minor. The significance of the proposed emissions is quickly illustrated by a comparison of the air quality impacts from Shell's Beaufort operations with the *Discoverer* (a major PSD source) and the *Kulluk* emissions. Shell's operation of the *Kulluk* under the proposed permit will actually have a greater impact on air quality. And, if Shell obtained a major source permit, as they are doing for the *Discoverer*, impacts could be less. For example, the *Kulluk* one hour NO₂ impacts are predicted to be 151.5 µg/m³ compared to 81.6 µg/m³ from the *Discoverer* operations in the Beaufort Sea. Similarly, the 24-hour PM_{2.5} impacts are predicted to be 34 µg/m³ for the *Kulluk* and only 18.2 µg/m³ for the *Discoverer* in the Beaufort.

Statutory Background

In 1990, Congress added to the Clean Air Act the requirement that EPA establish regulations “to control air pollution from Outer Continental Shelf sources located offshore . . . to attain and maintain Federal and State ambient air quality standards and to comply with the provisions of” the prevention of significant deterioration (PSD) program.¹ EPA has promulgated regulations to control air pollution on the outer continental shelf (OCS) for this purpose.²

According to the regulations, if an OCS source is located within 25 miles of a state’s seaward boundary, the same requirements for sources located in the “corresponding onshore area” (COA) apply.³ As the COA requirements are subject to change, EPA is required to update the OCS regulations as necessary to remain consistent with the applicable COA requirements. EPA most recently updated the OCS regulations in June 2011 to reflect the current COA requirements in Alaska.⁴

The potential for the OCS source to emit New Source Review (NSR) pollutants must be calculated and the OCS source operator must apply for a CAA Title V operating permit.⁵ If the source “directly emits or has the potential to emit, 100 tpy or more of any air pollutant” it is a major source for purposes of the Title V program.⁶

Factual Background

Shell is proposing to conduct exploratory drilling operations in the Beaufort Sea using the *Kulluk* drillship. Shell’s current exploration plan for the Beaufort Sea includes drilling four wells in Camden Bay with either the *Kulluk* or the *Discoverer*, supported by a fleet of additional vessels.⁷

This fleet of vessels includes:

Table 1: Vessels Included in Shell’s Beaufort Sea Exploration Plan

Type of Vessel	Vessel Name
Drillship	<i>Discoverer</i> or <i>Kulluk</i> ⁸
Primary Ice Management	Nordica
Secondary Ice Management / Anchor Handler	Hull 247
Resupply (shallow water)	Arctic Seal
Offshore Resupply Vessel (ORV)	Harvey Explorer
Waste Stream Transfer Vessel	Carol Chouest
Deck barge (temporary storage of waste)	Southeast Provider

¹ 42 U.S.C. § 7627(a)(1).

² 40 C.F.R. Part 55.

³ 42 U.S.C. § 7627(a)(1).

⁴ 76 Fed. Reg. 37,274 (June 27, 2011).

⁵ 40 C.F.R. § 71.5(a)(1)(i).

⁶ 40 C.F.R. § 71.2 (“major source”).

⁷ Shell, Camden Bay EP at 1-1-1-2; Shell, Chukchi EP at 1-1.

⁸ Shell, Camden Bay EP at 1-3.

Deck barge tug	Ocean Ranger
Waste Barge (for storage)	TBD
Waste Barge tug	TBD
Primary Oil Spill Response (OSR) barge	Arctic Endeavor Barge
Primary Oil Spill Response Tug	Point Oliktok Tug
OSR Liquid Storage & Refuel Supply Vessel (OST)*	Mikhail Ulyanov
OSR Containment barge*	Barge
OSR Containment barge tug*	Invader Class tug
Anchor Handler for Containment barge*	TBD
Secondary Relief Well Drilling Vessel*	<i>Kulluk or Discoverer</i> ⁹
Chukchi OSR Barge ^{10*}	
Chukchi OSR Barge Tug*	
Chukchi OSR Vessel*	
Science Vessel ¹¹	
West Dock Shuttle ¹²	
Lamor brush skimmer ^{13*}	
Lamor brush skimmer*	
34-foot workboat*	
34-foot workboat*	
34-foot workboat*	
Transrec 150 skimmer*	
Transrec 150 skimmer*	

* Indicates vessels that are not part of the immediate operations – *i.e.*, they are neither within 25 miles of the *Discoverer* nor part of the fleet that will remain in the vicinity of the *Discoverer* but outside the 25 mile boundary.

Shell is seeking three air permits: a synthetic minor source air permit, a Title V permit, and a permit under Alaska’s Clean Air Act.¹⁴ The actual and permitted potentials to emit (PTE) are detailed in Table 2, below, along with the emission thresholds for PSD major source and the Title V major source permits.

⁹ Shell, Camden Bay EP at 2-6.

¹⁰ Shell, Camden Bay EP at 8-1.

¹¹ Shell, Camden Bay EP at 10-2.

¹² Shell, Camden Bay EP at 15-5.

¹³ Shell, Beaufort Sea Regional Exploration Oil Discharge and Prevention Contingency Plan at 1-71 (revised Jan. 2010 plan).

¹⁴ A permit under Alaska’s Clean Air Act is required because some of the operations are occurring in the inner OCS (within the first 25 miles beyond the State’s seaward boundary).

Table 2: Varying Potential To Emit Calculations & Major Source Thresholds

Pollutant	Pre-Permitted PTE¹⁵	Permitted PTE¹⁶	PSD Major Source Threshold	Title V Major Source Threshold
Greenhouse Gases (GHG)	141,487 tons per year	80,000	75,000	
Nitrogen Oxides (NO ₂)	2,339 tons per year	240	250	100
Carbon Monoxide (CO)	855 tons per year	200	250	100
Sulfur Dioxide (SO ₂)	833 tons per year	10	250	100
VOC	132 tons per year	40	250	100
Particulate Matter (PM ₁₀)	110 tons per year	30 ¹⁷	250	100
Small Particulate Matter (PM _{2.5})	109 tons per year	29 ¹⁸	250	100

This is the third time that Shell has sought a minor source air permit for the *Kulluk*. Shell first submitted a minor source permit application to Region 10 in December 2006. Region 10 issued the permit in June 2007. The permit was challenged, and the Environmental Appeals Board (EAB) remanded the permit to Region 10 to justify its “stationary source” determination.¹⁹ Region 10 then issued a revised minor source permit for the *Kulluk*’s operations in the Arctic on June 18, 2008. This revised minor source permit was again challenged before the Environmental Appeals Board. Before the EAB could hear oral argument however, Shell withdrew its permit application.²⁰ After withdrawing that minor source permit in 2008, Shell has again applied for a minor source permit application to operate the *Kulluk* in the Beaufort Sea.

¹⁵ EPA, Stmt. of Basis at 24; Shell, Permit Application, Appendix H at 1 (June 29, 2011).

¹⁶ EPA, draft *Kulluk* Minor Source Air Permit condition D.4. at 35-37; Shell, Permit Application, Appendix G at 1 (June 29, 2011).

¹⁷ EPA does not identify the permitted PTE for PM_{2.5} or PM₁₀ in the draft permit or supporting documents. These numbers represent the modeled emissions, as presented by Shell in its June 29, 2011 submittal, Attachment A.

¹⁸ EPA does not identify the permitted PTE for PM_{2.5} or PM₁₀ in the draft permit or supporting documents. These numbers represent the modeled emissions, as presented by Shell in its June 29, 2011 submittal, Attachment A.

¹⁹ *In Re: Shell Offshore, Inc., Kulluk Drilling Unit and Frontier Discoverer Drilling Unit*, 13 E.A.D. 357 (Sept. 14, 2007).

²⁰ *In Re: Shell Offshore, Inc. Kulluk Drilling Unit*, 2008 WL 4682857, OCS Appeals Nos. 08-01, 08-02, 08-03 (Oct. 16, 2008).

Comments

A. Inadequate Opportunity for Public Comment.

1. Comment Period.

Clean Air Act (CAA) regulations reflect the importance of public participation, requiring a minimum of 30 days for public comment on all permits and allowing for extensions. The regulations specifically note that longer comment periods are necessary in complicated proceedings and allow EPA to grant extensions at the request of commenters.²¹ The Environmental Appeals Board (EAB) has explicitly recognized the importance of adequate opportunity for public participation, and has held that inadequate opportunity for public comment requires the Administrator to object to a permit.²² And, although stakeholders generally must raise any objections during the public comment period in order to legally challenge the permit later, an inadequate public comment period opens the door for additional issues to be raised in any appeal of the permit.²³ Opening that door can further complicate the permitting process. Furthermore, Executive Order 12,898 requires that EPA ensure our communities have an opportunity for meaningful involvement in the permitting process. For all of the reasons discussed in this section, the abbreviated comment periods did not allow adequate time for meaningful involvement.

The public comment period for the *Kulluk*'s permit was inadequate. First, Region 10 is accepting public comment on four air permits for Arctic OCS exploration this summer, in addition to the numerous other ongoing permitting and regulatory measures undertaken by other state and federal agencies.²⁴ The public comment period for this permit overlapped significantly with the comment period for two revised major source OCS PSD permits for Shell's *Discoverer* which ran from July 6 to August 5. The July 22 to September 6 comment period for the *Kulluk* also overlaps with the comment period for ConocoPhillips' air permit. The original comment schedule established by Region 10 allowed a total of sixty calendar days for stakeholders to review four different air permits, all of which are technically and legally complex. That public comment schedule effectively limited stakeholders to fifteen days to review each air permit.²⁵ On

²¹ 40 C.F.R. § 71.11 (h)(4) and (g).

²² *In the Matter of the Proposed Operating Permit for: Louisville Gas & Electric to Operate the Proposed Source Located at 487 Corn Creek, Bedford, Trimble County, Kentucky Proposed by the Commonwealth of Kentucky, Environmental and Public Protection Cabinet*, 2006 WL 6676160, Permit No. V-02-043 Revision 2 Source I.D. No. 21.223-00002 (EAB March 2, 2006) (citing 40 C.F.R. § 70.7(a)(iii) and (h)) (Noting that the "Title V process prioritizes public participation.").

²³ 40 C.F.R. § 71.11(l)(1).

²⁴ For example, just during the month of July BOEMRE set three significant comment deadlines. BOEMRE solicited public comment on a revised draft supplemental environmental impact statement for lease sale 193 (comment deadline July 11), an environmental assessment for Shell's Camden Bay Exploration Plan (comment deadline July 15), and the OCSLA review of Shell's Exploration Plan and Oil Discharge Prevention and Contingency Plan (comment deadline July 25).

²⁵ AEW, ICAS and NSB objected to the proposed comment periods in a June 15, 2011 letter to EPA requesting a minimum of 45 days to comment on each of the four air permits open for public comment, with no overlap in the comment periods. We noted the volume of material associated with each of the four permits and stated that without separate 45-day comment periods it would be impossible for us to provide meaningful written comments or otherwise adequately participate in the public process.

August 24, Region 10 revised the public comment period for the ConocoPhillips' air permit, extending the deadline from September 6 to September 21. While we appreciate the additional time to review the ConocoPhillips permit, this additional time still is not adequate and does not address the abbreviated timeframe for Shell's permits.

Second, Region 10 specifically solicited public comment on the new modeling algorithms used to predict air pollutant concentrations, but expert review of the algorithms proved impossible. For both the *Discoverer* and *Kulluk* air permits, we attempted to hire a consultant with the requisite expertise to review the new modeling algorithms. However, despite our best efforts, we were unable to find an appropriate expert in the amount of time provided by EPA. And, those experts we spoke with advised us that it would be very difficult for anyone in the field to conduct a comprehensive review of the permits in the time allowed. So, while our comments identify possible problems or shortcomings with the modeling, we have not completed a comprehensive review.

Finally, there does not seem to be a reason for rushing the permits. EPA has eighteen months to review Title V permits once the applications are complete.²⁶ EPA's completeness determination for Shell's *Kulluk* permit application was not issued until July 19, 2011.²⁷ EPA still has over sixteen months to review the permit application, so there is plenty of time in the regulatory schedule to extend the public comment period for the *Kulluk*.

Our residents and members constitute the population most impacted by the permitted operations; we should be given adequate opportunity to engage in the public process.²⁸ We reiterate our

We received a response from EPA on July 26, 2011, denying an extension or separate comment periods for these four air permits. This letter emphasized opportunities for North Slope organizations and residents to meet with EPA permitting officials, argued that the issues open for comment on the *Discoverer*'s permits are limited to those identified in the EAB remand and therefore should require less time to review, and suggested that the similarities of the new minor source permits makes a combined comment period appropriate. The letter stated that EPA must adhere to its original schedule with overlap in comment periods "in order to fulfill our responsibility for issuing timely permits." EPA expressed concern that "a short delay in permit issuance can result in a long delay in exploration" and noted that the agency has "mandatory deadlines" to meet.

In our joint comments regarding the *Discoverer* air permits, submitted to EPA on August 6, we objected to Region 10's response, itemizing why we felt Region 10's enumerated reasons fell short of justifying the burden placed on stakeholders, and reiterated our request for separate 45-day comment periods to review the permits.

²⁶ 40 C.F.R. § 71.7(a)(2).

²⁷ Letter from Rick Albright, Director, Region 10 Office of Air, Waste and Toxics, to Susan Childs, Alaska Venture Support Integrator Manager, Shell Offshore Incorporated (July 19, 2011) (available at http://www.epa.gov/region10/pdf/permits/shell/Kulluk/Shell_Kulluk_air_permit_application_completeness_determination_letter_July_2011.pdf).

²⁸ The requirement that stakeholders specifically request the administrative record from Region 10 holds potential for delay and complications. Although our staff and consultants received the administrative record in a timely fashion for the *Kulluk* permit, this became a problem in our review of the ConocoPhillips permit, as we will note in those comments. It should be possible for Region 10 to both post these materials on the FTP site, and offer CD copies upon request. The EAB has noted that the Administrator may not approve a final permit if the public does not have access to all relevant information and that lack of access "forecloses 'meaningful assessment' of the issues and prevents the public 'from making meaningful substantive comments.'" *In the Matter of the Proposed Operating Permit for: Louisville Gas & Electric to Operate the Proposed Source Located at 487 Corn Creek, Bedford, Trimble*

request that EPA extend the public comment periods. At a minimum, 45-day comment periods for each air permit, without overlap, are needed for comprehensive review of these permits.

2. Public Hearing.

The August 23, 2011 public hearing for the *Kulluk* air permit was problematic. EPA officials held an informational meeting and public hearing in Barrow, and residents in other NSB villages were invited to participate at their community teleconference call centers. While we appreciate Region 10 staff traveling to Barrow, the teleconference set-up and EPA preparation for remote participation proved problematic. The telephone connection was poor on both ends – as is not uncommon on the North Slope. As was acknowledged by all concerned, residents had difficulty hearing EPA officials in Barrow, and EPA officials in Barrow had difficulty hearing residents who were trying to participate. EPA simply proceeded despite these problems. Furthermore, EPA made PowerPoint presentations in the Barrow meeting which they had not made available to those attending the meeting at teleconference call centers. Teleconference accessibility to the Barrow meeting is certainly preferred to no contact between EPA permitting officials and impacted communities. But, given the problems encountered, we urge EPA to give further thought to how our communities can be effectively engaged in the public process. Ideally, EPA should be visiting each of the communities to hear directly from residents.

B. Inspection Request and Vessel Readiness.

We request that EPA exercise its authority²⁹ to conduct physical inspections of the *Kulluk*. There are genuine reasons to be concerned about the condition of the rig, so there must be independent verification of compliance with permit provisions.

We ask first that EPA conduct a pre-drill inspection substantially in advance of the operating season. That way, if the inspectors identify problems with any source or equipment, Shell will have adequate time to undertake appropriate repairs or upgrades. As of March 1, 2011, when NSB staff and representatives toured Shell's *Kulluk*, the rig was not in drill-ready condition, and many of the upgrades and improvements Shell had announced as completed were not complete. Reportedly, the *Kulluk* is currently docked in Seattle and promised upgrades are taking place. The logistics for a pre-season inspection by Region 10 staff of the *Kulluk*, in Seattle, would be relatively simple.

Inspections should take place during drill operations as well. We ask that EPA ensure that the actual operations are in compliance with the final permit. Finally, we request that EPA promptly share the records, reports, and information gained from physical inspections of the rig and support fleet with the public as authorized by regulation.³⁰ If EPA does not have the requisite resources to dedicate to oversight of Arctic OCS operations, we ask that EPA coordinate with BOEMRE or other federal agencies to inspect the rigs for compliance with the air permits.

County, Kentucky Proposed by the Commonwealth of Kentucky, Environmental and Public Protection Cabinet, 2006 WL 6676160, Permit No. V-02-043 Revision 2 Source I.D. No. 21.223-00002 (EAB March 2, 2006).

²⁹ 42 U.S.C. § 7414; 40 C.F.R. § 55.8.

³⁰ 42 U.S.C. § 7414(c).

C. Ambient Air Quality Boundary.

Shell has requested and Region 10 has agreed to a 500-meter ambient air quality boundary around the *Kulluk*. Shell has proposed to have the Coast Guard designate a safety zone within this area. The boundary of the ambient air quality region will be enforced by Shell by “radio, physical contact or other reasonable measures.”³¹

Allowing OCS sources to establish such boundaries in the Arctic raises concerns regarding the cumulative impacts to offshore air quality of the several similar planned operations. EPA has been subject to scrutiny for creating ambient air boundaries in the first instance because they allow for greater air quality deterioration.³² Region 10 should explain why this boundary works in the Arctic and how it arrived at the decision to allow more pollution instead of less, particularly in light of the heavy use of offshore areas by subsistence communities.

Additionally, if this boundary remains in place, EPA should examine options for requiring monitoring at 500 meters from the *Kulluk* for the first two weeks of the drilling season. We are not aware of any reasons why it would not be technologically feasible to operate monitoring equipment from a moored vessel.

D. OCS Source Definition.

At the outset, because Shell is currently proposing only exploration for offshore oil and gas resources we ask that Region 10 classify Shell’s operations as a new “exploratory OCS source.”³³

1. Drillship Location.

The draft permit specifically provides “that the *Kulluk* be considered an OCS source at all times that it is attached to the seabed at a drill site by at least one anchor.”³⁴ We disagree that the statutory and regulatory language requires the *Kulluk* to be at a drill site in order to be an OCS source.

Under section 328 of the CAA, an OCS source is any equipment, activity or facility which: 1) has the potential to emit air pollutants, 2) is regulated or authorized under OCSLA, and 3) is located on the OCS or in the waters above the OCS.³⁵ This includes “drillship exploration.”³⁶

³¹ EPA, Stmt. of Basis at 40.

³² GAO, EPA’s Ambient Air Policy Results in Additional Pollution (*available at* <http://archive.gao.gov/d26t7/139340.pdf>) (Attachment 1).

³³ 40 C.F.R. § 55.2.

³⁴ EPA, Stmt. of Basis at 17. The draft permit defines the drill site as “any location at which Shell is authorized to operate under this permit and for which Shell or a leaseholder has received from the [BOEMRE] an authorization to drill.” Draft *Kulluk* Permit at 7. Region 10 cannot argue both that Shell is “authorized” to operate at all of its lease blocks, which is necessary for CAA jurisdiction, and then limit Shell to being a source only where it has a permit to drill. Thus, we ask Region 10 to change this permit condition to read: “A drill site is any location at which Shell is a leaseholder of a lease from BOEMRE.”

³⁵ 42 U.S.C. § 7627(a)(4)(C).

³⁶ *Id.*

The regulatory definition includes the statutory language and adds that vessels are OCS sources when they are “1) Permanently or temporarily attached to the seabed and erected thereon and used for the purpose of exploring, developing or producing resources therefrom, within the meaning of” OCSLA or “2) Physically attached to an OCS facility, in which case only the stationary source aspects of the vessels will be regulated.”³⁷

Because a vessel is an OCS source when it is “temporarily” attached to the seabed, because it then “may be used” for the purpose of exploring for oil and gas resources, and because it then is in an area authorized by OCSLA (*i.e.* Shell’s lease blocks) the *Kulluk* – a drillship – should be considered to be an OCS source whenever it drops a single anchor within Shell’s lease blocks.³⁸ Put more simply, once a drill ship arrives at the permittee’s lease blocks and drops an anchor, it is attached to the seabed and erected thereon, and therefore is an OCS source.

2. Other Vessels.

Shell says that the Oil Spill Response vessel and quartering vessel will be anchored.³⁹ If this is still the case, the anchoring of these vessels should trigger defining these vessels as additional OCS sources. As described above, these vessels have the potential to emit pollutants, are authorized and regulated under OCSLA, are located in the waters above the OCS, and are attached to the seabed and erected thereon for the purpose of aiding in the exploration of oil and gas.

E. As a Temporary Source, Shell Must Demonstrate Compliance with both the Increments and Visibility Requirements.

1. Legal Authority.

We support Region 10’s determination that Shell is a temporary source.⁴⁰ Shell’s operations are “temporary” in that they “involve at least one change of location during the term of the permit.”⁴¹

³⁷ 40 C.F.R. § 55.2.

³⁸ As the EAB noted in the most recent remand decision, section 4(a)(1) of OCSLA, to which the regulatory definition of OCS source refers, uses the term “which may be” in connecting the “attached to the seabed” requirement to the latter two phrases. *See Shell II*, slip op. at 51 n.61; 43 U.S.C. § 1333(a)(1) (applying to “all installations and other devices permanently or temporarily attached to the seabed, *which may be* erected thereon for the purpose of exploring for, developing, or producing resources therefrom” (emphasis added); *cf. Alliance to Protect Nantucket Sound, Inc. v. United States Dep’t of the Army*, 288 F. Supp. 2d 64, 75 (D. Mass. 2003) (holding that OCSLA’s “which may be” clause is not restrictive, and that —authority extends to all artificial islands, installations, and other devices located on the seabed, to the seaward limit of the [OCS], including, but not limited to, those that “may be used to explore for, develop, or produce resources”), *aff’d on other grounds*, 398 F.3d 105 (1st Cir. 2005). Region 1 of EPA made this precise point in its recent response to comments on OCS permits for the Cape Wind facility off the coast of Massachusetts, Region 1, EPA Permit No. OCS-R1-01 Cape Wind Energy Project RTC at 13.

³⁹ Shell, Supp. Report at 28.

⁴⁰ EPA, Stmt. of Basis at 25-26.

⁴¹ 40 C.F.R. § 71.6(e).

Section 504(e) of the Clean Air Act provides:

The permitting authority may issue a single permit authorizing emissions from similar operations at multiple temporary locations. No such permit shall be issued unless it includes conditions that will *assure compliance with all the requirements of this chapter at all authorized locations*, including, but not limited to, ambient standards and compliance with any applicable increment or visibility requirements under part C of subchapter I of this chapter.⁴²

Region 10 concludes that this provision does not require Shell to comply with the increments or visibility requirements.⁴³ Region 10 explains that:

Because the language in section 504(e) of the Clean Air Act uses the term “applicable” before “increment or visibility requirements under part C,” Region 10 interprets Section 504(e) to only make increment and visibility requirements “applicable requirements” for a temporary source when they would otherwise be “applicable” to a new major stationary source or major modification to an existing major stationary source in a permit required under Part C of the Act. Because the permittee is taking limits such that the source will not be a new major stationary source subject to PSD, the increment and visibility requirements under 40 CFR § 52.21 and Part C of the Act are not “applicable” in this instance.⁴⁴

This interpretation is inconsistent with both the statutory language and EPA’s own regulations.

First, Region 10’s explanation does not address the statutory language specifying that “[n]o such permit shall be issued unless it includes conditions that will assure compliance with *all the requirements of this chapter* at all authorized locations”⁴⁵ Region 10’s explanation for its decision only interprets a part of the statutory language and therefore misses both the meaning and the intent behind the provision pertaining to temporary sources.

Moreover, the legislative history of section 504(e) makes it clear that Congress contemplated “all applicable requirements” to include the NAAQS, PSD increments and visibility requirements. It provides that:

Some sources requiring permits do not operate at fixed locations. These might include asbestos demolition contractors and certain asphalt plants. Subsection (e) allows the permittee to receive a permit allowing operations, after notification to the permitting authority, at numerous fixed locations without requiring a new permit at each site. Any such permit must assure compliance at all locations of

⁴² 42 U.S.C. § 7661d(e) (emphasis added).

⁴³ EPA, Stmt. of Basis at 26 (“Section 504(e) of the CAA identifies applicable requirements for temporary sources as including ‘ambient standards and compliance with any applicable increment or visibility requirements under part C.’ Region 10 interprets these provisions to mean that NAAQS are applicable requirements for all Title V temporary sources, but that increment and visibility requirements are applicable requirements only if such sources would otherwise be subject to PSD.”)

⁴⁴ EPA, Stmt. of Basis at 26.

⁴⁵ 42 U.S.C. § 7661d(e) (emphasis added).

operation with all applicable requirements of the Act, including visibility protection and PSD requirements and ambient standards.⁴⁶

Second, even the agency's regulations fail to support this interpretation of the statute. EPA's regulations explain that "[p]ermits for temporary sources shall include the following: (1) Conditions that will assure compliance with all applicable requirements at all authorized locations"⁴⁷ The regulations also include a definition of "applicable requirements" that includes thirteen requirements.⁴⁸ The second requirement is that "[a]ny terms or condition of the preconstruction permits issued pursuant to regulations approved or promulgated through rulemaking under title I, including parts C and D, of the Act" are applicable.⁴⁹ The thirteenth requirement is that the permittee comply with "[a]ny national ambient air quality standard or increment or visibility requirement under part C of title I of the Act, but only as it would apply to temporary sources permitted pursuant to section 504(e) of the Act."⁵⁰

Region 10's interpretation of these provisions reads the thirteenth requirement out of the regulations, because its interpretation is subsumed by the second requirement. Thus, the interpretation that requires temporary sources to comply with the NAAQS and the increments and visibility standards is the only reading that gives meaning to all the regulatory provisions.⁵¹

In light of the statutory and regulatory language and the special treatment given to temporary sources in the 1990 amendments to the Clean Air Act, it is appropriate that compliance with both the increments and visibility requirements is ensured for these permits. This is particularly critical because of the proximity of these operations to the Arctic National Wildlife Refuge, (ANWR) as discussed below. The OCS regulations provide that EPA "shall not issue a permit to operate to any existing OCS source that has not demonstrated compliance with all applicable requirements of this part."⁵²

This interpretation is further supported by the preamble to the part 70 regulations. In that preamble, EPA explained that temporary sources must comply with the NAAQS, increments, and visibility requirements. The agency explained:

An environmental group commented that excluding protection of ambient standards, PSD increments or visibility requirements as applicable requirements are unlawful and bad policy. It argued that section 504(e) expressly defines "requirements of the Act" as "including, but not limited to, ambient standards and compliance with applicable increment or visibility requirements under part C of title I." Although this provision applies only to temporary sources, the group

⁴⁶ H.R. Rep 101-490, 101st Congress, 2d session (May 17, 1990), 1990 CAA Leg. Hist. 3021, 3374.

⁴⁷ 40 C.F.R. § 71.6(e).

⁴⁸ 40 C.F.R. § 71.2; 40 C.F.R. § 70.2.

⁴⁹ 40 C.F.R. § 71.2.

⁵⁰ 40 C.F.R. § 71.2.

⁵¹ This point is further supported by the OCS regulations, which provide that "[t]he requirements of this section shall apply to OCS sources as set forth below . . . 40 CFR 52.21 (PSD) shall apply to OCS sources" 40 C.F.R. § 55.14(a), (d).

⁵² 40 C.F.R. § 55.6(c)(2).

asserts that it would be anomalous for Congress to impose more comprehensive permit requirements for temporary sources than for permanent sources.

The EPA disagrees with the comment that would apply section 504(e) to permanent sources. Temporary sources must comply with these requirements because the SIP is unlikely to have performed an attainment demonstration on a temporary source. . . . In its final rule, EPA clarifies that *the NAAQS and the increment and visibility requirements under part C of title I of the Act are applicable requirements for temporary sources only.*⁵³

Temporary sources must demonstrate compliance with the NAAQS, increments, and visibility requirements because the State Implementation Plan (SIP) would not have performed such an analysis for temporary sources. Indeed, in the preamble, EPA went on to clarify that “that ambient impact assessment information would be required of temporary sources or any other source where such information is needed to meet an applicable requirement (e.g., regulation to ensure good engineering stack height consistent with section 123 of the Act).”⁵⁴

Of course, the part 70 regulations pertain to State Implementation Plans and the oil and gas companies have advocated that such requirements only apply in the inner OCS (*i.e.*, within 25 miles of the State’s seaward boundary). However, section 328 of the Clean Air Act makes it clear that EPA “shall establish requirements to control air pollution from Outer Continental Shelf sources located offshore . . . to attain and maintain Federal and State ambient air quality standards and to comply with the provisions of” the PSD program.⁵⁵ Therefore, because the goal of Section 328 of the Act is attainment of air quality standards it matters little whether the source is located on the inner or outer OCS, because in both cases the relevant SIP will not have performed an attainment demonstration for such sources.

Moreover, the preamble to the part 71 regulations relies upon the reasoning put forth by EPA in developing the part 70 regulations, especially in discussing applicable requirements.⁵⁶ Indeed, it was EPA’s goal “to model part 71 procedures on those required by part 70, in order to promote national consistency between title V programs that are administered throughout the country” and “ensure that sources are not faced with substantially different programs simply because EPA, as opposed to State agencies, is the relevant title V permitting authority”⁵⁷ Therefore, the statutory and regulatory language, as well as EPA’s regulatory preambles all support a finding that the NAAQS, increments, and visibility requirements are all applicable to temporary OCS sources.

⁵³ 57 Fed. Reg. 32250 (July 21, 1992) (emphasis added).

⁵⁴ *Id.* In further support, EPA’s regulations for SIPs note that “[i]n accordance with the policy of section 101(b)(1) of the Act and the purposes of section 160 of the Act, each applicable State Implementation Plan and each applicable Tribal Implementation Plan shall contain emission limitations and such other measures as may be necessary to prevent significant deterioration of air quality.” 40 C.F.R. § 51.166(a). This regulatory provision supports the need for the SIP to protect increments. Therefore, even though the SIP would not have accounted for the temporary sources in assuring protection of the increments, any temporary source permitted under Part 71 must demonstrate compliance with the increments in order to ensure all SIP requirements are met.

⁵⁵ Section 328(a)(1), 42 U.S.C. § 7627(a)(1).

⁵⁶ 61 Fed. Reg. 34202, 34209-10 (July 1, 1996).

⁵⁷ 61 Fed. Reg. at 34203 (citing 60 Fed. Reg. at 20816).

2. Compliance with the Increments.

The *Kulluk* operations, as proposed, do not comply with the 24-hour average Class II PSD increment for PM_{2.5}.

Table 3: Class II Increment Comparison for the *Kulluk*

Pollutant	Averaging time	Max modeled concentration (w/out Background) [$\mu\text{g}/\text{m}^3$]	PSD Class II Increment [$\mu\text{g}/\text{m}^3$]	% of PSD Class II Increment
NO ₂	Annual	4.4	25	18%
PM ₁₀	24-hour	20.8	30	69%
PM _{2.5}	24-hour	17.0	9	189%
	Annual	1.0	4	25%
SO ₂	3-hour	8.9	512	2%
	24-hour	2.8	91	3%
	Annual	0.2	20	1%

On October 20, 2010, EPA adopted a final regulation establishing new PSD increments for PM_{2.5} that went into effect on December 20, 2010.⁵⁸ As the final regulation explains:

[f]ine PM is derived directly from combustion material that has volatilized and then condensed to form primary PM or from precursor gases, such as SO₂ and NO_x, reacting in the atmosphere to form secondary PM . . . Primary and secondary fine particles have long lifetimes in the atmosphere (days to weeks) and travel long distances (hundreds to thousands of kilometers).⁵⁹

The new regulation was finalized in 2010 and the increments go into effect on October 20, 2011.⁶⁰ However, for Title V permits, “applicable requirements” include “requirements that have been promulgated or approved by EPA through rulemaking at the time of issuance but have future compliance dates.”⁶¹ Because the new increments have already been established by EPA by regulation, Shell must demonstrate compliance with them.

With the proposed *Kulluk* operations, Shell has consumed almost two times the available increment and would not be able to demonstrate compliance with these increments as of the time that the minor source baseline date is established. Even if the permits are issued prior to the establishment of the minor source baseline date, Shell should be required to demonstrate that it will comply with the PM_{2.5} increments prior to commencement of operations.

3. Visibility Protection.

EPA must ensure that the permitted temporary source will not adversely impact visibility in the region including in nearby refuge lands, such as the Arctic National Wildlife Refuge (ANWR),

⁵⁸ 75 Fed. Reg. 64,863-64,907 (Oct. 20, 2010); 72 Fed. Reg. 54,112 (Sept. 21, 2007).

⁵⁹ 75 Fed. Reg. at 64,880.

⁶⁰ 75 Fed. Reg. at 64,865.

⁶¹ 40 C.F.R. § 71.2 (“Applicable requirement”).

located adjacent to Kaktovik, which is as close as 14 kilometers (8 miles) from the nearest lease area. Congress recognized the “unique wildlife, wilderness and recreational values” of ANWR⁶²

Part C of the Clean Air Act recognizes the importance of protecting air quality of areas with unique wildlife and recreational values, such as ANWR. The Act establishes the need to “preserve, protect and enhance the air quality ... areas of natural, recreational, scenic or historic value” and to “insure economic growth will occur in a manner consistent with the preservation of existing clean air resources.”⁶³ NSB generally supports responsible onshore oil and gas development, including in ANWR, and also agrees with the CAA goal of protecting clean air. Given the proximity of ANWR to the proposed areas of operation, EPA must consider the air quality impacts, including visibility, to this area.

In addition to the basic provisions for preventing significant deterioration of air quality under the CAA, other authorities also seek to protect air quality related values (AQRVs), such as visibility, in areas designated as Class II air sheds. The Fish and Wildlife Service (FWS), the Federal Land Manager (FLM) of ANWR, suggests that “planning, research and monitoring outlined ... for Class I areas can also be applied in Class II areas” and further notes that “information on air quality and AQRVs of a Class II area is important for comprehensive management of these refuge resources.”⁶⁴ One of FWS’ broadly stated goals is to “[i]dentify and recommend solutions for external threats to refuge habitats, such as air and water quality.”⁶⁵

Emissions can be seen at distances greater than the 8 miles that Shell will be from ANWR. For example, the modeling prepared for the Shell oil shale research, development and demonstration (RD&D) Environmental Assessments (EAs) in northwest Colorado predicted that on 8-14 days per year, the visibility “limit of acceptable change” would be exceeded as a direct result of the Shell projects (not considering cumulative sources) at Flat Tops Wilderness Area, roughly 50 miles from the proposed source.⁶⁶ And while this particular project predicted greater emissions than projected emissions from Shell exploration activities, the distances at which visibility impacts were predicted indicate that, even at lower emission rates, the *Kulluk* operations have the potential to impact visibility onshore and in ANWR.⁶⁷ Given the potential for visibility impacts in the FWS managed area, EPA must, at a minimum, notify FWS of the potential visibility effects of proposed offshore exploration activities on ANWR.

F. The Owner-Requested Restrictions Are Not Enforceable.

As a synthetic minor source, Shell is relying on certain restrictions to avoid being considered a major source and having to undertake a best available control technology (BACT) analysis and

⁶² Public Land Order 2214; see <http://arctic.fws.gov/plo2214.htm>. See also Alaska National Interest Lands Conservation Act (ANILCA), Title III § 303(2)(B); ANILCA, P. L. 96-487, 94 Stat. 2371.

⁶³ CAA § 160(2) and 42 U.S.C. §7470.

⁶⁴ Fish and Wildlife Service Manual, 563 FW 2, 2.8B.

⁶⁵ U.S. Fish and Wildlife Service, Department of the Interior, “Fulfilling the Promise, The National Wildlife Refuge System, Visions for Wildlife, Habitat, People, and Leadership,” 24 (March 22, 1999).

⁶⁶ Shell Oil Shale Research, Development and Demonstration Projects EA, CO-110-2006-117-EA, August 2006, p. 18. See http://www.blm.gov/wo/st/en/prog/energy/oilshale_2/research_development.html.

⁶⁷ Emissions from the oil shale RD&D project are 500 TPY NO_x, 75 TPY VOC, 55 TPY PM₁₀, 40 TPY PM_{2.5}, 12 TPY SO₂. Air Sciences Engineering Calculations, Oil Shale RD&D EA – Shell (May 24, 2006).

other restrictions to try to ensure compliance with the NAAQS. In order for these provisions to operate as intended they must both be (1) “federally enforceable as defined by 40 C.F.R. Sections 52.21(b) (17), 51.165(a) (1) (xiv), 51.166(b) (17)”⁶⁸; and, (2) “enforceable as a practical matter.”⁶⁸ A range of limitations is possible, including

restrictions over a given period of time on the amount of a pollutant which may be emitted from a source into the outside air. Production limits are restrictions on the amount of final product which can be manufactured or otherwise produced at a source. Operational limits are all other restrictions on the manner in which a source is run, including hours of operation, amount of raw material consumed, fuel combusted, or conditions which specify that the source must install and maintain add-on controls that operate at a specified emission rate or efficiency.⁶⁹

When both production and operational limits are used they “must be stated as conditions that can be enforced independently of one another.”⁷⁰ By way of example, the guidance explains that “restrictions on fuel which relates to both type and amount of fuel combusted should state each as an independent condition in the permit.”⁷¹

The duration of these limitations is key to their success. EPA guidance recommends “a one month limit” as the “maximum time EPA should generally accept for avoiding a PSD/NSR threshold.”⁷² Only when seasonal variations come into play and the “source is unable to use the monthly limit” are “rolling periods of longer durations ... also acceptable for determining applicability to major source review.”⁷³ The permitting authority is first to consider “the possibility of imposing a month-by-month limit.”⁷⁴ If that is not feasible, then the maximum the agency may agree to is a “twelve month rolling” time period.”⁷⁵ “Under no circumstances would a production or operation limit expressed on a calendar year annual basis be considered capable of legally restricting potential to emit.”⁷⁶

The duration of operations under the permit is limited to those occurring “between July 1 and November 30 each year (referred to hereafter as the “drilling season”).”⁷⁷ We ask that EPA add to the list of “Prohibited Activities” the operation of the vessels between December 1 and June 30.⁷⁸

⁶⁸ EPA, Limiting Potential to Emit in New Source Permitting at 2 (1989).

⁶⁹ *Id.* at 5.

⁷⁰ *Id.* at 6.

⁷¹ *Id.* at 6.

⁷² Edward Reich, Memorandum Time Frames for Determination of Applicability to New Sources (March 13, 1986).

⁷³ *Id.*

⁷⁴ EPA, Limiting Potential to Emit in New Source Permitting at 10 (1989).

⁷⁵ Edward Reich, Memorandum Time Frames for Determination of Applicability to New Sources (March 13, 1986).

⁷⁶ EPA, Limiting Potential to Emit in New Source Permitting at 10 (1989).

⁷⁷ EPA, Stmt of Basis at 37.

⁷⁸ See EPA, Limiting Potential to Emit in New Source Permitting at 10 (1989) (“Rolling limits could be used as well for sources which shut down or curtail operation during part of a year on a regular seasonal cycle, but the permitting authority should first explore the possibility of imposing a month-by-month limit. For example, if a pulp drier is periodically shut down from December to April, the permit could contain a zero hours of operation limit for each of those months, and then the appropriate hourly operation limit for each of the remaining months.”).

The Statement of Basis fails to explain why monthly limits could not be imposed in this situation and why Shell was provided the leniency of 12-month rolling emissions limits for certain pollutants.⁷⁹ Pursuant to agency guidance, Region 10 is to first consider “the possibility of imposing a month-by-month limit”⁸⁰ and only if that is not feasible, impose a “twelve month rolling” time period.”⁸¹ Instead, the Statement of Basis notes that “because the annual NAAQS are set based on calendar years, the restriction can similarly apply on a calendar year basis (or, in the case of these permits, a drilling season which is limited by the permit to a specific 5 month period out of any calendar year).” This statement is misleading because it implies that Shell is complying with the NAAQS and other standards during the limited drilling season instead of taking a rolling 12-month timeframe in which to document compliance. The public may believe that Shell is demonstrating compliance with air quality standards during the limited open water season when in fact the company is using the entire year to demonstrate compliance.

1. Unenforceable Potential to Emit Restrictions.

We are deeply concerned that the potential to emit (PTE) requested restrictions are not consistent with Shell’s representations to other agencies, and are not practical or enforceable. EPA’s guidance recognizes that in certain instances a permittee may request limits on its operations to avoid new source review (and the accompanying BACT analysis) when in reality these limits are not how the permittee intends to conduct its operations.⁸² We ask Region 10 to ensure that Shell will abide by the restrictions in its air permits. We make this request because in the air permit for the *Kulluk* Shell agrees to certain restrictions that are not reflected in Shell’s Camden Bay Exploration Plan that was submitted to BOEMRE or in its Incidental Harassment Authorization (IHA) application that accompanies that plan.

Table 4: Comparison of Days of Operations; Days Drilling; and Days Constructing Mud Line Cellar (MLC) and Drilling

Permit or Authorization	Total Number of Days of Operations	Number of Days Drilling	Total Number of Days Drilling
<i>Kulluk</i> Permit	120 days	48 days	68 days including MLC construction (20 days)
Exploration Plan ⁸³	Each Torpedo Well about 54 days	Each Torpedo Well 44 days	Each Torpedo Well 49 days
	Each Sivulliq Well about 44 days	Each Sivulliq Well 34 days	Each Sivulliq Well 39 days
IHA Application ⁸⁴	89 days	78 days	78 days

⁷⁹ Memorandum, Guidance an[d] Enforceability Requirements for Limiting Potential to Emit through SIP and §112 Rules and General Permits at 9 (January 25, 1995).

⁸⁰ EPA, Limiting Potential to Emit in New Source Permitting at 10 (1989).

⁸¹ Edward Reich, Memorandum Time Frames for Determination of Applicability to New Sources (March 13, 1986).

⁸² EPA, Limiting Potential to Emit in New Source Permitting at 10-11 (1989).

⁸³ Shell, EIA for the Camden Bay Exploration Plan at 2-25 (2011).

⁸⁴ Shell, IHA Application at 17 (available at:

http://alaska.boemre.gov/ref/ProjectHistory/2012Shell_BF/revisedEP/Appendix%20C.pdf).

Indeed, based on the restrictions Shell has agreed to in its air permit application and the information in its Exploration Plan on the amount of time various activities take, Shell could only drill one well in Camden Bay this year. If EPA cannot confirm that this is the company's intent, then it is imperative that Region 10 issue a major source PSD permit for Shell's operations.

For NO_x, Shell has the potential to emit 2,339 tons per year.⁸⁵ This is substantial and far above the trigger for a BACT analysis for NO_x. Shell has requested limitations in its permits in an effort to bring its NO_x emissions to 240 tpy. The draft permit provides that "Nitrogen oxides (NO_x) emissions from the *Kulluk* and Associated Fleet shall not exceed 240 tpy as determined on a rolling 365-day basis . . ."⁸⁶ The draft permit goes on to explain how to calculate NO_x emissions but it fails to specify how the emissions will be so limited – *i.e.*, through an operational limit, a production limit, or the installation of controls or other mechanisms. As a result, this owner-requested limitation is not enforceable and fails to serve the intended purpose of restricting Shell's emissions of NO_x.

The same thing can be said for the other "synthetic minor PTE restrictions" for CO and CO_{2e}. The OCS regulations provide that "[a]ny physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is enforceable."⁸⁷ Without a limit on the amount of final product, the hours of operation, amount of material consumed, and fuel combusted, the draft permit fails to specify controls for the emissions. This amounts to an un-enforceable restriction on the amount of pollution that Shell can emit.

Under certain circumstances, EPA's guidance provides that emission limits are "sufficient to limit potential to emit" when they include "requirements to install, maintain, and operate a continuous emission monitoring (CEM) system and to retain CEM data, and specifies that CEM data may be used to determine compliance with the emission limit."⁸⁸ The present circumstances warrant CEM to ensure permit conditions are enforceable. The draft permit provisions are based on a new model and new algorithms that have not been tested for the Arctic and as discussed below, that we have concerns about. As a result, only monitoring the combustion of fuel or waste is not sufficient to protect air quality given the modeling uncertainties underlying the permit provisions.

Additionally, EPA's position is that a 5-10% buffer is appropriate for synthetic minor source air permits.⁸⁹ For NO_x, the draft permit fails to provide such a buffer (since 5% of 250 would be 12.5 or a limit of 237.5 tons per year). At the very least, the final permit needs to provide a 5 percent buffer. We ask, given all the unknowns associated with this permit – including how well control technologies will work under Arctic conditions, that Region 10 ensure a 10 % buffer for all owner requested restrictions.

⁸⁵ EPA, Stmt. of Basis at 24; Shell, Permit Application, Appendix H at 1 (June 29, 2011).

⁸⁶ EPA, draft *Kulluk* Permit at 35.

⁸⁷ 40 C.F.R. § 52.21(b)(4).

⁸⁸ EPA, Limiting Potential to Emit in New Source Permitting at 8 (1989).

⁸⁹ Region 9 letter to Nevada Division of Environmental Protection at 2 (March 29, 2011).

With respect to CO₂e, Region 10 incorrectly cites a 100,000 tpy limit to avoid PSD permitting. The Tailoring Rule provides that if a source is not major for any other pollutant, then the major source threshold is 100,000 tpy, but that if the source is major for another pollutant, that the trigger for CO₂e is 75,000 tpy. Here, because Shell's operations technically trigger the major source thresholds for NO_x, CO, and SO₂, the trigger for CO₂e should be 75,000 tpy – not 100,000 tpy. Shell is working to limit its emissions of the other pollutants to keep them below the triggering levels, but this does not change the fact that its emissions before being subject to owner-requested restrictions are far above the major source triggers.

Finally, this section requires a further permit condition making it clear that if the owner-requested restrictions are ever relaxed in the future that Shell will have to go through New Source Review as though the source were new.⁹⁰

2. Unenforceable Emission Limits Used to Meet the NAAQS.

Other critical permit elements, in addition to owner-requested limits, must also be enforceable.⁹¹ They are not. Specifically, requirements intended to assure compliance with the NAAQS are not enforceable. Again, Region 10 relies upon pounds per hour or day instead of meaningful operational or production limits. The NAAQS are critical to the maintenance and attainment of air quality. It is inappropriate to mark compliance with a simple pound per hour calculation without any underlying, enforceable measure (e.g., operational or production limits) to assure that those emissions limits are met.

G. Additional Permit Conditions.

Key operating parameters relied on to calculate potential to emit and demonstrate compliance with the NAAQS must be included as permit conditions because EPA relies on these parameters to demonstrate compliance with the synthetic minor permit limits and the NAAQS. Specifically, EPA must include the following as enforceable operating restrictions in the permit:

Table 5: Additional Required Permit Limits: Operating Parameters

Permitted Source	Permit Limit	Compliance Demonstration
Cementing and Logging Activity	1,248 hours/activity 52 days/activity ⁹²	Add provisions to condition D.3 to limit hours of operation and require sufficient recordkeeping
Deck Cranes (all 3 units combined)	Shall not operate more than 30% of the time in any given day during	Add provisions to condition D.3 to limit hours of operation and require sufficient recordkeeping

⁹⁰ 40 C.F.R. § 52.21(r).

⁹¹ *In re Newmont Nevada Energy Investment*, PSD Appeal 05-04, 12 EAD 429, 474 (EAD 2005); *In re ConocoPhillips Co.*, 13 EAD 768, 793-5 (2008).

⁹² As submitted by Shell, *Kulluk* OCS Application, June 29, 2011, Appendix G, p. 2 of 21.

Permitted Source	Permit Limit	Compliance Demonstration
	MLC and Well Drilling Activities ⁹³	
Deck Cranes (all 3 units combined)	Shall not operate more than 50% of the time in any given day during Cementing and Logging Activities ⁹⁴	Add provisions to condition D.3 to limit hours of operation and require sufficient recordkeeping
Resupply Ship - in transport	Limited to 1,200 gallons of fuel 1-way ⁹⁵	Add provisions to condition D to limit fuel usage and require sufficient monitoring and recordkeeping
Resupply Ship - in DP mode	Limited to 4,800 gallons per event ⁹⁶	Add provisions to condition D to limit fuel usage and require sufficient monitoring and recordkeeping
OSR Vessel	Limited to 2,800 gal/day ⁹⁷	Add provisions to condition D to limit fuel usage and require sufficient monitoring and recordkeeping
OSR Work Boats	Limited to 3,789 gal/day ⁹⁸	Add provisions to condition D to limit fuel usage and require sufficient monitoring and recordkeeping

Shell assumed certain control device efficiencies in the emissions inventory; EPA must include these efficiencies as enforceable permit limits as well, if it will be relying on this level of control to demonstrate compliance with the NAAQS and synthetic minor permit limits. The draft permit includes a requirement to operate selective catalytic reduction (SCR) control at all times for the *Kulluk* generators and the icebreakers (draft Permit Condition D.10) and to operate oxidation catalyst control at all times for the *Kulluk* generators, *Kulluk* MLC engines (including HPU and air compressor engines), *Kulluk* deck crane engines and the generator and propulsion engines on the icebreakers (draft Permit Condition D.11). These permit conditions must be expanded to include the following control efficiencies that are assumed in the inventory for the modeling and PTE calculations:

Table 6: Additional Required Permit Limits: Control Efficiencies

Control Device	Restriction ⁹⁹	Compliance Demonstration
SCR for NO _x control	1.6 g/kW-hr	Continuous monitoring
Oxy-Cat for PM control	50%	Periodic monitoring
Oxy-Cat for CO control	80%	Periodic monitoring

⁹³ *Id.*
⁹⁴ *Id.*
⁹⁵ *Id.*
⁹⁶ *Id.*
⁹⁷ *Id.*
⁹⁸ *Id.*
⁹⁹ *Id.* at 3.

Control Device	Restriction ⁹⁹	Compliance Demonstration
Oxy-Cat for VOC/HAP (except metals)/HCHO control	70%	Periodic monitoring

Shell assumed certain capacity limits for source operations that must also be included as enforceable permit conditions. Shell identified these capacity limits as “System Limitations.”¹⁰⁰ EPA must include associated permit provisions to ensure that Shell’s operations do not exceed these assumed capacity limits (or “system limitations”). Stack testing requirements for many of these sources require testing at 100% capacity (with a 10% buffer) which indicates that these units can, in fact, operate at, or very near, 100% capacity, but it is not clear what system limitations will keep the company from operating above the assumed levels.

Since modeling was conducted assuming these units would operate at capacities below 100%, EPA must include provisions limiting operation to the modeled capacities. Furthermore, since the modeling requirements in the proposed permit (draft Permit Condition C.4) specify that “[m]odeling analyses shall be conducted using the same model, meteorological data, and other assumptions used in the initial modeling analysis” (emphasis added), it is critical that EPA include permit provisions to ensure operational consistency with these modeling assumptions. Specifically, EPA must include the following capacity limits in the permit:

Table 7: Additional Required Permit Limits: Capacity Limits

Permitted Source	Capacity Limit	Compliance Demonstration
Kulluk Generators	85%	Continuous load monitoring
Deck Cranes (all 3 units combined)	40%	Continuous load monitoring
Cementing/Logging Units	60%	Continuous load monitoring

In the draft permit, EPA is relying on calculated emission factors to demonstrate compliance with certain emissions limits. At the beginning of each drilling season, Shell is required to establish test-derived emission factors for some emissions sources. For those sources that do not require source testing, however, the permit relies solely on the emission factors presented in Tables D.2.1 and D.2.2 of the draft permit to determine compliance with permitted emission rates. Because this draft permit does not specify equipment make, model and capacity it is absolutely critical that EPA require source testing for *all* permitted emission sources at the beginning of the drill season. In the absence of source testing for all emission sources, EPA must ensure that the emission factors relied on for the air quality analysis are the overall worst-case emission factors in order to ensure adequate protection of the NAAQS and to ensure a reasonable margin of safety in demonstrating compliance with the NAAQS and synthetic minor permit limits.

We question whether the emission factors for the boilers and heaters in Tables D.2.1 and D.2.2 of the draft permit will ensure adequate protection of the NAAQS. In fact, EPA’s recently

¹⁰⁰ Kulluk OCS Application, June 29, 2011, Appendix G.

revised permit for the Noble *Discoverer* includes a BACT limit for the boilers that is higher than the NO_x and PM emission factors used for this permit.¹⁰¹ Specifically, the NO_x and PM BACT limits for the *Discoverer* permit are equivalent to 26.6 lb/10³ gal of NO_x and 3.1 lb/10³ gal of PM and are based on stack test data from the actual units onboard the *Discoverer*.¹⁰² In comparison, the emission factors in the proposed permit for the *Kulluk* are 20 lb/10³ gal of NO_x and 3 lb/10³ gal of PM and are based on AP-42 emission factors. Considering the fact that the permit limits for the *Discoverer* permit represent what EPA determined to be the best available controls for these units, it is not reasonable to assume a *lower* emission rate for the boilers onboard the *Kulluk* and its associated fleet, where BACT is not a permit requirement. EPA must require source-specific emission factors for these units or must revise the emission factors upward to reflect the worst-case boilers that could potentially be used onboard the *Kulluk* and its associated fleet.

Similarly, we question whether the emission factors for the emergency generators, seldom-used engines and oil spill response vessels (OSRV) workboats are sufficiently conservative to account for the worst-case units being operated during *Kulluk* operations. Since the NO_x and PM emission factors for these units are based on stack testing for *Discoverer* sources¹⁰³ we doubt that the data truly reflect the worst-case emissions sources for these source types. Again, this is particularly important considering that these units are not subject to source testing requirements. These sources contribute between 5-10% of NO_x and PM emissions with the OSRV workboats representing a significant share of these emissions. Given the fact that NAAQS compliance is just barely demonstrated for PM (within 3% of the 24-hour average NAAQS) there is little room for uncertainty in the underlying analysis.

Again, although the synthetic minor limits on potential to emit are enumerated in the permit (draft Permit Condition D.4), the permit must also state that if these limits are relaxed at any time, the source will be subject to the requirements of 40 C.F.R. § 52.21(r)(4). In addition, if the synthetic minor pollutant limits are exceeded, the source will trigger PSD requirements and should be treated as a source that was required to obtain a PSD permit.

Please add to the permit a condition that the “approval to construct shall become invalid if construction is not commenced within 18 months after receipt of” approval or “if construction is discontinued for a period of 18 months or more.”¹⁰⁴

Please add a provision that discusses when the permit will be reopened for cause.¹⁰⁵ We ask that this provision include a requirement that Shell demonstrate compliance with the new 8-hour Ozone NAAQS within six months of the new standard being announced.

¹⁰¹ See, e.g., the revised proposed permit for the Beaufort Sea, Condition J.1.1 and J.1.2.

¹⁰² *Discoverer* Proposed Permit Conditions J.1.1 and J.1.3 list a NO_x BACT limit of 0.2 lb/mmBTU and a PM₁₀ BACT limit of 0.0235 lb/mmBTU, respectively. Based on the diesel fuel heating value in Shell’s engineering calculations (Appendix A of EPA’s Statement of Basis) of 0.1331 mmBTU/gal:
 0.2 lb/mmBTU * 0.1331 mmBTU/gal * 1000 gal/10³gal = 26.6 lb/10³gal NO_x.
 0.0235 lb/mmBTU * 0.1331 mmBTU/gal * 1000 gal/10³gal = 3.1 lb/10³gal PM₁₀.

¹⁰³ See *Kulluk* OCS Application, June 29, 2011, Appendix G, p. 3 of 21.

¹⁰⁴ 40 C.F.R. § 55.6(b)(4).

¹⁰⁵ 40 C.F.R. § 71.7(f).

Please change permit condition D.4.8. to read: “*the permittee shall not operate the Kulluk in the Beaufort Sea within the same drilling season as its operation of any other drillship or its lease of any other drillship, including the Noble Discoverer, to any other lessee with lease blocks in the Beaufort Sea.*” This condition is necessary to clarify two points. First, that Shell may not operate any two drillships in the Beaufort at the same time, since such operations were not contemplated by the *Kulluk* permit and supporting documents. Second, Shell cannot work around this permit condition by leasing its drillships to another company that also holds leases in the Beaufort.

H. Source Testing and Monitoring Provisions.

We are concerned about the monitoring provisions in the draft *Kulluk* permit especially with respect to those pollutants for which Shell is a synthetic minor source. Because of the threat of significant air pollution from these operations we ask that Region 10 revise the permit to require monitoring of actual emissions and not just fuel usage. As discussed below, this is particularly critical for NO₂ and PM. In the event actual emissions are not monitored, at least Region 10 should require monitoring of fuel consumption using a fuel flow analyzer device.

1. Source Testing for all Emissions Units.

EPA’s draft permit does not require source testing for many of the units associated with the *Kulluk*’s proposed operations. Specifically, source testing is not required for the boilers and heaters, the emergency generators or the seldom-used engines on the *Kulluk* and its associated fleet. Nor is source testing required for the OSRV workboats. Since the draft permit does not specify equipment make, model and capacity it is absolutely critical that EPA require source testing for *all* permitted emission sources. In the absence of source testing for all emission sources, EPA must ensure that the emission factors relied upon for the air quality analysis are the worst-case emission factors in order to ensure adequate protection of the NAAQS and to ensure a reasonable margin of safety in demonstrating compliance with the synthetic minor permit limits.

2. Proposed Monitoring and Recording Requirements are Insufficient to assure Compliance with Hourly NO_x and Daily PM Limits.

EPA’s draft permit includes hourly emission limits for NO_x and daily emission limits for PM in order to ensure compliance with the NAAQS.¹⁰⁶ EPA’s proposed corresponding monitoring and reporting requirements are not adequate to demonstrate compliance with these hourly and daily limits. Each week, Shell would be required to calculate and record (for the previous week), emissions of NO_x and PM by using the emission factors for each source collected under the stack testing requirements for that source or, for those sources not subject to stack testing requirements, the emission factors in Tables D.2.1 and D.2.2.¹⁰⁷ It is not sufficient to demonstrate compliance with hourly and daily limits on a weekly basis. At a minimum, compliance with PM emission limits must be demonstrated on a daily basis.

¹⁰⁶ Draft Permit Condition D.6.

¹⁰⁷ Draft Permit Condition D.1.

Since the NO_x emission rates presumably vary hour by hour, using emission factors based on a one-time stack test conducted at the beginning of (in some cases only the first) drilling season does not ensure continuous compliance with an hourly limit. There is no guarantee that these hourly limits can be complied with for each hour of operation and that the hourly emissions will stay at the emission rates modeled without more precise monitoring requirements.

The only way to ensure adequate compliance with the hourly limits is with the use of continuous emissions monitoring systems (CEMs). EPA must require the use of CEMs, or equivalent, for NO₂ compliance.¹⁰⁸ If there is some technical reason why CEMs are not feasible for these sources then EPA must require more frequent stack testing (*e.g.*, at the beginning of *each* season from every source).

Additionally, we fully support the required use of SCR pollution control on the generators onboard the *Kulluk* and on the icebreakers and the required use of oxidation catalysts on the *Kulluk* generators, icebreakers, MLC engines and deck crane,¹⁰⁹ but are concerned about how these controls will function in Arctic conditions. As Region 10 notes it “*believes that the SCR and OxyCat systems will be effective if the inlet temperature to each system is high enough, the urea feed to the SCR system is operating, and the catalysts are still active.*”¹¹⁰ Because the proper functioning of these controls is essential to compliance with the NO₂ and PM NAAQS, we reiterate our request for CEM for these systems (instead of weekly measurements with a portable device) per draft Permit Conditions F.3 and F.4.

As further evidence that Shell may not be able to demonstrate compliance with these control requirements, the draft permit includes special provisions whereby compliance with the hourly NO₂ and daily PM limits may be demonstrated using uncontrolled emission factors “for all periods when any of the deviations in Condition F.3.7 [and Condition F.4.7] exist” (see draft Permit Conditions D.6.14 and D.6.15). The referenced Permit Conditions D.6.15 and D.5.15 then allow for reporting under the “Emergency Provisions” of condition A.16 for periods when these control devices are not operating according to the parameters outlined in the permit (*e.g.*, when the urea pump is not operating in the SCR unit, etc.). This loophole undermines the requirement to operate these controls by allowing Shell to report their failure to properly operate as an “emergency condition.” The ability to reliably operate these controls is essential to the permit’s ability to protect the NAAQS. If EPA is going to rely on the use of these controls as the basis for the NAAQS analysis, then Shell must be required to operate these controls at all times, with no exception. If the controls fail, then that should be considered a violation of permit conditions D.10 and D.11 and such violations should not be excused under the emergency provisions of the permit.

¹⁰⁸ See <http://www.netl.doe.gov/publications/proceedings/02/scr-sncr/gaussummary.pdf>.

¹⁰⁹ See *e.g.*, draft Permit Conditions at D.10 and D.11.

¹¹⁰ EPA, Stmt. of Basis at 45 (emphasis added).

3. Requirement to Submit Reporting Data to EPA Periodically.

The Clean Air Act makes clear that Title V permits:

[S]hall include enforceable emissions limitations and standards, a schedule of compliance, a requirement that the permittee submit to the permitting authority, no less often than every 6 months, the results of any required monitoring, and such other conditions as are necessary to assure compliance with applicable requirements of this chapter.¹¹¹

Please add a condition to the permit requiring Shell to submit all of its monitoring results to Region 10. In light of the 120 day operating window for this permit, we ask that these submissions be required to be made every 60 days (or twice) while the operations are occurring. We request this condition so that Region 10 has time to take enforcement action if a problem arises during the course of the operations.

4. Addition of Sulfur to the Ultra Low Sulfur Fuel during Transport.

It is our understanding that Shell has committed to the use of Ultra Low Sulfur Diesel Fuel (ULSD) for its OCS exploration activities north of the Bering Strait.¹¹² The huge reduction in anticipated sulfur dioxide emissions that will result from this commitment is significant and will reduce not only localized emissions of SO₂ but will reduce PM_{2.5} pollution from Shell's exploration activities, as well. However, EPA's draft permit does not include a requirement to use ULSD fuel for the *Kulluk* and the associated fleet during exploration activities in the Beaufort Sea.

Rather, EPA's proposed permit condition D.4.5 requires the use of liquid fuel with a sulfur content less than or equal to 100 ppm, by weight, in any emission unit on the *Kulluk* or on the Associated Fleet. We request that these sources be required to use ultra-low sulfur fuel (15 ppm sulfur) in accordance with Shell's commitment to use ULSD in the Beaufort Sea and with EPA's June 6, 2006 Final Rule: Control of Air Pollution from Motor Vehicles and Nonroad Diesel Engines: Alternative Low-Sulfur Diesel Fuel Transition Program for Alaska.¹¹³ This rule requires marine vessels to comply with a 15 ppm fuel sulfur standard as of June 1, 2010. Shell's proposed operations, therefore, need to comply with this standard.¹¹⁴

The final rule states:

Beginning June 1, 2010, diesel fuel used in these applications must meet a 15 ppm (maximum) sulfur content standard.

¹¹¹ Section 504(a); 42 U.S.C. § 7661c(a).

¹¹² December 9, 2009 letter from Shell to EPA Re Shell Gulf of Mexico Inc. Supplement to Application for *Discoverer/Chukchi* OCS/PSD Permit.

¹¹³ 71 Fed. Reg. 32450-32464 (June 6, 2006).

¹¹⁴ EPA, Regulatory Announcement <http://www.epa.gov/otaq/regs/fuels/diesel/420f06040.htm>.

In 2010, highway and nonroad fuel in rural Alaska will be required to meet the 15 ppm sulfur standard, providing the full environmental benefits of these programs to rural Alaska as well.

The permanent exemption from the 500 ppm sulfur standard of 40 CFR 80.29 for rural Alaska terminates on the implementation date of the new 15 ppm sulfur standard in 2006.

On September 14, 2003, Alaska ...requested that the *15 ppm standard* applicable to locomotive and *marine diesel fuel produced in, imported into, and distributed or used within rural Alaska be moved up to June 2010*, from the June 2012 date in the final nationwide NRLM rule.

This rule specifies one exception to the nationwide NRLM standards and implementation deadlines in effect for diesel fuel produced in, imported into, and distributed or used within rural Alaska, beginning June 1, 2010. *This exception is that locomotive and marine diesel fuel will also be required to meet the 15 ppm sulfur content standard on June 1, 2010* rather than in 2012.

This rule further specifies that the 15 ppm sulfur standard applicable to locomotive and marine fuel (LM) be moved forward to 2010 to be implemented at the same time as the 15 ppm sulfur standard for nonroad (NR) diesel fuel. In this way there will only be one grade of NRLM¹¹⁵ diesel fuel in the rural areas in 2010 and 2011 instead of two separate grades (i.e. 15 ppm and 500 ppm). The implementation dates for the NRLM diesel fuel sulfur standards are shown in Table II.B-1. [Table II.B-1 shows refiners and importers of fuel must meet the 15 ppm fuel sulfur standard on June 1, 2010.]¹¹⁶

We hope that Shell's commitment to purchase ULSD fuel for its operations in the Beaufort Sea extends to the *Kulluk* operations. Shell has acknowledged that, upon delivery the fuel may have a higher sulfur content because the hull of the barge in which the fuel is transported will not be cleaned out.¹¹⁷ We ask EPA to address how use of fuel with a sulfur content as high as 100 ppm is acceptable given the regulatory requirement to use fuel with a sulfur content of 15 ppm. If EPA determines that an exception must be allowed due to the logistics of transporting fuel to the region, then we request that EPA fully evaluate the appropriate sulfur content and whether or not Shell can comply with a limit lower than 100 ppm.

I. Modeling, Background Data, and Ambient Air Quality Analysis.

We have a number of concerns regarding the modeling underlying this permit. Although time constraints did not allow for a comprehensive review of the model itself, we still have a number of questions and suggestions regarding the ambient air quality modeling, the inputs for that

¹¹⁵ Nonroad, Locomotive and Marine (NRLM).

¹¹⁶ 71 Fed. Reg. 32450-32464 (June 6, 2006) (emphasis added).

¹¹⁷ Shell, *Kulluk* Supplemental Report at 25 (Feb. 28, 2011) (requesting "a permissible test limit of 100 ppm sulfur in the fuel consumed by the *Kulluk* and associated fleet.").

modeling, some of the modeling outcomes, and modeling that was not performed at all for this permit.

1. Insufficient Margin of Safety to Demonstrate Compliance with Air Standards.

The compliance demonstration for PM_{2.5} leaves no room for uncertainty; modeled PM impacts are predicted to be at 97% of the 24-hour average PM_{2.5} NAAQS.¹¹⁸ Region 10 must be able to demonstrate compliance with the NAAQS considering a margin of error based on the accuracies of the input data. Specifically, demonstration of compliance must account for the uncertainty in the stack test data used to determine the emission factors. Since the emissions inputs for the modeling analysis are based, in general, on multiplying the applicable emission factor by the associated operating factor (*e.g.*, fuel usage rate) then the accuracy of this input is determined by the sum, in quadrature, of the fractional uncertainties associated with each factor.¹¹⁹ If, as has been indicated by Shell previously¹²⁰, the uncertainty in the stack test data is upwards of 15 %, then Shell must be able to demonstrate compliance with the NAAQS considering a margin of error no less than 15 %.¹²¹

This means that the predicted 24-hour PM_{2.5} concentration must be less than 29.8 µg/m³ when considering the background concentration and the predicted 1-hour NO₂ concentration must be less than 160 µg/m³. Yet, the highest predicted 24-hour PM_{2.5} concentration, with background, from the permit modeling was 34 µg/m³, well above 29.8 µg/m³ (114 % of the 29.8 µg/m³ level).¹²² Region 10 must establish permit limits that, when considering the accuracy of the emission factor and operating data, demonstrate compliance with the NAAQS with a margin of error no less than the accuracy of the input data.¹²³

2. AERMOD-COARE.

Region 10 solicited comments on the use of the non-guideline AERMOD-COARE model used in this draft permit.¹²⁴ Given the limited comment period and the overlap with the *Discoverer* permits comment period, it is not feasible to provide comprehensive and appropriately technical comments on the model. The new COARE model is highly involved and a thorough review would take more time than Region 10 provided for comment. Public input on this new model would be a valuable opportunity for broad peer review of the models used; unfortunately, this opportunity is lost as Region 10 failed to provide adequate time for the public to be able to respond with meaningful input.

¹¹⁸ EPA Air Quality Impact Analysis, Table 11, p. 33.

¹¹⁹ The quadrature sum is the square root of the sum of the squares.

¹²⁰ See, *e.g.*, Shell's September 17, 2009 comments on the *Discoverer* Chukchi PSD permit, p. 11.

¹²¹ The uncertainty in the calculated emission rate would be the square root of the sum of the squares of the fractional uncertainties, as follows: $q = ((x\%)^2 + (15\%)^2)^{1/2} > 15\%$, where x is the fractional uncertainty of the applicable operating factor.

¹²² EPA Air Quality Impact Analysis, Table 11, p. 33.

¹²³ As determined by the sum, in quadrature, of the fractional uncertainties for each variable.

¹²⁴ EPA, Stmt. of Basis at 48.

In general, we question whether the performance evaluations used to assess the model are representative. The results from the three tracer sites (Pismo Beach, Cameron, and Carpinteria) reflect significant variation in model performance. Given the degree of variation among these “similar” California and Louisiana sites, we are concerned that performance will vary even more greatly in Arctic conditions.

Differences in sea surface temperature, depth of the marine layer, sea surface roughness, and other conditions could produce very different results in an Arctic environment, particularly with respect to the 1-hour NO₂ NAAQS. Based on the results of the performance evaluation presented in the Model Clearinghouse review,¹²⁵ additional tracer experiments off the North Slope are clearly needed. Because this is the first time using this non-guideline modeling approach in the Arctic we believe it is reasonable for Region 10 to require Shell to conduct these needed tracer gas tests before a final permit is issued.

At a minimum, Region 10 must include a permit condition that requires Shell to collect data for use in evaluating the performance of the AERMOD-COARE model. This, at least, would help provide a data set for the future. In fact, the EPA Model Clearinghouse recommended further investigation to “determine if other tracer gas experiments are available to evaluate AERMOD-COARE, especially for Arctic conditions.”¹²⁶

It is unclear whether Shell tuned the COARE model with the available data sets and then used the same tuned model in the performance evaluation. Region 10 must ensure, and make it known to the public, that Shell tested the model with an independent data set. There is very little discussion of performance goals in the modeling evaluation so it is difficult to assess the model performance presented by EPA. In general, the goal must be to select the best performing model that does not under-predict impacts. From a scientific perspective, the use of AERMOD-COARE is far superior to the Offshore Coastal Dispersion (OCD) model, however that does not necessarily mean it is accurate in this particular application. Region 10 must make it clear, from the outset, what the acceptable performance results must be, based on the available data – *e.g.*, is it good enough to get within a factor of two or are the data good enough to demand results within 30 percent. Region 10 must be able to clearly demonstrate that the model is accurately predicting impacts to a reasonable degree and that the model is not under-predicting impacts.

The AERMOD-COARE model does not account for platform building downwash or shoreline fumigation. Since the *Kulluk* is described as a conical drilling platform, EPA must ensure that the model sufficiently simulates cavity effects next to the *Kulluk* drilling platform. Regarding shoreline fumigation, it is not clear whether those conditions were included in any of the tracer data sets. Shoreline fumigation can cause higher short-term concentrations. Given the proximity of the *Kulluk*'s operations to on-shore communities along the Beaufort Sea coast (EPA estimates it is approximately 14 kilometers, or 8 miles, from the closest lease block to Kaktovik),¹²⁷ EPA must include an assessment of potential shoreline fumigation impacts on pollutant concentrations.

¹²⁵ EPA Memo, May 6, 2011, Model Clearinghouse Review of AERMOD-COARE as an Alternative Model for Application in an Arctic Marine Ice Free Environment.

¹²⁶ *Id.* at 12.

¹²⁷ *See*, Stmt. of Basis at 58.

3. NO₂/NO_x Ratios.

The Plume Volume Molar Ratio Method (PVMRM) algorithm used in the ambient analysis to determine the atmospheric conversion of NO_x to NO₂ requires estimates of in-stack ratios of NO₂/NO_x. These in-stack ratios appear to be important parameters in the modeling and, therefore, EPA must ensure the ratios used are protective of the NAAQS since small changes to the ratios used could have a significant impact on modeled concentrations.¹²⁸ This is especially important given the fact that Shell is requesting approval for the least-conservative options for modeling 1-hour NO₂ impacts (*i.e.*, using the non-regulatory-default PRVRM option – a Tier 3 application under Section 5.2.4, App W that requires Regional approval – and pairing NO₂ data in time (*see* comments on *Use of Paired Data*, below)).

The draft permit is based on the use of source-specific test data from the *Discoverer* drillship and associated fleet.¹²⁹ Specifically, Shell “developed average ratios for general types of combustion units and post-combustion control combinations, based on numerous source tests of the existing emission units on the *Discoverer* Drillship and associated fleet.” Region 10 relied on these ratios as “a reasonable approach given the similarity in emission units”.¹³⁰ We do not agree that, for the *Kulluk*, source-specific test data (from a source applying BACT) is sufficiently representative of the range of possible units used as part of the *Kulluk* operations. That is to say, since the *Kulluk* permit does not specify equipment make and model it must use the most conservative generic ratio to represent the worst-case operating scenario. As long as Shell is allowed the flexibility to have a permit based on generic equipment, Shell must use NO₂/NO_x ratios based on the generic value proposed by EPA as “a reasonable upper bound based on the available in-stack data.”¹³¹ The modeling for this permit, therefore, must be based on a NO₂/NO_x ratio of 0.5.

It is unclear how the generic ratio compares to the ratios used in Shell’s modeling for the *Kulluk* that is based on source testing from the *Discoverer* drilling operations. There are no supporting data presented in the air quality impact analysis for the *Kulluk* or included in the administrative record files that specify the ratios used in the *Kulluk* modeling. However, a look at the source test data provided as part of the revised *Discoverer* permits (and included in the administrative record files for the *Kulluk*) shows that the equipment-specific ratios are consistently significantly lower than the generic value of 0.5.¹³²

Given the significance of this parameter in the modeling, it is essential that EPA ensure the most protective values are used. EPA should use the generic ratio value of 0.5 for the PVMRM modeling algorithm.

¹²⁸ See 4/29/11 Shell modeling submittal for the *Discoverer* (“Alternate_NO2_Modeling_Disco_04_29_2011.pdf”)

¹²⁹ Ambient Air Quality Analysis at 20.

¹³⁰ *Id.*

¹³¹ EPA Memo Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO₂ National Ambient Air Quality Standard (March 1, 2011).

¹³² “Alternate_NO2_Modeling_Disco_04_29_11.pdf”

4. Paired Data.

We strongly support Region 10's decision not to allow a PM_{2.5} modeling analysis that pairs modeled data with monitored data (in time) to determine compliance with the NAAQS. In the past, EPA has said, and we support the position, that pairing data does not ensure protection of the air quality standards. As an example, EPA Region 8 made the following statement regarding this issue:

The EPA's recommended procedure for modeling impacts from increment consuming sources is to acquire emissions data from the most recent 2 consecutive years, in order to characterize the full range of typical emissions patterns, and 5 years of meteorology data, in order to account for variability in weather patterns from year-to-year. As you know, the purpose of the increment modeling is to use these inputs to identify whether an increment violation is likely to occur in the future under realistic emissions and meteorology conditions. In contrast, the use of CEM data paired with corresponding, or same hour, meteorological data would only serve to document whether an increment violation took place over the period of time being modeled, not to realistically assess whether violations are likely under expected emissions and weather conditions over time. For this reason, we have no objection to your use of CEM data to determine a single emissions value that represents actual emissions patterns for each source, but we believe that you should use two consecutive years of CEM data to determine the maximum, or near maximum, emission rate, just as you would if you were using permitted potential emissions. That single emissions value for each source would then be modeled over 5 years of meteorological data to identify expected increment violations under realistic conditions.¹³³

While the context of EPA's position in the above case is for increment modeling, a modeling analysis for permit compliance with the NAAQS is equally relevant. The NAAQS modeling is needed in order to ensure that a violation *will not occur in the future*, not simply to determine that a violation occurred over the period of time modeled. And even in recently allowing limited, case-by-case situations where paired data can be modeled to demonstrate compliance with the 1-hour NO₂ NAAQS, EPA is admitting that this type of analysis results in "a less conservative" estimate of impacts.¹³⁴

While we support EPA's decision to not allow pairing of NO₂ data as Shell originally proposed (*i.e.*, hour-by-hour pairing of modeled concentrations with background concentrations), we do not agree that the diurnal pairing of the 3-year average of the 98th percentile NO₂ concentrations by hour (based on the number of samples) between July 1 and November 30 with corresponding modeled concentrations for that hour is protective enough of the NAAQS. A more protective approach would be to use the 98th percentile of the annual distribution of daily maximum 1-hour average values averaged across the 3-year meteorological data period used in the dispersion modeling. Given the fact that the modeling is not based on source specific data, EPA must make

¹³³ Letter from EPA Region 8 to North Dakota Department of Health (December 10, 2001).

¹³⁴ EPA Memo Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO₂ National Ambient Air Quality Standard (March 1, 2011).

sure that Shell is not under-predicting impacts. The use of diurnal pairing results in a less conservative analysis and, given that the modeling is based on generic source parameters, this approach does not seem warranted.

5. Averaging of Emissions and Duration of Modeling.

In the technical review document for the *Kulluk* permit, Region 10 notes that:

Shell prorated the period averages in order to estimate the annual average impacts. For example, to estimate the annual average NO₂, PM-2.5, or SO₂ impacts, Shell multiplied the 120-day average impact by 0.329 (120 drilling days out of 365 days in a year). Shell's approach for estimating the annual average impact is reasonable since the impact during non-drilling periods will be zero.¹³⁵

Period averages cannot be prorated in this manner. This is particularly true for pollutants such as NO₂ that have rolling 12-month emissions limits. The permit cannot rely on a 12-month period in which to demonstrate compliance with air quality standards and at the same time prorate those very same emissions. Essentially, by allowing the prorating, Region 10 is allowing Shell to average out the impacts of its air emissions twice. Please update the permit analysis so that the impacts for NO₂, PM_{2.5}, and SO₂ are not prorated and then update any relevant permit conditions as necessary to ensure compliance with relevant standards.

6. Background Concentrations.

We appreciate Shell's continued commitment to collecting background data on air quality at different sites in the Arctic. However, we have concerns about that data and how certain datasets were selected for use in the air modeling for the permit.

First, we question Region 10's initial assumption that the use of onshore data is "conservative" because "onshore monitoring stations will be influenced by local sources that are not present in the vicinity of Shell's offshore operations."¹³⁶ The emissions from Shell's operations will be influenced by local sources. These local sources include the associated vessels that are stationed more than 25 miles from the drillship and whose emissions are not even counted toward Shell's potential to emit. Local sources further include the substantial and ever increasing barge and shipping traffic in the Arctic OCS as well as scientific research vessels and accompanying ice breakers and other vessels. The presence of these local sources of emissions offshore undermines expectations that onshore data is automatically conservative. This is important for this permit because the most conservative background data was not necessarily used for the modeling.

Second, there is significant confusion in the permit record regarding the datasets used for different background concentrations. Most notably, the record is unclear about the datasets used to establish background concentrations of NO₂. In the air quality impact analysis for the draft permit EPA proposes using NO₂ data from the Prudhoe Bay A-Pad monitoring site as

¹³⁵ EPA, Air Quality Analysis at 10.

¹³⁶ EPA, Technical Support Document Review of Shell's Ambient Air Quality Impact Analysis for the *Kulluk* OCS Permit Application at 29 (July 18, 2011).

representative of background concentrations for both the 1-hour and annual NAAQS.¹³⁷ However, EPA’s June 23, 2011 determination of background concentrations for the Beaufort Sea concludes that the Prudhoe Bay CCP monitoring site is better: “Since some of the lease blocks for the Kulluk permit are very near to the Prudhoe Bay area it was deemed appropriate to utilize the Deadhorse PM_{2.5} data set for determining a background value and *CCP for NO₂* and SO₂.”¹³⁸ There is no further discussion in the air quality impact analysis or in EPA’s June 23, 2011 memo about the NO₂ dataset from the Prudhoe Bay CCP monitoring site. EPA must use the CCP data if they represent a more conservative background dataset for the 1-hour average and annual average NO₂ NAAQS demonstration. In fact, annual average NO₂ concentrations from the CCP site are one and a half times higher than those monitored at the A-Pad location so it is likely that the hourly average concentrations are also higher.¹³⁹ EPA must use the dataset with the highest monitored 1-hour average and annual average NO₂ concentrations, particularly for the 1-hour average NAAQS if the modeling will be based on an analysis of data paired in time.

Third, we are also concerned about the use of entirely different background concentrations for the Shell Beaufort *Discoverer* and Shell *Kulluk* air permits.¹⁴⁰ Aside from specific points highlighted below, we generally support the use of the datasets used in the *Kulluk* permit as compared to the datasets used for the *Discoverer* permit as they are more conservative.

Table 8: Information from “EPA Region 10 Determination of Appropriate Background Values for the Chukchi and Beaufort Sea OCS Permits” (June 23, 2011)

	Shell <i>Kulluk</i> ¹⁴¹	Shell <i>Discoverer</i> Beaufort	ConocoPhillips Jackup Rig	Shell <i>Discoverer</i> Chukchi
PM _{2.5} 24hr	Deadhorse	Badami	Wainwright permanent	Wainwright permanent
PM _{2.5} annual	Deadhorse	Badami	Wainwright permanent	Wainwright permanent
PM ₁₀ 24 hr	Prudhoe Bay CCP	Prudhoe Bay CCP (Same as <i>Kulluk</i>)	Wainwright permanent	Wainwright permanent
NO ₂ 1 hr	Prudhoe Bay A Pad	Badami	Wainwright temporary	Wainwright temporary
NO ₂ annual	Prudhoe Bay CCP (text) Badami (chart)	Badami	Wainwright temporary	Wainwright temporary
SO ₂	Prudhoe Bay CCP	SDI	Wainwright	Wainwright

¹³⁷ EPA, Air Quality Impact Analysis at 30, Table 9

¹³⁸ EPA Memo, “EPA Region 10 Determination of Appropriate Background Values for the Chukchi Sea and Beaufort Sea OCS Permits” (June 23, 2011) at 5 (*emphasis added*).

¹³⁹ EPA Memo, “EPA Region 10 Determination of Appropriate Background Values for the Chukchi Sea and Beaufort Sea OCS Permits” (June 23, 2011), Table 6.

¹⁴⁰ In contrast, EPA used the same background data for both exploration programs proposed in the Chukchi, as demonstrated by Table 8.

¹⁴¹ The technical review of Shell’s application provides still different information. It states that the NO₂ data is from Prudhoe Bay A Pad, the PM_{2.5} data is from Deadhorse, and the PM₁₀ data is from Prudhoe Bay CCP, SO₂ data is from SDI, and CO is also from SDI. EPA, Technical Support Document Review of Shell’s Ambient Air Quality Impact Analysis for the *Kulluk* OCS Permit Application at 29 (July 18, 2011).

	Shell <i>Kulluk</i> ¹⁴¹	Shell Discoverer Beaufort	ConocoPhillips Jackup Rig	Shell Discoverer Chukchi
			temporary	temporary
CO	SDI	SDI (Same as <i>Kulluk</i>)	Wainwright temporary	Wainwright temporary
O ₃	No information	No information	No information	No information

To highlight the differences in the background concentrations that Shell used for the *Kulluk* and *Discoverer* applications, below are the numbers used in the maximum impact charts in the agency’s two statements of basis:

Table 9: Comparison of Background Concentrations from Maximum Modeled Impact Charts from the *Kulluk* and *Discoverer* Statement of Bases¹⁴²

Air Pollutant	Shell <i>Kulluk</i>	Shell <i>Discoverer</i> Beaufort
NO ₂ 1 hour	41	9
NO ₂ annual	11	1
PM _{2.5} 24-hour	17	6
PM _{2.5} annual	4	3
PM ₁₀ 24-hour	53	53
SO ₂ 1-hour	29	13
SO ₂ 3-hour	29	11
SO ₂ 24-hour	22	4
SO ₂ annual	4	2
CO 1-hour	1,742	1,742
CO 8-hour	1,094	1,094

Region 10’s justification for the use of different data is unconvincing. Region 10 states that “some of the lease blocks for the *Kulluk* permit are very near to the Prudhoe Bay area” making it “appropriate to utilize the Deadhorse PM_{2.5} data set.”¹⁴³ However, the lease blocks that were “removed from [the *Kulluk*’s] application” are those that are closest to Prudhoe Bay, while some of those same lease blocks (lease blocks 6562, 6512, 6510) are still included the draft *Discoverer* Beaufort permit.¹⁴⁴ Therefore, Region 10 should have used the Prudhoe Bay data for *both* the *Kulluk* and the *Discoverer* Beaufort permits.

Finally, we strongly support the use of the highest dataset to represent background concentrations. We take this position because the modeling must be based on a worst-case scenario in order to allow for the flexibility in the sources used by Shell; and also, because the background concentrations must represent secondary pollutant formation as well as the many other offshore background sources that are not modeled. These background offshore sources include significant shipping traffic in the area and the associated fleet when it is beyond 25 miles

¹⁴² EPA, Stmt. of Basis at 33; EPA, Revised Stmt of Basis for *Discoverer* at 57.

¹⁴³ EPA, Region 10 Determination of Appropriate Background Values for the Chukchi and Beaufort Sea OCS Permits at 5 (June 23, 2011).

¹⁴⁴ Compare Shell, *Kulluk* Application (2001-06-29), Appendix A at 2, with Undated.e_Lease Map from the *Discoverer* file. See also Draft *Discoverer* Beaufort permit at 1 (listing lease blocks).

from the drillship. These unaccounted for background concentrations also include the emissions associated with the *Kulluk*, the icebreakers/anchor handlers, and all of the other associated fleet emissions that occur before the *Kulluk* is determined to be an OCS source. Therefore, EPA must use the highest values as representative of background concentrations and must not exclude certain days in a monitoring record that may be due to onshore sources (e.g., emissions events due to wind-blown dust, fire, etc.). EPA is using PM_{2.5} data from Deadhorse “to better account for the potential impacts from existing onshore sources.”¹⁴⁵ But, EPA discounts days with high recorded concentrations due to these events such as wind-blown dust and fire. If these high value concentrations are discounted, EPA must otherwise include the impacts from the additional offshore sources that are not included in the background concentrations monitored onshore (e.g., by modeling these emissions).

7. Ice Breaking.

We have two primary concerns with the assumptions for icebreaker use and modeling. First, Shell has assumed it will break ice for 38 % of the time for the *Kulluk*, which is the same assumption it made for the *Discoverer*. Please explain why icebreaking will occur for the same amount of time in both the *Kulluk* and *Discoverer* air permits, when the drilling vessels are different¹⁴⁶ and conditions in the two oceans are different.

Second, Shell has assumed the following with regard to the icebreakers in the analysis submitted in its permit application:

For emission estimation purposes the ice management fleet is assumed to be operating at maximum (nameplate rates) rate for 38 percent of the 120-day OCS period. For modeling purposes, the ice management vessels are assumed to be operating at maximum emission rate whenever the meteorology indicates that ice is present and assumed to be beyond the 25-mile radius when the data indicates open water.¹⁴⁷

There is no mention of icebreaker activity assumptions in the Statement of Basis or Air Quality Impact Analysis. In fact, it is not clear how much of the time (*i.e.*, what the exact percentage of time is) that the icebreaker was actually assumed to be operating in the modeling analysis and how that compares to the 38% figure used for estimating emissions. EPA must make it clear that the modeled activity reflects the worst-case operating scenario.

We continue to be concerned that ice management activities may be underestimated in Shell’s analyses for its OCS permits. Heavier ice conditions result in heavier engine load factors and higher emissions. The application materials state that icebreaker estimates are based on 2003-2005 data.¹⁴⁸ The reference for this statement is a (2009) conversation between the air quality consultant preparing PSD permit application materials for Shell (Air Sciences Inc) and the “Arctic Wells Advisor” for Shell International Exploration and Production, Inc. Based on these

¹⁴⁵ EPA, Air Quality Impact Analysis at 32.

¹⁴⁶ See 2010-10-13d_EPA meeting notes Re: Shell Ap Meeting at 3 (discussing the *Kulluk*).

¹⁴⁷ Shell June 29, 2011 permit submittal at 21.

¹⁴⁸ *Id.*

data and this reference, it was assumed that there would be a 38% frequency of ice within 30 miles of the drillship. However, in its revised application to the US Coast Guard for safety zone designation, Shell characterized the ice conditions more recently than 2003-2005 as follows:

Ice conditions during 2006 were such that the areas of drilling interest were ice covered the majority of the period between July and October. If ice conditions are similar during 2007, then each drill rig will be constantly ice managed within its anchor array.¹⁴⁹

In fact, Shell's permit application for the *Kulluk* admits that, "[t]he frequency and intensity of ice conditions is unpredictable and could range from no ice to ice sufficiently dense that the ice management vessels have insufficient capacity to push it out of the way".¹⁵⁰ Shell's statements indicate that the 38% frequency-of-ice factor grossly underestimates emissions from the icebreaker activity.

EPA must base its emissions estimates and modeling analysis on an unbiased source of data – something other than the applicant's estimate of ice conditions. If the operator's estimate is based on a scientific analysis of ice flow data from 2003-2005 then that analysis should be made available for review and more recent data should be incorporated into the analysis if possible. Alternatively, the icebreaker emissions could be estimated and modeled to account for the maximum potential operation scenario; any operation percentage less than the worst possible case would need to be specified as an enforceable permit conditions (*e.g.*, the permit could include an enforceable provision limiting the icebreaker operations to more than 38% of the time).

8. Cumulative Impacts.

We have significant concerns that the air quality analysis relied upon by Region 10 does not account for the potentially significant contribution of pollutants from vessels/mobile sources that will operate in the same vicinity as the OCS Source and Associated Fleet. In particular, it appears that the air quality analysis relied upon by Region 10 in no way accounts for emissions from the *Kulluk*, the Icebreakers/Anchor Handlers, or the any of the other Associated Fleet before the *Kulluk* is determined to be an OCS Source.

First, it is clear that emissions from mobile sources connected with the drilling operation are not represented in the existing background air quality data. Given that no drilling operations have been conducted in the last several years, the background data was clearly collected at times when those mobile sources were not operating.

Second, it appears that the modeling conducted by Shell and Region 10 also fails to account for the emissions from nearby mobile sources. Our understanding of the modeling work is that

¹⁴⁹ Letter from Susan Childs, Regulatory Affairs Coordinator – Alaska, Shell Offshore Inc. to United States Coast Guard, District 17, regarding the establishment of safety zones for the Frontier *Discoverer* drill ship and the semi-submersible drill unit *Kulluk* in the Beaufort Sea, Alaska, 2 (May 30, 2007).

¹⁵⁰ Shell June 29, 2011 permit submittal at 20-21.

modeled emissions are only from the OCS Source and Associated Fleet and no other mobile sources are included.

We are therefore concerned that the modeling relied upon by Region 10 fails to account for a potentially significant source of pollution, which may result in inaccurate predictions of impacts to air quality. We ask that EPA clarify whether and how the air quality analysis incorporates the potential emissions from mobile sources related to the drilling program that are not captured in the PTE calculations for the OCS Source and Associated Fleet. We are concerned both with respect to the impacts on short-term standards, including the 1-hour NO_x, but also the annual air quality standards.

9. Ozone.

Additional information is required for this permit regarding Ozone. As EPA has described, ground-level ozone is:

created by chemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Emissions from industrial facilities and electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of NO_x and VOC. Breathing ozone, a primary component of smog, can trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma. Ground-level ozone also can reduce lung function and inflame the linings of the lungs. Repeated exposure may permanently scar lung tissue.¹⁵¹

Shell is proposing to emit 240 tons per year of NO_x and 40 tons per year of VOCs.¹⁵² Other OCS sources permitted this year, and possibly in coming years, will add to these numbers. And, nearby “point sources in the North Slope oil and gas fields near Deadhorse contribute approximately 65,000 tpy of NO_x and 1,100 tpy of VOC.”¹⁵³ Given this level of activity and predicted emissions of Ozone constituents EPA should be assessing the cumulative impacts of permitted activities together with documented background concentrations; Shell’s decision to not model ozone is not justified.¹⁵⁴

Research conducted on air quality in Nuiqsut (in light of the pollution generated by Alpine Oil Field and Prudhoe Bay) showed elevated Ozone levels in the winter months.¹⁵⁵ Additionally, as Region 10 previously recognized:

Over the past ten years, there have been monitoring programs that measured ozone and ozone precursors (i.e., NO_x and VOC) in the North Slope where oil and gas operations are currently located. The ozone measurement programs

¹⁵¹ EPA, Basic Information on Ozone.

¹⁵² EPA, Air Quality Impact Analysis at 34.

¹⁵³ *Id.* at 34.

¹⁵⁴ *Id.* at 6 (“Shell did not provide a modeling analysis for the Pb and ozone NAAQS.”).

¹⁵⁵ Fish, C. Air Quality Work in Alaska Native Villages (Attachment 2).

include Barrow (2003 - 2005), BPX-Badami (1999), BPX-Prudhoe Bay (2006 - 2007), CPAI-Alpine (Nov 2004 - Dec 2005) and CPAI-Kuparuk River (Jun 2001 - June 2002). Measurements from these six sites indicate that the highest 1-hour concentration was 73 parts per billion (ppb) while the highest 8-hour measurement was 50 ppb.¹⁵⁶

Acknowledging the previous data on background levels of ozone, it is unreasonable for Region 10 to conclude that no further evaluation is needed for the ozone standard.

This issue is particularly salient in light of EPA's decision to revise the 8-hour standard.¹⁵⁷ The agency expects to adopt a new primary 8-hour standard of between 0.060-0.070 parts per million (ppm) shortly.¹⁵⁸ The existing 8-hour standard is 0.075 ppm.

We ask Region 10 to ensure compliance with the new 8-hour standard for Ozone for several reasons. First, as just discussed, current background concentrations of Ozone are already as high as 0.050 ppm (8-hour average) on the North Slope.¹⁵⁹ Therefore, the formation of additional Ozone as a result of offshore oil and gas operations could take the North Slope out of attainment.

Second, the new 8-hour standard is an important health based standard and this standard should be the one that Shell seeks to comply with in its proposed years of operations in the Beaufort and Chukchi Seas. Indeed, the lengthy duration of the OCS air permits being issued, five years, further supports the need for compliance with the most recent legal requirements. Additionally, both BOEMRE and Shell rely upon the NAAQS to mitigate the impacts of the air emissions associated with Shell's exploration plans on air quality, marine mammals, and other resources.¹⁶⁰ Therefore, it is particularly critical that compliance with these emerging standards is ensured.

10. Secondary formation of PM_{2.5}.

EPA's consideration of the secondary formation of PM_{2.5} is inadequate. EPA presents a qualitative discussion of secondary PM_{2.5} impacts in the air quality analysis for the draft permit.¹⁶¹ EPA determined that a quantitative photochemical modeling analysis was not needed to assess secondary PM_{2.5} impacts. However, in making this decision EPA relied heavily on the fact that the monitored background concentrations used in the impact analysis include the impacts of secondary PM_{2.5} from onshore sources.¹⁶²

EPA's approach does not provide any margin of safety in the PM_{2.5} NAAQS compliance demonstration, with total concentrations at 97 % of the NAAQS.¹⁶³ Without a quantitative assessment of secondary PM_{2.5} impacts, EPA cannot be sure to what degree secondary PM_{2.5} formation will contribute to PM_{2.5} concentrations. The draft permit allows for only an additional

¹⁵⁶ EPA, Stmt. of Basis for Shell's Original *Discoverer* Permit in the Beaufort Sea at 126.

¹⁵⁷ 75 Fed. Reg. 2938 (Jan. 19, 2010).

¹⁵⁸ See, <http://www.epa.gov/glo/actions.html> and <http://www.epa.gov/air/ozonepollution/pdfs/20100106present.pdf>.

¹⁵⁹ EPA, Stmt. of Basis for Shell's Original *Discoverer* Permit in the Beaufort Sea at 126.

¹⁶⁰ See, e.g., Shell, EIA for Camden Bay Exploration Plan at 4-12, 4-55.

¹⁶¹ EPA, Air Quality Impact Analysis at 20-22.

¹⁶² EPA, Ambient Air Quality Analysis at 20.

¹⁶³ EPA, Ambient Air Quality Analysis at 33, Table 11.

1 $\mu\text{g}/\text{m}^3$ (an additional 3%) before the impacts of the *Kulluk* operations would be at the level of the NAAQS.

Based on these facts, a cursory, qualitative secondary $\text{PM}_{2.5}$ analysis is not sufficient to assure protection of the NAAQS. If a quantitative assessment of secondary $\text{PM}_{2.5}$ impacts is not completed then EPA must, at the very least, provide for NAAQS compliance with a greater margin of safety that better reflects the uncertainty in secondary $\text{PM}_{2.5}$ contributions to overall $\text{PM}_{2.5}$ concentrations. This margin of safety would need to be sufficient to ensure that potential secondary $\text{PM}_{2.5}$ impacts would not cause or contribute to NAAQS violations.

11. Onshore Projections and Background Concentrations.

A Quality Assurance Project Plan (QAPP) was approved for the monitoring station in Kaktovik in May-June of 2011.¹⁶⁴ Nowhere is this new data set mentioned. We request a comparison between the datasets from the Badami and Endicott monitors and the data from the Kaktovik monitor to determine whether the Badami and Endicott data sets appear to be accurate for representing for the background concentrations of air pollutants in Kaktovik. Similarly, please provide a similar comparison of the recent air quality monitoring data collected from Nuiqust.

J. Environmental Justice Analysis.

Although we appreciate that the EPA has conducted an analysis of compliance with the new 1-hour NO_2 NAAQS, which present a significant concern for North Slope communities, we are still concerned that the revised Environmental Justice analysis omits consideration of important factors that may present a risk to human health, and, therefore a disproportionate risk to environmental justice communities on the North Slope. We are also concerned that the community participation process was lacking in this instance, because our communities were not given adequate opportunity to enlist technical support and provide relevant comments on the proposed permit and in particular, on the critical issue of the appropriate model to be used in assessing impacts to air quality.

With respect to the air impacts of the proposed operations, it appears that Region 10 has once again relied on a demonstration of compliance with the NAAQS in order to assess whether any adverse impacts would result for North Slope communities. As the EAB held in the recent appeal of the *Discoverer* permit:

While that analysis may, in part, rely on demonstrated compliance with applicable statutes and regulations, including compliance with the NAAQS standards in effect at the time of permit issuance that are indicative of adequate protection of public health, the permit issuer must endeavor to include and analyze in its environmental justice analysis available data that is germane to the environmental justice issue raised during the comment period.¹⁶⁵

¹⁶⁴ 2001-05-01c_Kaktovik QAPP (May 2011).

¹⁶⁵ *In re Shell*, Slip Op. at *79-80 n 87.

On the issue of potential impacts to the health of the North Slope residents, we again reiterate that the existing modeling of NAAQS compliance appears to exclude any potential impacts from mobile source emissions that occur before the *Kulluk* is deemed to be an OCS Source and/or take place more than 25 miles from the OCS Source. Those include, without limitation, emissions from the anchor handler towing the *Kulluk* to the drill site, the emissions of the anchor handler while setting the 12 anchors for the *Kulluk* and the emissions from fleet of support vessels, including icebreakers, before the *Kulluk* drops its ship anchor. Although these are not deemed to be emissions from the OCS Source, for purposes of assessing potential adverse impacts to the health of the Inupiat and all residents, Region 10 must provide a rational basis for whether and how the OCS Source and the Associated Fleet emissions have been analyzed in combination with the mobile source emissions in assessing potential adverse health impacts to local communities, both onshore and in offshore areas used for subsistence purposes. At this point, we are concerned that the NAAQS analysis, in and of itself, does not account for the potential combined impacts of the stationary and mobile source emissions, which could be relevant considerations in assessing potential health impacts from short-term and long-term exposure to NO₂ as well as exposure to Ozone, PM_{2.5}, and PM₁₀, among other pollutants.

We are also concerned that Region 10 appears to have again ignored a newly revised NAAQS in conducting its environmental justice analysis – this time the 8-hour standard for Ozone. EPA revised the 8-hour Ozone standard because the prior standard does not adequately protect human health. The agency is aware of existing data suggesting that existing levels of Ozone on the North Slope are as high as 0.050 ppm (8-hour average), and the *Kulluk*'s operations will add to significant existing and planned sources of VOCs. As set forth by the EAB, Region 10 must not only consider compliance with the existing NAAQS, but must also include and analyze other data that is germane to the issue of potential disproportionate adverse health impacts. The Statement of Basis as well as the supporting documents relating to the environmental justice analysis, to this point, have not accounted for additional, relevant information related to health threats posed by the potential formation of ozone.

We note in this regard that EPA Region 10 has failed to provide for **any** analysis of the impacts of Ozone in analyzing environmental justice concerns in the Statement of Basis. In the Environmental Justice Analysis, Region 10 ignores entirely Ozone as pollutant of concern despite documentation that Ozone levels on the North Slope are elevated in regions impacted by existing oil and gas development.¹⁶⁶ Despite the absence of any analysis of Ozone in the environmental justice analysis, EPA concludes, without support, that the activities “will not cause or contribute to air quality levels in excess of health-based standards for . . . Ozone . . .”¹⁶⁷

The passing reference to ozone is arbitrary and inadequate for a number of reasons. First, EPA does not provide any clarification as to whether it considered the new 8-hour Ozone standard.

Second, the statement in the environmental justice analysis appears to mischaracterize the findings of the air quality analysis. In that document, without conducting any modeling, EPA could conclude only that “it is unlikely that this small increase in ozone precursor emissions

¹⁶⁶ Environmental Justice Analysis for proposed Outer Continental Shelf Permit No. R10OCS030000 *Kulluk* Drilling Unit.

¹⁶⁷ *Id.* at 15.

would cause or contribute to a violations of the ozone NAAQS.”¹⁶⁸ Given the lack of quantified data and modeling, EPA was unable to rule out possible violations of NAAQS, stating only that they would be unlikely. At the same time, however, EPA appears to concede that violations of the NAAQS could be possible – even if they are unlikely – because EPA has not conducted quantified modeling. Here too, EPA has not considered the 8-hours standard.

Third, given the fact that Ozone is a regional pollutant, EPA cannot justify its decision to ignore the combined cumulative impacts of all of the proposed drilling operations in the Beaufort and Chukchi Seas. Without looking at the combined emissions of Ozone precursors from the *Discoverer*, the *Kulluk*, ConocoPhillips’ jack-up rig, mobile sources, and onshore sources, EPA can only speculate as to whether the *Kulluk* will contribute to possible violations of the NAAQS in communities like Nuiqsut or at subsistence use areas like Cross Island. This is reflected in EPA’s conclusion that violations of the existing NAAQS were “unlikely” without any statement with respect to the new 8-hour standard and without any more definitive statement on the probability of a possible NAAQS violation.

Finally, we reiterate that the extremely limited public comment period presents serious environmental justice issues for North Slope communities. The EPA has specifically requested input into the new air quality model used for the first time in these permit proceedings. The modeling took years to prepare. Evaluation of that modeling requires an extremely high level of technical expertise, which is both time consuming and resource intensive. The agency’s decision to provide limited, overlapping comment periods for recognized environmental justice communities to review, analyze and then provide comment on a brand new, technical modeling exercise simply forecloses our communities from their ability to adequately participate in the process. As a result, we are unable to submit comments on key aspects of the environmental justice analysis, namely whether the predicted impacts to air quality, and therefore the health of our people, are accurate and defensible.

At minimum, EPA should provide adequate time to obtain an independent technical review of the chosen modeling methodologies, and, ideally, EPA would have publicized this important issue many months before the public comment period to allow for fully informed and equitable participation from our communities.

CONCLUSION

Thank you for the opportunity to submit these comments. In light of the concerns raised in this letter we reiterate our request that Region 10 issue a major source air permit for these operations to protect our air quality.

¹⁶⁸ Ambient Air Quality Impact Analysis at 34.