

**ALASKA WILDERNESS LEAGUE—AUDUBON ALASKA**  
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**EARTHJUSTICE—EYAK PRESERVATION COUNCIL—GREENPEACE**  
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**NORTHERN ALASKA ENVIRONMENTAL CENTER—OCEAN CONSERVANCY**  
**OCEANA—PACIFIC ENVIRONMENT—REDOIL—SIERRA CLUB**  
**THE WILDERNESS SOCIETY—WORLD WILDLIFE FUND**

September 6, 2011

**VIA EMAIL**

Shell Kulluk Air Permit  
 EPA Region 10  
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 Seattle, WA 98101  
 Email: r10ocsairpermits@epa.gov

**Re: Draft Air Permit No. R10OCS030000 for Shell's Proposed *Kulluk* Drilling Operations in the Beaufort Sea, Alaska**

Alaska Wilderness League, Audubon Alaska, Center for Biological Diversity, Defenders of Wildlife, Earthjustice, Eyak Preservation Council, Greenpeace, National Wildlife Federation, Natural Resources Defense Council, Northern Alaska Environmental Center, Ocean Conservancy, Oceana, Pacific Environment, REDOIL, Sierra Club, The Wilderness Society, and World Wildlife Fund hereby submit the following comments on U.S. EPA Region 10's draft Clean Air Act Outer Continental Shelf ("OCS") Permit to Construct and Title V Air Quality Operating Permit for Shell Offshore Inc. ("Shell"), authorizing air emissions from Shell's *Kulluk* conical drilling unit (or "drillship") and associated vessels for proposed oil and gas exploration drilling operations in the Beaufort Sea.

Shell proposes to undertake large-scale and long-term industrial operations involving many ships that will emit large amounts of pollution into the environment and create significant amounts of noise that is harmful to Arctic species. Shell's operations would affect a large region of the Beaufort Sea that contains important habitat for endangered species and that serves as subsistence hunting grounds for Alaska Native communities. Further, Shell's *Kulluk* permit application is just the beginning of what could become a massive influx of oil company development in the Arctic. Indeed, Region 10 also has received Clean Air Act permit applications from Shell for exploratory drilling operations in the Beaufort Sea and Chukchi Sea using the *Discoverer* drill rig and from ConocoPhillips ("Conoco") for exploratory drilling operations in the Chukchi Sea using a jack-up rig. Thus, it is essential that Region 10 exercise extreme diligence and caution; the agency's actions here will have consequences beyond the *Kulluk's* potential operations and will establish precedents that affect the Arctic's people and environment.

As an initial matter, Region 10 must account for the substantial lack of data concerning the Arctic environment. In June 2011, the Secretary of the Interior released a major report from the U.S. Geological Survey on the gaps in the scientific understanding of the United States' Arctic. See U.S. Geological Survey, *An evaluation of the science needs to inform decisions on Outer Continental Shelf energy development in the Chukchi and Beaufort Seas, Alaska* (Leslie Holland-Bartels and Brenda Pierce eds., 2011). The report concludes that there are large information gaps about the Arctic Ocean, and these gaps are a “major constraint[] to a defensible science framework for critical Arctic decision making.” *Id.* at 151. Region 10 must acknowledge these shortcomings in the scientific understanding of the Arctic and move forward cautiously, ensuring that any air permits it issues are designed to provide maximum protection for human health and the environment.

Further, this draft permit represents a significant step backward—rather than following the precedent set by classifying the *Frontier Discoverer* as a major source, subject to the Prevention of Significant Deterioration (“PSD”) program, Region 10 has reverted to the tack it took in 2006 by determining that less stringent protections are necessary because the *Kulluk* is a minor source. We encourage Region 10 to insist on strict compliance with the law and robust protection for the relatively pristine Arctic air.

In issuing the draft *Kulluk* permit, Region 10 has ignored established law and EPA policy. If issued as currently drafted, this permit would establish precedents that impair protection of the Arctic's people and environment as oil and gas activity intensifies. Region 10 must retract the draft permit and address the problems identified below.

**I. The Kulluk must be permitted as a major source because the owner-requested limits on Shell's potential to emit are unenforceable and unlawful.**

The Clean Air Act requires new sources to comply with PSD program requirements, including installation of “best available control technology” (“BACT”), if those sources are “major.” 42 U.S.C. §§ 7475, 7627. For emission units such as Shell's *Kulluk*, the Clean Air Act states that a new source is major if it has “the potential to emit two hundred and fifty tons per year or more of any air pollutant.” *Id.* § 7479(1). This default 250 ton per year (“tpy”) threshold applies to all of the so-called “criteria” pollutants, including nitrogen oxides (NO<sub>x</sub>), particulate matter (PM), sulfur oxides (SO<sub>x</sub>), and carbon monoxide (CO). For greenhouse gases, including carbon dioxide (CO<sub>2</sub>), EPA has “tailored” special rules defining when a new source is major. For a source that is already major for another pollutant, that source will also be subject to regulation for greenhouse gas emissions if it “will emit or will have the potential to emit 75,000 tpy CO<sub>2</sub>e or more . . . .” 40 C.F.R. § 52.21(b)(49)(iv).<sup>1</sup> Any other new source will be major if it “will emit or have the potential to emit 100,000 tpy CO<sub>2</sub>e . . . .” *Id.* § 52.21(b)(49)(v)(a).

Absent enforceable permit limitations, Shell's yearly potential to emit greatly exceeds the major source thresholds of 250 tpy (criteria pollutants) and 75,000 tpy (greenhouse gases), respectively. For instance, Shell's operations would emit 2,339 tpy of NO<sub>x</sub> and 141,487 tpy of greenhouse

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<sup>1</sup> CO<sub>2</sub>e means “carbon dioxide equivalent.” It is a standardized measurement for the climate change forcing effect of various greenhouse gases. The CO<sub>2</sub>e for a greenhouse gas is the concentration of CO<sub>2</sub> that would cause the same level of radiative forcing.

gases. U.S. EPA Region 10, Statement of Basis for Draft Outer Continental Shelf Permit to Construct and Title V Air Quality Operating Permit No. R10OCS030000, Shell Offshore Inc., Conical Drilling Unit Kulluk, Beaufort Sea Exploration Drilling Program at 24 (Jul. 20, 2011) (“Statement of Basis”). At Shell’s request, Region 10 has proposed permit conditions intended to restrict Shell’s potential to emit to levels below the major source threshold (*i.e.*, intended to make the *Kulluk* a “synthetic minor” source). Under the proposed permit conditions, Region 10 pegs the *Kulluk*’s potential to emit NO<sub>x</sub>—the criteria pollutant for which Shell has the greatest potential to emit—at 240 tpy, which is effectively at the major source limit. As for greenhouse gases, Region 10 has determined that Shell’s operations may emit 80,000 tpy of CO<sub>2</sub>e, which would require regulation, were the *Kulluk* deemed a major source. *Id.* However, Region 10’s determination that Shell’s *Kulluk* operations do not constitute a major source is unlawful because the proposed permit conditions are not practically enforceable and Region 10’s assumptions regarding Shell’s operating scenarios are arbitrary.

**a. The draft permit’s limits on Shell’s emissions are not practically enforceable.**

Region 10’s determination that Shell’s operations do not constitute a major source is unlawful because the permit conditions restricting Shell’s potential to emit pollution are not practically enforceable. A source that otherwise would be classified as major and subject to BACT—because its potential to emit a criteria pollutant exceeds 250 tpy—may reduce its potential to emit by including “physical or operational limitation[s] on the capacity of the source to emit a pollutant . . . .” 40 C.F.R. § 52.21(b)(4). Such limitations must be both federally and practicably enforceable. *Weiler v. Chatham Forest Prods.*, 392 F.3d 532, 535 (2nd Cir. 2004). The “federally enforceable” component ensures that the conditions are actually a part of the permit. *See* Memorandum from John S. Seitz, Director, Office of Air Quality Planning and Standards, Options for Limiting the Potential to Emit of a Stationary Source under Section 112 and Title V of the Clean Air Act, at 2 (Jan. 25, 1995). The related, but distinct, “practically enforceable” component ensures that the limitations written into the permit are sufficiently definite and supported by appropriate compliance records. *Id.* at 5.

Region 10’s limits on Shell’s emissions of criteria pollutants are not practically enforceable because Region 10 does not have adequate monitoring in place to ensure that Shell is complying with the limits. For example, Region 10 states that “[c]ompliance with the CO and NO<sub>x</sub> emission limits is determined by multiplying measured fuel by periodically confirmed emissions factors.” Statement of Basis at 38. The agency has authorized the use of “default emission factors that can be used until unit-specific emission factors are determined through testing . . . .” *Id.* For some emission units, however, the agency will never obtain unit-specific factors because it does not plan to test all units. *Id.* at 44.

This failure to obtain unit-specific data for all units is inconsistent with the agency’s own statement that when, as is the case here, a permittee fails to identify the emission units it will use, it creates an “inherent uncertainty” that necessitates “thorough source testing . . . .” *Id.* at 43. This inherent uncertainty remains unresolved here for some equipment Shell will not test, and the permit’s limitations on CO and NO<sub>x</sub> emissions will be unenforceable as a practical matter, because there will be no way of identifying whether the default emission factors are wrong. *See*

Memorandum from Terrell E. Hunt, Associates Enforcement Counsel, Air Enforcement Division, U.S. EPA Office of Enforcement and Compliance Monitoring, and John S. Seitz, Guidance on Limiting Potential to Emit in New Source Permitting at 5-6 (Jun. 13, 1989) (“Hunt Memo”) (stating that some system of verification of compliance is necessary to track compliance with production or operational limits); *see also* 18 A.A.C. 50.225(b)(5) (a request for an owner requested limit shall include “a description of a verifiable method to attain and maintain the limit, including monitoring and recordkeeping requirements”).

The failure to obtain unit-specific data for all units is particularly problematic because the default emission factors that Region 10 is relying upon are notoriously inaccurate and frequently understate true emissions. For instance, Region 10 has relied upon AP-42—EPA’s primary compilation of emission factor information—to develop the emission factors that supposedly define Shell’s operation’s potential to emit. *See, e.g.*, Statement of Basis at 43. However, EPA has specifically stated that it does not recommend this practice because the use of such factors will result in a significant chance of noncompliance:

Use of these [AP-42] factors as source-specific permit limits and/or as emission regulation compliance determinations is not recommended by EPA. Because emission factors essentially represent an average of a range of emission rates, approximately half of the subject sources will have emission rates greater than the emission factor and the other half will have emission rates less than the factor. As such, a permit limit using an AP-42 emission factor would result in half of the sources being in noncompliance.

U.S. EPA Office of Air Quality Planning and Standards, 1 *Compilation of Air Pollutant Emission Factors* at 2 (Jan. 1995) (emphasis added).

Also, while Region 10 has placed a limit of 80,000 tons per year of CO<sub>2</sub>e in the draft permit, *see* Statement of Basis at 24, this limit is not practically enforceable because Shell’s methane emissions are both uncontrolled and unmonitored. Region 10 has neglected to require monitoring or controls for the *Kulluk*’s emissions of methane. Methane is a powerful greenhouse gas that has a warming potential that is 21 times greater than that of CO<sub>2</sub>. 40 C.F.R. part 98, subpart A. A source’s emissions of methane are included in calculating whether the source is subject to the Clean Air Act’s greenhouse gas controls. When a rig drills into porous, hydrocarbon bearing rock, methane mixes into the drilling muds and is brought to the surface. For Shell’s *Kulluk* operations, some of this methane will be emitted through a vent, and thus, must be counted toward Shell’s potential to emit. Statement of Basis 38-39.

Shell does not have equipment that will limit these methane emissions, and it could exceed the limit on CO<sub>2</sub>e emissions without Region 10 or the public knowing. In particular, Region 10 assumes that the drilling mud system will vent no more than 399 pounds of methane per month (4 tons per month of CO<sub>2</sub>e). Region 10 makes this assumption based on nothing more than assurances from Shell regarding its “past drilling experience,” Statement of Basis at 39, even though Region 10 issued a draft permit for Conoco that estimated 183 tons per month of CO<sub>2</sub>e for methane, or close to 46 times Shell’s estimate. *See* U.S. EPA Region 10, Statement of Basis for Draft Outer Continental Shelf Title V Air Quality Operating Permit No. R10OCS020000, ConocoPhillips Company, Jackup Drill Rig, Chukchi Sea Exploration Drilling Program at 35

(Jul. 22, 2011). Remarkably, despite the obvious risk of relying upon Shell's unsubstantiated appraisal when Conoco's estimate was so much larger, Region 10 determined that there is no need for Shell to control, monitor, or report these emissions. This lack of monitoring or reporting renders the greenhouse gas owner requested limit unenforceable as a practical matter. *See* Hunt Memo at 5-6; *see also* 18 A.A.C. 50.225(b)(5).

Thus, the draft permit limits for criteria pollutant and greenhouse gas emissions are not practically enforceable and are not sufficient to define Shell's operations as a minor source.

**b. Region 10 should require Shell to apply for a major source permit as Shell's "synthetic minor" status is premised on arbitrary assumptions concerning Shell's operations.**

The draft permit places limitations on the operation of Shell's icebreakers and support vessels that are intended to keep Shell's emissions just below the major source threshold. But these limitations, in fact, may not be realistic or feasible. Region 10's reliance upon operational limits for the icebreakers, in particular, is problematic because such restrictions will be difficult to enforce and may limit Shell's ability to respond to unpredictable Arctic conditions. As a result, Region 10 cannot reasonably rely on the proposed operating conditions to justify a minor source permit for Shell's operations.

For example, in order to prevent Shell's operations from being a major source, the draft permit limits Shell to emitting 240 tons per year of NO<sub>x</sub>. This limit prevents Shell from operating its icebreakers for more than about 38 percent of the drilling season, or roughly 46 days. *See* Shell Offshore Inc., Supplement to EPA Outer Continental Shelf (OCS) Operating Permit Application, Shell Beaufort Sea, Alaska Exploratory Drilling Program: Conical Drilling Unit Kulluk at 21 (Feb. 28, 2011) ("Shell, February 28, 2011, App."). However, Shell concedes that the "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." *Id.* at 20-21. Thus, Arctic conditions may demand that much more than 46 days of icebreaking per season are necessary. In particular, Shell may not be able to quickly end its operations, and the few extra days of icebreaker activity necessary to protect the drill rig and ensure safety could force Shell to exceed the major source threshold. In the face of this variability, it is arbitrary for Region 10 to assume that Shell will be able to pack up and leave once their emissions approach the permit limitations.

Thus, in order to ensure that Shell will comply with the terms of its permit and the Clean Air Act, Region 10 should require Shell to apply for a major source permit and apply PSD program requirements as necessary.

**II. The draft permit's 540 meter ambient air boundary is unlawful.**

Region 10's decision to set the ambient air quality boundary at 540 meters from the center of the *Kulluk* is inconsistent with the Clean Air Act and EPA's policy regarding where the ambient air begins. In order to comply with EPA's longstanding policy, Region 10 must set the ambient air boundary at the hull of the *Kulluk*.

The Clean Air Act requires EPA to promulgate standards protecting the quality of the ambient air. 42 U.S.C. § 7409 (2006). EPA has defined “ambient air” as “that portion of the atmosphere, external to buildings, to which the general public has access.” 40 C.F.R. § 50.1(e). According to EPA policy, an “exemption from ambient air is available only for the atmosphere over land owned or controlled by the source and to which public access is precluded by a fence or other physical barriers.” Letter from Douglas M. Costle, EPA Administrator, to The Honorable Jennings Randolph (Dec. 19, 1980) (“Letter Costle to Randolph”). EPA’s interpretation is a longstanding policy: it has been in force for over 30 years.

The 540 meter ambient air boundary for the *Kulluk* is inconsistent with this longstanding policy. Shell does not own or control the area within the 540 meter radius and it cannot effectively prevent public access. Shell’s proposal to implement a public access control program to “locate, identify and intercept the general public” clearly does not constitute the fence or other physical barrier that EPA’s policy requires. *See* Statement of Basis at 40. In fact, Shell actually plans to allow members of the public—such as marine mammal observers and subcontractors, who are not Shell employees—onto and near Shell’s vessels within the 540 meter boundary.

Also, Region 10’s approach to setting the ambient air boundary for the *Kulluk* is inconsistent with its previous determination regarding Shell’s exploratory drilling operations. When Shell applied for air permits for its *Discoverer* operations in 2009, the company’s application materials included an ambient air boundary of 900 meters. *See* Shell, Outer Continental Shelf Pre-Construction Air Permit Application, Frontier Discoverer, Chukchi Sea Exploration Drilling Program at 63 (Feb. 23, 2009). Shell assumed that the ambient air would begin at this distance because it had “submitted a request to the US Coast Guard, for issuance of a safety exclusion and equipment protection zone surrounding the *Discoverer* . . . .” *Id.* Nevertheless, Region 10 rejected Shell’s proffered approach and required the company to model impacts from the hull of the *Discoverer*, outward. *See, e.g.*, U.S. EPA Region 10, Statement of Basis for Proposed Outer Continental Shelf Prevention of Significant Deterioration Permit No. R10OCS/PSD-AK-09-01, Shell Gulf of Mexico Inc., Frontier Discoverer Drillship, Chukchi Sea Exploration Drilling Program at 99 (Jan. 8, 2010). Now, for the *Kulluk* permit, Shell has proposed and Region 10 has accepted an ambient air boundary set at a distance of 540 meters from the center of the drilling unit.

Shell has failed to demonstrate it will not cause a violation of air quality standards if the ambient air boundary is properly set at the *Kulluk*’s hull. Both Region 10 and Shell acknowledge that even greater impacts would almost certainly occur within 500 meters of the drill ship, where Shell has not modeled impacts. In the Statement of Basis, Region 10 states that “modeled impacts generally decrease as the distance from the 500 meter assumed ambient air boundary increases, and on average there is a rapid decrease in concentrations as the distance from the *Kulluk* increases.” U.S. EPA Region 10, Technical Support Document Review of Shell’s Ambient Air Quality Impact Analysis for the *Kulluk* OCS Permit Application Permit No. R10OCS030000 at 36 (Jul. 18, 2011) (“Technical Support Document”). Also, in its permit application, Shell directly states its modeled maximum impacts occurred on or near the 540 meter boundary line, indicating likely greater impacts inside of that boundary. *See* Memorandum from Tim Martin, Air Sciences Inc., to Pauline Ruddy, Shell, Updates to Air Quality Impact

Analysis—Kulluk Drillship at 20 (May 4, 2011) (“Shell, May 4, 2011, App.”). Because Region 10 has arbitrarily approved an inappropriate boundary, Shell did not provide information about compliance with standards at a distance less than 540 meters.

Thus, in order to comply with EPA’s policy defining the extent of ambient air, identify maximum impacts, and properly ensure that Shell will not violate NAAQS, Region 10 must set the ambient air boundary at the *Kulluk*’s hull and require Shell to resubmit its application based on that boundary.

### **III. Region 10’s failure to require Shell to comply with applicable increments is unlawful.**

The draft Title V air quality operating permit for the *Kulluk* is unlawful because it does not include conditions that will assure compliance with all applicable requirements of the Clean Air Act. In particular, the permit is unlawful because Region 10 has failed to assess whether emissions from Shell’s *Kulluk* operations will exceed applicable air increments.

Pursuant to Clean Air Act section 328, Congress mandated that EPA establish “requirements to control air pollution from Outer Continental Shelf sources located offshore” of the Arctic coast “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].” 42 USC § 7627. EPA first finalized its OCS regulations, codified at 40 C.F.R. Part 55, in 1992. *See* 57 Fed. Reg. 40,792 (Sept. 4, 1992). Among the requirements applicable to OCS sources are “operating permit program” requirements set forth in Title V of the Clean Air Act (42 U.S.C. §§7661-7661f) and Part 71 of the implementing regulations (40 C.F.R. Part 71). 40 C.F.R. § 55.13(f) (“40 CFR part 71 shall apply to OCS sources . . . .”); *see also* 57 Fed. Reg. at 40,803 (“When promulgated, EPA will incorporate the requirements of the federal operating permit program (40 CFR part 71) into part 55.”).

The federal operating permit program authorizes EPA to issue permits not only to stationary sources but also to “temporary sources” that are expected to have “emissions from similar operations at multiple temporary locations,” such as Shell’s proposed exploratory drilling using the *Kulluk*. 42 U.S.C. § 7661c(e). According to Clean Air Act section 504(e), *id.*, no operating permit shall be issued to a temporary source “unless it includes conditions that will assure compliance with all the requirements of [the Clean Air Act] at all locations, including, but not limited to, ambient standards and compliance with any applicable increment or visibility requirements . . . .” *Id.* (emphasis added); *see also* 40 C.F.R. §§ 71.2, 71.6(e)(1).

To date, EPA has both identified an offshore “baseline area” to assess increments in the Chukchi and Beaufort seas and identified a “minor source baseline date” (namely, July 31, 2009) for SO<sub>2</sub>,

NO<sub>2</sub>, and PM.<sup>2</sup> See Memorandum from D. Bray, Senior-Policy Advisor, U.S. EPA, to R. Albright, Director, Office of Air, Waste, and Toxics, U.S. EPA at 3 (July 2, 2009); Statement of Basis for Proposed OCS PSD Permit No. R10OCS/PSD-AK-2010-01 (Feb. 17, 2010). Now that the minor source baseline date has passed, the Clean Air Act “places strict limits on aggregate increases in pollution within the baseline area whether the increases come from minor or major sources.” *Great Basin Mine Watch v. EPA*, 401 F.3d 1094, 1096 (9th Cir. 2005). See also *Reno-Sparks Indian Colony v. U.S. E.P.A.*, 336 F.3d 899, 903 (9th Cir. 2003); 75 Fed. Reg. at 64,868 (“After the minor source baseline date, any increase in actual emissions (from both major and minor sources) consumes the PSD increment for that area.”) (emphasis added). Similar to NAAQS, once triggered, increments are limitations on pollution of air from a variety of sources in a given region, establishing “maximum allowable increase[s]” for a given “area.” 42 U.S.C. § 7473. Increments are thus applicable to all sources—both major and minor.

In issuing Shell’s draft permit for the *Kulluk*, however, Region 10 has neglected even to analyze Shell’s compliance with applicable increments, let alone develop permit conditions to ensure compliance with them. See Statement of Basis at 25-26. The draft permit obviously cannot ensure compliance with requirements that the agency did not even analyze and therefore the permit violates section 504(e) of the Act.

In the Statement of Basis, Region 10 attempts to justify its wholesale failure to address compliance with increments by suggesting that they are applicable only where a source “would otherwise be subject to PSD.” Statement of Basis at 25-26. Region 10 bases this conclusion on the observation that the word “applicable” precedes “increment” in Clean Air Act section 504(e). The agency takes this to mean that a Title V permit for a temporary source need only address increments where the permitted source is a major source subject to the PSD program. This interpretation is wrong as a matter of law. As discussed above, once triggered by a major source permit application in an area, increment limits apply to both major and minor sources. Section 504(e) does not create a different rule for temporary sources. Indeed, it states that a Title V permit shall not be issued to a temporary source “unless it includes conditions that will assure compliance with all the requirements” of the Act. 42 U.S.C. § 7661c(e) (emphasis added). The term “applicable” as used in section 504(e) is not a reference to the applicability of general PSD requirements to a particular source. Rather, it refers to whether a major source application has triggered increment requirements for the relevant baseline area within which the temporary

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<sup>2</sup> EPA also finalized increments for PM<sub>2.5</sub> on October 20, 2010. 75 Fed. Reg. 64,864 (Oct. 20, 2010). Section 328 states that “[n]ew OCS sources shall comply with such requirements on the date of promulgation.” 42 U.S.C. § 7627 (emphasis added). As a “new OCS source” yet to commence operation, Shell’s proposed Arctic drilling operations must comply with all NAAQS and PSD program requirements that pre-date commencement of operations, including the new PM<sub>2.5</sub> increments. See 42 U.S.C. §§ 7411(a)(2), 7475(a), 7627(a)(1) and (a)(4)(D). Moreover, with respect to OCS sources, Congress clearly prohibited grandfathering by directing that even “existing OCS sources shall comply on the date 24 months” after promulgation of standards. 42 U.S.C. § 7627(a)(1). Application of the PM<sub>2.5</sub> increment is important for Shell’s permit because Shell’s modeling indicates that Shell’s emissions could increase 24-hour PM<sub>2.5</sub> concentrations by 17 µg/m<sup>3</sup>, Technical Support Document at 33, which substantially exceeds EPA’s newly enacted 24-hour PM<sub>2.5</sub> increment of 9 µg/m<sup>3</sup>, 75 Fed. Reg. at 64,865.



source is expected to operate and thus made such requirements “applicable.”<sup>3</sup> In this case, previous major source applications have triggered the increment requirements in the area, so Region 10 must ensure the permit meets those requirements.

Because Region 10 has failed to analyze whether Shell’s proposed *Kulluk* operations will comply with applicable increments, the permit is unlawful.

**IV. Shell has not demonstrated that its operations will not violate the NAAQS nor has Region 10 proposed permit conditions adequate to prevent such a violation.**

Both the statute and applicable regulations dictate that Region 10 may not issue Shell a Title V operating permit unless it “includes conditions that will assure compliance with all the requirements of [the Clean Air Act] at all authorized locations, including, but not limited to, ambient standards and compliance with any applicable increment or visibility requirements . . . .” 42 U.S.C § 7661c(e); *see also id.* at § 7661c(a); 40 C.F.R. §§ 71.2, 71.6(a)(1), 71.6(e)(1). As described below, Shell has not demonstrated its ability to comply with all applicable requirements. Nor has Region 10—which premised the draft permit conditions on Shell’s modeling assumptions—established adequate permit conditions sufficient to guarantee compliance.

**a. Shell has not demonstrated that it will comply with the new 1-hour NO<sub>2</sub> standard.**

A new, 1-hour national ambient air quality standard (“NAAQS”) for nitrogen dioxide (NO<sub>2</sub>) became effective on April 12, 2010. 75 Fed. Reg. 6,474, 6,474 (Feb. 9, 2010). EPA set the 1-hour NAAQS at a level of 188 µg/m<sup>3</sup> (or 100 parts per billion). *Id.* at 6,475. This standard reflects EPA’s recognition of the substantial body of scientific evidence demonstrating that the previous, annual NO<sub>2</sub> NAAQS alone was insufficient to protect human health. *Id.* at 6,479-81. Short term spikes in NO<sub>2</sub> concentrations are associated with a range of negative human health effects, including breathing problems and even death. *Id.* The new 1-hour NO<sub>2</sub> NAAQS also includes a new “form” for the standard: compliance is “based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations . . . .” *Id.* at 6,474.

Region 10 cannot issue Shell the permits unless Shell demonstrates that it will comply with the 1-hour NO<sub>2</sub> standard. 40 C.F.R. § 52.21(k). Shell has not made this demonstration.

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<sup>3</sup> EPA has previously highlighted the importance of requiring temporary sources to establish compliance with increments, explaining that “[t]emporary sources must comply with [NAAQS, increments, and visibility requirements] because the [state implementation plan] is unlikely to have performed an attainment demonstration on a temporary source.” 57 Fed. Reg. 32,250, 32,276 (July 21, 1992). Indeed, in promulgating its Title V implementing regulations EPA declared unequivocally that “NAAQS and the increment and visibility requirements under part C of title I of the Act are applicable requirements for temporary sources . . . .” *Id.*

**i. Shell has failed to demonstrate it will not cause a violation of NAAQS because it has improperly used data handling conventions that discount impacts.**

Shell has not demonstrated compliance with NAAQS because it unlawfully underestimated its maximum impacts. EPA has issued “data handling conventions for NO<sub>2</sub>” whereby NAAQS compliance is “based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations.” 75 Fed. Reg. at 6,474. Significantly, the new data handling convention is specific to determining “area-wide” compliance with the revised NAAQS. *See, e.g., id.* at 6,482. There is no basis in the Clean Air Act nor the new standard itself for the permitting approach Region 10 has adopted here, namely, allowing a proposed new source to discount its highest projected impacts. Indeed, such an approach ignores both the importance of the absolute value of the NAAQS standard—which must be set at the requisite level to protect human health, *see* 42 U.S.C. § 7409—as well as the Title V program requirement that a proposed permit include sufficient conditions to prevent a NAAQS exceedance. 42 U.S.C §§ 7661c(a), (e); 40 C.F.R. §§ 71.2, 71.6(a)(1), 71.6(e)(1).

**ii. Even if Shell could use the data handling conventions, it still would not have demonstrated compliance with NAAQS because it has misapplied those conventions.**

Even if Shell could use the data handling conventions for NO<sub>2</sub>, it still has not demonstrated compliance with NAAQS because it unlawfully excluded modeled impacts and background data from its analysis.

**1. Shell understated 1-hour NO<sub>2</sub> impacts by excluding modeling results confirming higher impacts.**

Even if Shell could have used the data handling conventions, it still would have understated maximum 1-hour NO<sub>2</sub> impacts by failing to calculate the multiyear average of the 98th percentile of the annual distribution of daily maximum 1-hour values. EPA determined that use of the 98th percentile is appropriate for determining compliance with the 1-hour NO<sub>2</sub> standard because it will help insulate the standard from extreme events, meaning outlier concentrations. 75 Fed. Reg. at 6,492-93. EPA estimated that, when evaluating the measured concentrations for a year’s worth of monitoring data, the 98th percentile would be equivalent to the 7th or 8th highest daily maximum for the 365-day period. *Id.* at 6,492.

In calculating its compliance with the 1-hour NO<sub>2</sub> standard, Shell selected the 8th highest daily maximum, but this is an underestimate of the true 98th percentile associated with its operations. Shell’s drilling season is only 120 days long, and it modeled only that many days. Selecting the 8th highest daily maximum from 120 days corresponds roughly to the 93rd percentile, not the 98th percentile. Having failed to identify the 98th percentile maximum daily 1-hour NO<sub>2</sub> impact associated with the duration of its actual operations, Shell clearly has failed to demonstrate that it will not cause a violation of air quality standards. 42 U.S.C §§ 7661c(a), (e); 40 C.F.R. §§ 71.2, 71.6(a)(1), 71.6(e)(1).

**2. Shell has understated 1-hour NO<sub>2</sub> impacts by using background data in a manner that understates health and environmental risks.**

Shell has not demonstrated compliance with the 1-hour NO<sub>2</sub> NAAQS in accordance with the data handling conventions because Shell has used background ambient air data in a manner that systematically understates the impact of its operations. In its modeling, Shell has neglected to use the highest background pollution levels measured in the vicinity of its proposed operations. Instead, Shell has adjusted background ambient air data by using multiyear averages of the 98th percentile background concentrations for each hour of the day. Thus, Shell has made two downward adjustments: in addition to discounting the highest concentrations caused by its operations, Shell has assumed that such concentrations will not occur at a time when background concentrations are at their highest observed levels. This has the effect of “compounding” the 98th percentile adjustment, thereby even further understating the impacts that may occur as a consequence of Shell’s operations.

Region 10 has not offered any explanation for why Shell’s double-discounting approach is consistent with the data handling conventions. In separate guidance, EPA has indicated that this technique may be appropriate in some circumstances. *See* Memorandum from Tyler Fox to Regional Air Division Directors, Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour NO<sub>2</sub> National Ambient Air Quality Standard at 19-20 (Mar. 1, 2011) (“Fox Memo”). However, it is impossible to square this guidance with the 1-hour NO<sub>2</sub> standard itself. The 1-hour NO<sub>2</sub> NAAQS limit is 188 ug/m<sup>3</sup> (or 100 ppb), and the data handling conventions, to the extent they apply at all here, allow a single adjustment for the 98th percentile.

Shell’s manner of selecting 1-hour NO<sub>2</sub> background data for use in its model disregards the highest possible background levels and underestimates the impact of Shell’s operations. In light of this downward bias, Shell plainly has failed to demonstrate that it will not cause a violation of air quality standards, as required by law. 42 U.S.C §§ 7661c(a), (e); 40 C.F.R. §§ 71.2, 71.6(a)(1), 71.6(e)(1).

**iii. Shell’s use of the PVMRM model adjustment is unlawful.**

Region 10 has specifically requested public comment on Shell’s use of the Plume Volume Molar Ratio Method (“PVMRM”) as a component of its ambient air modeling. *See* Statement of Basis at 48. Shell used AERMOD’s PVMRM option to model its 1-hour NO<sub>2</sub> impacts. Shell, February 28, 2011, App. at 39.

The NO<sub>x</sub> emissions created during combustion (as occurs in Shell’s ship engines and other equipment) are emitted partly as nitric oxide (NO) and partly as NO<sub>2</sub>. Once in the atmosphere, NO interacts with ozone and is ultimately converted to NO<sub>2</sub>. Both NO and NO<sub>2</sub> are harmful to human health and the environment. However, compliance with the final 1-hour NO<sub>2</sub> NAAQS is calculated by measuring NO<sub>2</sub> alone. *See* 75 Fed. Reg. at 6,474. The standard relies upon NO<sub>2</sub> as an indicator for ambient NO<sub>x</sub>, 75 Fed. Reg. at 7,490, mostly as a matter of administrative convenience.

Region 10 must reject Shell's use of PVMRM to demonstrate compliance with the 1-hour NO<sub>2</sub> standard. In predicting ambient air impacts, PVMRM significantly understates the extent to which NO will convert to NO<sub>2</sub> in the presence of ozone. PVMRM fixates on the short-term rates of conversion, even though nearly all NO is eventually converted to NO<sub>2</sub>.

The use of PVMRM also contradicts—and undermines—the underlying assumptions of the NO<sub>2</sub> standard itself. In promulgating the 1-hour NO<sub>2</sub> standard, EPA elected to rely on NO<sub>2</sub>—as opposed to other nitrogen oxides—as the overall indicator for ambient NO<sub>x</sub>. 75 Fed. Reg. at 6,490. Although NO<sub>2</sub> was chosen as the indicator, EPA intended for the 1-hour standard to not only reduce NO<sub>2</sub> levels, but to provide a corresponding reduction in other harmful nitrogen oxides as well. *See id.* PVMRM is necessarily unacceptable because it allows modelers to hide other harmful nitrogen oxides in low NO<sub>2</sub>/NO<sub>x</sub> ratios, resulting in a substantial understatement of total concentrations.

Thus, in order to maintain consistency with EPA's declared purpose of using NO<sub>2</sub> as an indicator to reduce total NO<sub>x</sub>, Region 10 must reject Shell's use of PVMRM.

**iv. Shell has utilized NO<sub>2</sub>/NO<sub>x</sub> ratios that underestimate the expected maximum impacts of its operations.**

Predictions of ambient 1-hour concentrations of NO<sub>2</sub> require data (or assumptions) about the initial, in-stack ratio of NO<sub>2</sub> to NO<sub>x</sub> in the emissions generated by a pollution source. Characterizing a source's emissions with a reliable NO<sub>2</sub>/NO<sub>x</sub> ratio (or ratios) is therefore essential to the modeling of 1-hour NO<sub>2</sub> impacts. An underestimation of the proportion of NO<sub>x</sub> emissions that are NO<sub>2</sub> leads to greatly understated projections of ambient NO<sub>2</sub> concentrations.

In accepting Shell's NO<sub>2</sub>/NO<sub>x</sub> ratios, Region 10 has failed to follow EPA policy. Region 10 states that for these ratios, “[s]ource specific data should be used when available. When source-specific data is not available, EPA recommend the use of 0.50 as a default in-stack ratio for purposes of modeling 1-hour NO<sub>2</sub> impacts.” Technical Support Document at 19 (citation omitted). In issuing the draft *Kulluk* permit, Region 10 claims that “Shell used the preferred approach of obtaining source-specific data, rather than the 0.5 default.” *Id.* at 20. Yet, in the very next sentence Region 10 contradicts itself, stating that the data Shell used are from source tests of the *Discoverer* operation's drill ship and associated fleet.

Region 10 claims that reliance on the ratios obtained from the *Discoverer* tests is a reasonable approach; however, a comparison of the emission units on the *Discoverer* and the *Kulluk* demonstrates that even if Shell potentially could use data from other vessels as source specific data—which it cannot—it would nevertheless be barred from doing so by an absence of similarity. Some of the *Discoverer*'s and *Kulluk*'s emission units are not only of different size and make, but they also have varying emission controls installed—something that Shell found affects NO<sub>2</sub>/NO<sub>x</sub> ratios. Shell, February 28, 2011, App. at 51, D-1—D-3. For instance, the *Discoverer*'s deck cranes have catalytic diesel particulate filters installed, while the *Kulluk*'s cranes have oxidation catalyst installed. *Id.* at D-1, D-3.

Further, Shell failed to demonstrate that its stack tests generated reliable data for the *Discoverer* operations, so, *a fortiori*, Shell cannot claim the data are reliable for use with the *Kulluk* operations. Shell's *Kulluk* and *Discoverer* operations both would be highly complex; they would involve a large number of emission units and many operating scenarios. Further, the NO<sub>2</sub>/NO<sub>x</sub> ratio for each emission unit could vary widely depending on the load at which Shell operates it. Yet, Shell conducted only 90 stack tests to determine the various NO<sub>2</sub>/NO<sub>x</sub> ratios associated with the *Discoverer* operations. See *Discoverer Drillship Impact Evaluation for SO<sub>2</sub> and NO<sub>2</sub> Using AERMOD, Chukchi and Beaufort Seas, Shell Alaska Exploration Drilling Program at E-1—E-2* (Mar. 18, 2011). As Region 10 recognized by requiring Shell to perform additional modeling for the *Discoverer*, these tests were insufficient to reveal the full range of emission ratios that might actually occur during Shell's operations. See *id.* Even Shell admits that its results are not trustworthy, stating that its results contained unexplained high ratios. Shell, February 28, 2011, App. at 51. Further, Shell compounded this problem by averaging the high ratios with the lower ratios, rather than performing more tests to either explain the results or actually gather real source-specific data. Thus, Shell's ratios are not dependable for use with its *Kulluk* operations because they are not even dependable for use with its *Discoverer* operations.

Region 10 and Shell have not provided any basis for concluding that the NO<sub>2</sub>/NO<sub>x</sub> ratios used in Shell's modeling are representative of the ratios that actually may result from Shell's operations. Due to the importance of these ratios to assessing 1-hour NO<sub>2</sub> impacts, Shell cannot say that it has demonstrated compliance with the standard. If Shell refuses to gather source-specific data, Region 10 must direct Shell to use the default in-stack ratio of 0.5.

**v. Region 10 has failed to ensure that Shell's modeling assumptions reflect actual operating conditions.**

Shell's modeling fails to demonstrate compliance with the new 1-hour NO<sub>2</sub> standard because Shell does not establish that its modeling captures all realistic combinations of allowable operations, background levels, and meteorological conditions that may result in maximum impacts. In modeling its effect on 1-hour NO<sub>2</sub> standards, Shell assumes a perfect choreography of closely-timed events and favorable conditions. Such modeling likely is not representative of actual operating conditions. Per the requirements of the Title V program, Region 10 must ensure that Shell has modeled—and the permit accounts for—the ways in which Shell's operations actually could affect air quality.

Shell's modeling lines up events and conditions in an unrealistically precise manner by varying—for every hour of its proposed 2,880 hours of operation—meteorological conditions, background concentrations, and fleet operations. This method of modeling operations, however, is vulnerable to missing maximum impacts as it is difficult to imagine that Shell's projected coincidences of well-timed fluctuations in background pollution levels, weather, and equipment operations will necessarily describe actual potential impacts. For example, Shell has used day to day meteorological conditions from 2009 and 2010 to determine the future positions of its ships hour by hour, rotating its vessels in accordance with wind direction from those prior years. Technical Support Document at 10. Of course, the wind will not behave in the same manner on a daily basis in future years, and by shifting the position of the vessels, Shell could be diluting concentrations in a way that masks even greater impacts. For example, Shell will miss maximum

24-hour PM<sub>2.5</sub> impacts if Shell assumes the ships will be shifting position every hour, when in fact the wind is steady and the vessels operate in one position. Thus, Region 10 should direct Shell to model potential scenarios in which Shell's operations and background conditions combine to maximize impacts.

**b. Shell has failed to demonstrate it will not violate the 24-hour PM<sub>2.5</sub> NAAQS.**

The 24-hour PM<sub>2.5</sub> NAAQS became effective on December 18, 2006. 71 Fed. Reg. 61,144 (Oct. 17, 2006). In the final rule, EPA set the 24-hour NAAQS at 35 µg/m<sup>3</sup>. *Id.* EPA promulgated this standard due to the large body of evidence that fine particulate matter is harmful to human health. *Id.* at 61,153. In particular, EPA found that PM<sub>2.5</sub> exposure causes cardiovascular problems, and can even cause death. *Id.* at 61,153-54. Compliance with the 24-hour PM<sub>2.5</sub> NAAQS is based on the 3-year average of the 98th percentile of 24-hour concentrations.

Region 10 cannot issue Shell the permits unless Shell demonstrates that it will comply with the 24-hour PM<sub>2.5</sub> standard. 40 C.F.R. § 52.21(k). Shell has not made this demonstration.

**i. Shell understated maximum 24-hour PM<sub>2.5</sub> impacts by improperly using data handling conventions to average its impacts.**

Shell has not demonstrated compliance with NAAQS because it unlawfully underestimated its maximum impacts. In issuing the 24-hour PM<sub>2.5</sub> NAAQS, EPA determined that NAAQS compliance would be based on “the 98th percentile of the annual 24-hour concentrations at each population-oriented monitor within an area, averaged over three years . . . .” 71 Fed. Reg. 61,144, 61,164 (Oct. 17, 2006). Significantly, EPA repeatedly indicated that this form was specific to determining area compliance by reviewing data from “population-oriented monitor[s].” *Id.* There is no basis in the Clean Air Act nor the 24-hour PM<sub>2.5</sub> standard itself for the permitting approach Region 10 has adopted here, namely, allowing a proposed new source to discount its highest projected impacts. Indeed, such an approach ignores both the importance of the absolute value of the NAAQS standard—which must be set at the requisite level to protect human health, *see* 42 U.S.C. § 7409—as well as the Title V program requirement that a proposed permit include sufficient conditions to prevent a NAAQS exceedance. 42 U.S.C §§ 7661c(a), (e); 40 C.F.R. §§ 71.2, 71.6(a)(1), 71.6(e)(1). This is important here because Shell's modeling indicates it could cause pollution concentrations to exceed the NAAQS limit of 35 µg/m<sup>3</sup>. Adding Shell's maximum modeled impact of 20.5 µg/m<sup>3</sup> to Shell's background value of 17.0 yields 37.5 µg/m<sup>3</sup>.

**ii. In its 24-hour PM<sub>2.5</sub> analysis, Shell has understated its 98th percentile impact.**

Even if Shell could calculate its 24-hour PM<sub>2.5</sub> impact by finding the 3-year average of its 98th percentile impacts, Shell has not calculated that value correctly. In selecting the background value for its 24-hour PM<sub>2.5</sub> modeling, Shell eliminated days that had “high windblown dust values.” Shell, May 4, 2011, App. at 14. Shell has not offered persuasive reasons for excluding these values which only may be excluded by EPA itself and only pursuant to the requirements of

EPA’s “exceptional events rule,” *see generally* 72 Fed. Reg. 13,560 (Mar. 22, 2007), which EPA has not invoked here. After eliminating these days, Shell then selected the 98th percentile value of the remaining days. *Id.* Region 10’s apparent approval of this method plainly underestimates even the 98th percentile impact. Instead of obtaining representative data and then finding the true 98th percentile, Shell has used unrepresentative data and then used the low quality of these data as an excuse to eliminate measurements until Shell gets the result it wants.

**iii. Region 10’s analysis of potential secondary PM<sub>2.5</sub> formation is insufficient.**

Despite the EAB’s clear direction on the issue, neither Shell nor Region 10 have performed a proper analysis of Shell’s potential contribution to secondary PM<sub>2.5</sub>. Shell cannot demonstrate compliance with NAAQS until it has performed a sufficient secondary PM<sub>2.5</sub> analysis.

In issuing the *Discoverer* permits in 2010 to Shell, Region 10 did not analyze Shell’s potential contribution to secondary PM<sub>2.5</sub> formation. The EAB remanded Region 10’s PM<sub>2.5</sub> analysis in order to ensure the proper accounting of secondary PM<sub>2.5</sub> formation. In particular, the EAB was concerned with Region 10’s failure to follow EPA’s guidance on modeling PM<sub>2.5</sub> impacts. *See In re: Shell Gulf of Mexico Inc. and Shell Offshore Inc.*, OCS Appeal Nos. 10-01 through 10-04, 15 E.A.D. \_\_\_, 17 (Mar. 14, 2011). This guidance states that “if the facility emits significant quantities of PM<sub>2.5</sub> precursors, some assessment of their potential contribution to cumulative impacts as secondary PM<sub>2.5</sub> may be necessary.” *Id.* at 16 (citing Memorandum from Stephen D. Page, Director, Office of Air Quality Planning & Standards, U.S. EPA, to EPA Regional Modeling Contacts, U.S. EPA, *Modeling Procedures for Demonstrating Compliance with PM<sub>2.5</sub> NAAQS* at 9 (Mar. 23, 2010)). Region 10 argued to the EAB that Shell’s operations would not emit significant quantities of precursor pollution; however, the EAB ruled that this was simply a post hoc rationale that could not sustain Region 10’s permitting decision. *Shell Gulf of Mexico*, 15 E.A.D. at 17 (Mar. 14, 2011, Opinion). In remanding the permitting decision to Region 10, the EAB specifically instructed that “the Region should . . . provide an explanation of why modeling secondary PM<sub>2.5</sub> is necessary or not after determining whether PM<sub>2.5</sub> precursors will be emitted in significant quantities.” *Id.* at 2.

For the draft *Kulluk* permit, Region 10 has not performed—or required Shell to perform—the analysis the EAB demanded in its opinion in the *Discoverer* challenge. The EAB specifically directed Region 10 to first determine whether PM<sub>2.5</sub> precursors will be emitted in significant quantities. Region 10 has ignored this order. The Technical Support Document states that “Region 10 has not made a determination of whether PM<sub>2.5</sub> precursor emissions from the project are significant . . . .” Technical Support Document at 21 n.4. Region 10’s refusal to make a finding on the significance of Shell’s precursor emissions is noteworthy given that the Technical Support Document notes that Shell’s emissions will exceed the regulatory “significant emission rate” for the precursor NO<sub>x</sub>. *See id.* at 21 (citing 40 C.F.R. § 52.21(b)(23)(i)). In fact, Shell’s emissions exceed this level by many times. *See* Statement of Basis at 21.

Region 10’s failure to assess whether Shell will emit significant quantities of PM<sub>2.5</sub> precursors is important. Shell’s modeling already indicates it may cause 24-hour PM<sub>2.5</sub> concentrations to reach 97 percent of NAAQS, so a relatively small amount of secondary formation could cause a

violation. Further, if Region 10 does not determine whether those precursor emissions are significant, it certainly cannot accurately estimate the amount of potential secondary PM<sub>2.5</sub> formation, and Region 10 has not tried to do so. Instead, it has based its determination primarily on a rough comparison of Shell's potential emissions to North Slope emissions and the observation that North Slope sources do not currently appear to be contributing to substantial secondary formation in onshore communities. *Id.* at 20-22. Region 10 should not—and indeed, pursuant to the EAB's order, cannot—rely on such generalizations. Region 10 must assess directly whether Shell will emit precursors in a significant quantity.

In analyzing potential secondary PM<sub>2.5</sub> formation, Region 10 should address additional factors. In particular, Region 10 acknowledges that secondary PM<sub>2.5</sub> formation can occur at a different time and place than where the precursors were emitted. Thus, Region 10 must account for the emission of precursors from Shell's operation before it has technically become an OCS source and after it has stopped being one, since these non-OCS source emissions could react with OCS source emissions.

**c. Region 10 cannot issue Shell the permits because Shell has collected far fewer meteorological data than required by EPA's regulations.**

Region 10 may not issue Shell permits because Shell has not met minimum regulatory requirements for the amount of site-specific meteorological data Shell must obtain to support a modeling demonstration that Shell's operations will not violate air standards. Shell must obtain a minimum of one year of site-specific data, or five years of National Weather Service data. 40 C.F.R. Part 51, App. W § 8.3.1.2(b). According to EPA's guidelines, site-specific data are data collected on-site. *See* EPA, Ambient Monitoring Guidelines for Prevention of Significant Deterioration at 48 (May 1987) ("Site-specific data are always preferable to data collected off-site.").

Region 10 states that it believes that Shell's Reindeer Island data are site-specific data, but this position is not consistent with EPA's own guidance and past practice. According to EPA guidelines, site-specific data are data collected on-site, *see id.*, and Reindeer Island does not satisfy this condition: it is not within any of Shell's leases and does not represent open water conditions. Region 10's own past statement confirms this understanding. Many of these data were available in 2010 when Region 10 was considering Shell's *Discoverer* permit for the Beaufort Sea, yet Region 10 maintained that they were not site-specific or characteristic of the open Beaufort Sea. *See* 2010 Beaufort Sea Statement of Basis at 102 ("Because meteorological data representative of the open Beaufort Sea was not available, Shell used screening meteorology").

Further, as a whole, the meteorological data Shell has collected do not meet the standard set by EPA's guidelines for the required time period or location. Shell's buoy data cover the period from mid-August to mid-October, meaning that Shell has no over-water data for July or November. Shell, February 28, 2011, App. at 43. All of Shell's Beaufort Sea data total under 4 years of data, and the majority of these data were collected on-land. *Id.*



Therefore, Region 10 cannot issue Shell's permit because Shell has failed to meet the regulatory minimum requirements for meteorological data collection. Region 10 must retract the draft permit and direct Shell to collect additional meteorological data.

**d. Shell's use of area sources to model the emissions of associated vessels underestimates impacts.**

Shell has not demonstrated compliance with applicable ambient standards and increments, as required by the Title V program, because its modeling dilutes Shell's associated vessel emissions over a large area, artificially reducing projected maximum impacts. Region 10 should direct Shell to re-model impacts using a method that does not bias modeled impacts in this manner.

In modeling the emissions of its associated vessels, Shell has used area sources rather than volume sources to represent the emissions of associated vessels. Technical Support Document at 10-12. Shell's use of this method results in the distribution of associated vessel emissions over large areas. *Id.* The icebreaker emissions appear to be distributed over an area of roughly eight square kilometers, and the emissions of other support vessels distributed over four square kilometers. *Id.*

By treating the associated vessel emissions in this manner, Shell likely overestimates how much its ships will be moving, and further, underestimates short-term impacts to air quality. For instance, in discussing its icebreakers, Shell has previously stated that “[o]ccasionally there may be multi-year ice ridges that are expected to be broken at a much slower speed than used for first-year ice. Multi-year ice may be broken by riding up onto the ice so that the weight of the icebreaker on top of the ice breaks it.” Shell, Outer Continental Shelf Pre-Construction Air Permit Application, Frontier Discoverer, Beaufort Sea Exploration Drilling Program at 19 (May 2009). Operating over such a small area could result in higher concentrations because the vessels will emit the pollution in essentially the same location for extended periods of time. Use of area sources does not account for operation of the icebreakers under these foreseeable conditions. As a consequence, pollution impacts are underestimated. The potential for underestimating impacts is particularly significant with short-term standards like the 1-hour NO<sub>2</sub> standard.

An additional problem with the area sources is that due to their size, associated vessel emissions will never be modeled as directly upwind or downwind of major *Kulluk* emission units. Shell's area sources are many times wider than the *Kulluk*. The area source—by its very configuration—prevents an accurate assessment of the maximum impacts that would be expected during alignment of the *Kulluk* and associated icebreakers.

**e. Region 10's promise to demonstrate compliance in the future does not satisfy the regulatory requirement that Region 10 assure compliance before it issues an operating permit.**

One of the basic principles of the Clean Air Act is that EPA may not issue a permit unless it can “assure” that allowable emissions will not result in a violation of any applicable requirement, including NAAQS. 42 U.S.C § 7661c(e); *see also id.* at § 7661c(a); 40 C.F.R. §§ 71.2, 71.6(a)(1), 71.6(e)(1). Consistent with this basic principle, Region 10 has interpreted Title V as

requiring that operating permit applicant demonstrate compliance with NAAQS in the same manner as the PSD program requires. Statement of Basis at 26-27. Thus, to receive a Title V permit, Shell must first show that emission increases allowed by the permit will not result in a violation of NAAQS.

Modeling Shell's proposed operations is both complex and wholly uncertain because Shell has not identified many of the emission units it will use. Shell attempts to solve this obvious shortcoming by using example emission units where it cannot identify an actual unit. *See, e.g.*, Statement of Basis at 15. Nevertheless, this method results in "inherent uncertainty . . ." *Id.* at 43. Region 10 acknowledges that Shell's failure to identify many emission units means that it has not actually demonstrated allowable increases will not violate NAAQS. Region 10 states:

The emission units on the Kulluk and Associated Fleet that are actually used in each year must comply with all of the conditions and limitations in this permit, including the Synthetic Minor PTE Limits (condition D.4), the Operational Restrictions to Protect the NAAQS (condition D.5), and the Emission Limits to Protect the NAAQS (condition D.6). However, different configurations of emission units as well as their stack characteristics (height, diameter, location relative to structures) can change the modeled impact even if emissions are the same.

Statement of Basis at 36 (emphasis added).

While acknowledging the inherent uncertainty in Shell's application, Region 10 nevertheless attempts to comply with the law by "[r]equiring subsequent modeling analyses to be conducted . . . to establish that any future configuration" will not cause a violation of standards. *Id.* In other words, Shell's present modeling is essentially a preliminary and purely hypothetical exercise that Region 10 intends to revisit once Shell identifies the equipment it intends to use.

This deferred approach does not comply with the requirement that Shell demonstrate, before it is issued a permit, that its emissions will not cause a violation of applicable standards. 42 U.S.C. § 7661c(a), (e); 40 C.F.R. §§ 52.21(k), 71.2, 71.6(a)(1), 71.6(e)(1). Moreover, allowing Shell to provide its final modeling after Region 10 issues the permit violates the public's right to comment on the complete draft permit, including the modeling demonstration. 40 C.F.R. § 71.11.

Region 10 cannot issue the permit until Shell has demonstrated that allowable emission increases will not violate NAAQS and other applicable requirements, including increments. Region 10 admits that Shell has not yet done this. Thus, Region 10 must withdraw the permit and require Shell to make this showing based upon the actual equipment that Shell intends to use in its exploratory drilling operations.

**f. Shell has not demonstrated compliance with NAAQS because its cumulative impacts analysis fails to consider Shell's pre-OCS source emissions and the emissions of other sources.**

Shell has not demonstrated its operations will ensure the protection of NAAQS because Shell has not considered cumulative impacts. Region 10 must require Shell to perform a full impacts analysis that considers the numerous local sources of pollution, as well as the pollution generated by Shell's operations before Shell becomes an OCS source.

There are many large sources of pollution near the leases on which Shell seeks approval to drill. For instance, BP's Central Compression Plant has facility wide emissions of 14,238 tons per year of NO<sub>x</sub> and 347 tons per year of PM<sub>10</sub>; BP's Central Gas Facility emits close to 11,000 tons per year of NO<sub>x</sub> and 305 tons per year of PM<sub>10</sub>; and 14 sources emit over 1,000 tons per year of NO<sub>x</sub>. 2010 Beaufort Sea Statement of Basis at 108

EPA's guidelines on air quality modeling state that "[a]ll sources expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration for emission limit(s) should be explicitly modeled." 40 C.F.R. Part 51, App. W § 8.2.3. Shell has not complied with this standard because it has not properly determined which sources may cause a significant concentration gradient. Shell excuses this omission on the ground that Shell has determined that its background measurements are overly conservative and therefore account for the potential effects of other sources. Shell states that the largest source on the North Slope—BP's Central Compression Plant—is 11.5 kilometers from the monitoring location Shell uses for determining background pollution levels, Shell, May 4, 2011, App., Attachment B, and Shell states that there is no source that could be that distance or less from Shell's operations. *Id.* From this, Shell asserts that no source could affect pollution levels at its drill site as much as BP's Central Compression Plant affects pollution levels at the background monitoring location, and that as a result no cumulative effects modeling is necessary. However, Region 10's approval of Shell's method of determining significant gradient areas is arbitrary because this method fails to take into account the grouping of sources and local meteorological conditions. Instead, Region 10 should determine which sources could have overlapping emissions with Shell's source, and direct Shell to model those sources.

Shell also has not demonstrated it will not cause a violation of NAAQS because its analysis does not take into account operational emissions Shell would emit before it becomes an OCS source. Shell will have many vessels onsite when the *Kulluk* becomes an OCS source. However, the draft permit and its supporting documents provide no information on the level of pollution that these pre-OCS source operations may generate. Region 10 must direct Shell to model the effect of these pre-OCS source emissions on maximum impact levels.

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

Executive Order 12898 states that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on

minority populations and low-income populations in the United States . . . .” *See* 59 Fed. Reg. 7,629 (Feb. 16, 1994). Region 10’s environmental justice analysis fails to meet this standard because it relies entirely on expected NAAQS compliance, and as a result, does not consider the effect of Shell’s greenhouse gas and black carbon emissions on indigenous peoples or lawfully consider the effect of Shell’s emissions on subsistence users.

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

Shell stands to contribute to this warming, and resulting harm to indigenous cultures, by emitting greenhouse gases and black carbon. Shell’s operations could emit as much as 80,000 tons per year of CO<sub>2</sub>e. Statement of Basis at 39. EPA’s Administrator has found that greenhouse gases are “reasonably anticipated to endanger public health, for both current and future generations.” 74 Fed. Reg. 66,496, 66,524 (Dec. 15, 2009). Further, not all regions are equally vulnerable to the effects of climate change. *Id.* at 66,535. America’s Arctic—home to a large population of Alaska Natives—stands to suffer more than other locations due to the effects of high rates of projected regional warming on natural systems. *Id.*; U.S. EPA Region 10, *Environmental Justice Analysis for proposed Outer Continental Shelf Permit No. R10OCS030000, Kulluk Drilling Unit* at 6.

Shell’s operations also could emit up to 28 tons per year of PM<sub>2.5</sub>, *see* Shell, May 4, 2011, App. at 8, a large proportion of which will be black carbon. Sarofim, M.C., et al., *Current Policies, Emission Trends and Mitigation Options for Black Carbon in the Arctic Region* at 21-22 (April 28, 2009) (“EPA Draft White Paper”). Black carbon is generally regarded as the second most important driver of Arctic warming. Black carbon contributes to warming by absorbing incoming and outgoing radiation and by darkening snow and ice, “which reduces the reflection of light back to space and accelerates melting.” EPA, *Report to Congress on Black Carbon External Peer Review Draft* at 12-1 (March 2011) (“Black Carbon Report”). Emissions of black carbon from sources in the Arctic are particularly troubling because Arctic emissions can cause substantially more regional warming than similar amounts of black carbon emitted outside the Arctic. *See* D. Hirdman et al., *Source Identification of Short-Lived Air Pollutants in the Arctic Using Statistical Analysis of Measurement Data and Particle Dispersion Model Output*, 10 *ATMOS. CHEM. PHYS.* 669 (2010).

EPA has recognized black carbon’s role in global and Arctic warming. The Administrator has acknowledged that black carbon “is an important climate forcing agent and takes very seriously the emerging science on black carbon’s contribution to . . . the high rates of observed climate change in the Arctic.” 74 Fed. Reg. at 66,520. Further, in the draft report to Congress on black

carbon, EPA recognizes its “high capacity for light absorption and its role in key atmospheric processes link it to a range of climate impacts, including increased temperatures, accelerated ice and snow melt, and disruptions in precipitation patterns.” Black Carbon Report at 1-1. EPA states that modeling studies have shown that black carbon radiative forcing “from both atmospheric concentration and deposition on the snow and ice” has contributed to Arctic surface warming. *Id.* at 2-42. One study found that black carbon deposition on sea ice “may have resulted in a surface warming trend of as much as 0.5 to 1°C.” *Id.* Other modeling studies have shown increased warming of 0.4 to 0.5°C from black carbon deposited on snow; have shown black carbon may increase snowmelt rates north of 50°N latitude by as much as 19 to 28 percent; and have indicated that black carbon forcing may be the cause of as much as 50 percent of Arctic sea ice retreat. *Id.* at 2-45.

Region 10’s environmental justice analysis is arbitrary because in relying entirely on NAAQS, it failed to account for the effects Shell’s CO<sub>2</sub> and black carbon emissions could have on Alaska Natives. The information summarized above indicates the impact of CO<sub>2</sub> and black carbon emissions on the Arctic could have significant effects not accounted for in the NAAQS. For example, by relying exclusively on NAAQS, Region 10 has failed to account for effects on subsistence users. Shell’s operations would take place close to local villages and within subsistence hunting grounds. In particular, Shell would operate very close to the villages of Kaktovik and Nuiqsut. As a result, Region 10’s narrow focus on NAAQS compliance fails to account for the degree to which pollution below NAAQS levels might nonetheless disrupt subsistence activities by dissuading the native population for engaging in hunts due to fear of contamination. Also, Region 10’s analysis fails to address how Shell’s air pollution might cause a disproportionate impact through non-air pathways. For instance, Shell will emit hazardous air pollutants, *see* Shell, February 28, 2011, App., Attach. A at 11, and some hazardous air pollutants bioaccumulate, raising the risk of human ingestion of toxic substances.

Region 10’s past permitting activities demonstrate that this approach is unlawful. In its initial environmental justice analysis for the *Discoverer* permits, Region 10 relied entirely on Shell’s expected compliance with NAAQS in determining that Shell’s emissions would not have disproportionately high and adverse human health or environmental effects on minority and low income populations. *See, e.g.*, U.S. EPA Region 10, Response to Comments for Outer Continental Shelf Prevention of Significant Deterioration Permit No. R10OCS/PSD-AK-09-01 at 138 (Mar. 31, 2010). Petitioners Alaska Eskimo Whaling Commission (“AEWC”) and Inupiat Community of the Arctic Slope (“ICAS”) challenged this analysis, arguing that Region 10’s complete reliance on NAAQS was arbitrary. AEWC and ICAS, Petition for Review at 67-71 (May 3, 2010). The EAB remanded Region 10’s environmental justice analysis, holding that the reliance on then existing NAAQS was insufficient because EPA had indicated that those standards were insufficient to protect public health. *Shell Gulf of Mexico*, 15 E.A.D. at 81-82 (Dec. 30, 2010, Opinion). Here, Region 10 has made the same mistake the EAB faulted it for previously: by relying on NAAQS compliance, Region 10 has arbitrarily ignored other pollutants and effects recognized by EPA that NAAQS do not address.

Thus, Region 10’s environmental justice analysis is once again lacking because it fails to account for the adverse effects Shell’s greenhouse gas and black carbon emissions could have on minority and low-income populations.

\*\*\*\*\*

For the foregoing reasons, Region 10 should revoke its proposed permit for the *Kulluk*, require Shell to undertake additional analysis to demonstrate compliance with the Clean Air Act, and then determine if Region 10 can issue the permit lawfully.

Respectfully submitted,

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Draft Air Permit for Shell's Proposed *Kulluk* Drilling Operations in  
the Beaufort Sea, Alaska**

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September 6, 2011

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EPA Region 10  
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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

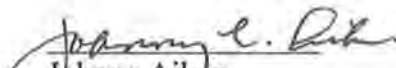
potential to emit (PTE) so the program qualifies for a minor source permit are unenforceable; even as currently drafted, Shell has not sufficiently restricted its emissions to qualify as a minor source; and, as a practical matter, the *Kulluk*'s proposed air emissions exceed those of the *Discoverer*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

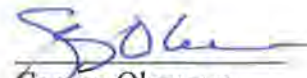
Shell's proposed air emissions pose risks to the environment and our communities that are not limited to the immediate proximity of their offshore sources. In addition to potential impacts to offshore resources and the subsistence activities that target those resources, impacts may be felt onshore. For example, emissions from the ocean-going vessels that Shell is proposing to use include major contributors to global climate change such as carbon dioxide (CO<sub>2</sub>) and other greenhouse gases. And, Shell proposes to emit pollutants that are harmful to human health, such as nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), 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 CO<sub>2e</sub> 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 CO<sub>2e</sub>. 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<sub>2.5</sub> 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 NO<sub>2</sub> impacts are predicted to be 151.5 µg/m<sup>3</sup> compared to 81.6 µg/m<sup>3</sup> from the *Discoverer* operations in the Beaufort Sea. Similarly, the 24-hour PM<sub>2.5</sub> impacts are predicted to be 34 µg/m<sup>3</sup> for the *Kulluk* and only 18.2 µg/m<sup>3</sup> 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.<sup>1</sup> EPA has promulgated regulations to control air pollution on the outer continental shelf (OCS) for this purpose.<sup>2</sup>

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.<sup>3</sup> 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.<sup>4</sup>

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.<sup>5</sup> 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.<sup>6</sup>

## 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.<sup>7</sup>

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> <sup>8</sup> |
| 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                              |

<sup>1</sup> 42 U.S.C. § 7627(a)(1).

<sup>2</sup> 40 C.F.R. Part 55.

<sup>3</sup> 42 U.S.C. § 7627(a)(1).

<sup>4</sup> 76 Fed. Reg. 37,274 (June 27, 2011).

<sup>5</sup> 40 C.F.R. § 71.5(a)(1)(i).

<sup>6</sup> 40 C.F.R. § 71.2 (“major source”).

<sup>7</sup> Shell, Camden Bay EP at 1-1-1-2; Shell, Chukchi EP at 1-1.

<sup>8</sup> 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> <sup>9</sup> |
| Chukchi OSR Barge <sup>10</sup> *                |  |
| Chukchi OSR Barge Tug*                           |  |
| Chukchi OSR Vessel*                              |  |
| Science Vessel <sup>11</sup>                     |  |
| West Dock Shuttle <sup>12</sup>                  |  |
| Lamor brush skimmer <sup>13</sup> *              |  |
| 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.<sup>14</sup> 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.

<sup>9</sup> Shell, Camden Bay EP at 2-6.

<sup>10</sup> Shell, Camden Bay EP at 8-1.

<sup>11</sup> Shell, Camden Bay EP at 10-2.

<sup>12</sup> Shell, Camden Bay EP at 15-5.

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

<sup>14</sup> 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 PTE <sup>15</sup> | Permitted PTE <sup>16</sup> | PSD Major Source Threshold | Title V Major Source Threshold |
|---|---------------------------------|-----------------------------|----------------------------|--------------------------------|
| Greenhouse Gases (GHG)                        | 141,487 tons per year           | 80,000                      | 75,000                     |                                |
| Nitrogen Oxides (NO <sub>2</sub> )            | 2,339 tons per year             | 240                         | 250                        | 100                            |
| Carbon Monoxide (CO)                          | 855 tons per year               | 200                         | 250                        | 100                            |
| Sulfur Dioxide (SO <sub>2</sub> )             | 833 tons per year               | 10                          | 250                        | 100                            |
| VOC   | 132 tons per year               | 40                          | 250                        | 100                            |
| Particulate Matter (PM <sub>10</sub> )        | 110 tons per year               | 30 <sup>17</sup>            | 250                        | 100                            |
| Small Particulate Matter (PM <sub>2.5</sub> ) | 109 tons per year               | 29 <sup>18</sup>            | 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.<sup>19</sup> 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.<sup>20</sup> 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.

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

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

<sup>17</sup> EPA does not identify the permitted PTE for PM<sub>2.5</sub> or PM<sub>10</sub> 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.

<sup>18</sup> EPA does not identify the permitted PTE for PM<sub>2.5</sub> or PM<sub>10</sub> 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.

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

<sup>20</sup> *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.<sup>21</sup> 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.<sup>22</sup> 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.<sup>23</sup> 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.<sup>24</sup> 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.<sup>25</sup> On

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<sup>21</sup> 40 C.F.R. § 71.11 (h)(4) and (g).

<sup>22</sup> *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.").

<sup>23</sup> 40 C.F.R. § 71.11(l)(1).

<sup>24</sup> 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).

<sup>25</sup> 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.<sup>26</sup> EPA's completeness determination for Shell's *Kulluk* permit application was not issued until July 19, 2011.<sup>27</sup> 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.<sup>28</sup> We reiterate our

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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.

<sup>26</sup> 40 C.F.R. § 71.7(a)(2).

<sup>27</sup> 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](http://www.epa.gov/region10/pdf/permits/shell/Kulluk/Shell_Kulluk_air_permit_application_completeness_determination_letter_July_2011.pdf)).

<sup>28</sup> 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 authority<sup>29</sup> 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.<sup>30</sup> 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.

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*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).*

<sup>29</sup> 42 U.S.C. § 7414; 40 C.F.R. § 55.8.

<sup>30</sup> 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.”<sup>31</sup>

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.<sup>32</sup> 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.”<sup>33</sup>

#### 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.”<sup>34</sup> 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.<sup>35</sup> This includes “drillship exploration.”<sup>36</sup>

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<sup>31</sup> EPA, Stmt. of Basis at 40.

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

<sup>33</sup> 40 C.F.R. § 55.2.

<sup>34</sup> 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.”

<sup>35</sup> 42 U.S.C. § 7627(a)(4)(C).

<sup>36</sup> *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.”<sup>37</sup>

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.<sup>38</sup> 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.<sup>39</sup> 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.<sup>40</sup> Shell’s operations are “temporary” in that they “involve at least one change of location during the term of the permit.”<sup>41</sup>

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<sup>37</sup> 40 C.F.R. § 55.2.

<sup>38</sup> 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],<sup>4</sup> 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.

<sup>39</sup> Shell, Supp. Report at 28.

<sup>40</sup> EPA, Stmt. of Basis at 25-26.

<sup>41</sup> 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.<sup>42</sup>

Region 10 concludes that this provision does not require Shell to comply with the increments or visibility requirements.<sup>43</sup> 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.<sup>44</sup>

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 . . . .”<sup>45</sup> 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

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<sup>42</sup> 42 U.S.C. § 7661d(e) (emphasis added).

<sup>43</sup> 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.”)

<sup>44</sup> EPA, Stmt. of Basis at 26.

<sup>45</sup> 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.<sup>46</sup>

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 . . . ."<sup>47</sup> The regulations also include a definition of "applicable requirements" that includes thirteen requirements.<sup>48</sup> 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.<sup>49</sup> 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."<sup>50</sup>

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.<sup>51</sup>

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."<sup>52</sup>

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

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

<sup>47</sup> 40 C.F.R. § 71.6(e).

<sup>48</sup> 40 C.F.R. § 71.2; 40 C.F.R. § 70.2.

<sup>49</sup> 40 C.F.R. § 71.2.

<sup>50</sup> 40 C.F.R. § 71.2.

<sup>51</sup> 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).

<sup>52</sup> 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.*<sup>53</sup>

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).”<sup>54</sup>

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.<sup>55</sup> 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.<sup>56</sup> 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 . . . .”<sup>57</sup> 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.

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<sup>53</sup> 57 Fed. Reg. 32250 (July 21, 1992) (emphasis added).

<sup>54</sup> *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.

<sup>55</sup> Section 328(a)(1), 42 U.S.C. § 7627(a)(1).

<sup>56</sup> 61 Fed. Reg. 34202, 34209-10 (July 1, 1996).

<sup>57</sup> 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<sub>2.5</sub>.

**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 <sub>2</sub>   | Annual         | 4.4   | 25  | 18%                         |
| PM <sub>10</sub>  | 24-hour        | 20.8  | 30  | 69%                         |
| PM <sub>2.5</sub> | 24-hour        | 17.0  | 9   | <b>189%</b>                 |
|                   | Annual         | 1.0   | 4   | 25%                         |
| SO <sub>2</sub>   | 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<sub>2.5</sub> that went into effect on December 20, 2010.<sup>58</sup> 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 SO<sub>2</sub> and NO<sub>X</sub>, 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).<sup>59</sup>

The new regulation was finalized in 2010 and the increments go into effect on October 20, 2011.<sup>60</sup> 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.”<sup>61</sup> 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<sub>2.5</sub> 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),

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

<sup>59</sup> 75 Fed. Reg. at 64,880.

<sup>60</sup> 75 Fed. Reg. at 64,865.

<sup>61</sup> 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 ANWR<sup>62</sup>

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.”<sup>63</sup> 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.”<sup>64</sup> 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.”<sup>65</sup>

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.<sup>66</sup> 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.<sup>67</sup> 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

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<sup>62</sup> 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.

<sup>63</sup> CAA § 160(2) and 42 U.S.C. §7470.

<sup>64</sup> Fish and Wildlife Service Manual, 563 FW 2, 2.8B.

<sup>65</sup> 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).

<sup>66</sup> 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](http://www.blm.gov/wo/st/en/prog/energy/oilshale_2/research_development.html).

<sup>67</sup> Emissions from the oil shale RD&D project are 500 TPY NO<sub>x</sub>, 75 TPY VOC, 55 TPY PM<sub>10</sub>, 40 TPY PM<sub>2.5</sub>, 12 TPY SO<sub>2</sub>. 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)”<sup>68</sup>; and, (2) “enforceable as a practical matter.”<sup>68</sup> 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.<sup>69</sup>

When both production and operational limits are used they “must be stated as conditions that can be enforced independently of one another.”<sup>70</sup> 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.”<sup>71</sup>

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.”<sup>72</sup> 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.”<sup>73</sup> The permitting authority is first to consider “the possibility of imposing a month-by-month limit.”<sup>74</sup> If that is not feasible, then the maximum the agency may agree to is a “twelve month rolling” time period.<sup>75</sup> “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.”<sup>76</sup>

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”).”<sup>77</sup> We ask that EPA add to the list of “Prohibited Activities” the operation of the vessels between December 1 and June 30.<sup>78</sup>

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

<sup>69</sup> *Id.* at 5.

<sup>70</sup> *Id.* at 6.

<sup>71</sup> *Id.* at 6.

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

<sup>73</sup> *Id.*

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

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

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

<sup>77</sup> EPA, Stmt of Basis at 37.

<sup>78</sup> 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.<sup>79</sup> Pursuant to agency guidance, Region 10 is to first consider “the possibility of imposing a month-by-month limit”<sup>80</sup> and only if that is not feasible, impose a “twelve month rolling” time period.”<sup>81</sup> 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.<sup>82</sup> 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 <sup>83</sup> | 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 <sup>84</sup>  | 89 days                            | 78 days                    | 78 days                                      |

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

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

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

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

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

<sup>84</sup> Shell, IHA Application at 17 (available at:

[http://alaska.boemre.gov/ref/ProjectHistory/2012Shell\\_BF/revisedEP/Appendix%20C.pdf](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<sub>x</sub>, Shell has the potential to emit 2,339 tons per year.<sup>85</sup> This is substantial and far above the trigger for a BACT analysis for NO<sub>x</sub>. Shell has requested limitations in its permits in an effort to bring its NO<sub>x</sub> emissions to 240 tpy. The draft permit provides that "Nitrogen oxides (NO<sub>x</sub>) emissions from the *Kulluk* and Associated Fleet shall not exceed 240 tpy as determined on a rolling 365-day basis . . . ."<sup>86</sup> The draft permit goes on to explain how to calculate NO<sub>x</sub> 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<sub>x</sub>.

The same thing can be said for the other "synthetic minor PTE restrictions" for CO and CO<sub>2e</sub>. 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."<sup>87</sup> 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."<sup>88</sup> 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.<sup>89</sup> For NO<sub>x</sub>, 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.

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

<sup>86</sup> EPA, draft *Kulluk* Permit at 35.

<sup>87</sup> 40 C.F.R. § 52.21(b)(4).

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

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

With respect to CO<sub>2</sub>e, 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 CO<sub>2</sub>e is 75,000 tpy. Here, because Shell's operations technically trigger the major source thresholds for NO<sub>x</sub>, CO, and SO<sub>2</sub>, the trigger for CO<sub>2</sub>e 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.<sup>90</sup>

## 2. Unenforceable Emission Limits Used to Meet the NAAQS.

Other critical permit elements, in addition to owner-requested limits, must also be enforceable.<sup>91</sup> 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<br>52 days/activity <sup>92</sup>              | 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 |

<sup>90</sup> 40 C.F.R. § 52.21(r).

<sup>91</sup> *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).

<sup>92</sup> 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 <sup>93</sup>   |   |
| Deck Cranes (all 3 units combined) | Shall not operate more than 50% of the time in any given day during Cementing and Logging Activities <sup>94</sup> | 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 <sup>95</sup>   | 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 <sup>96</sup>   | Add provisions to condition D to limit fuel usage and require sufficient monitoring and recordkeeping |
| OSR Vessel                         | Limited to 2,800 gal/day <sup>97</sup>   | Add provisions to condition D to limit fuel usage and require sufficient monitoring and recordkeeping |
| OSR Work Boats                     | Limited to 3,789 gal/day <sup>98</sup>   | 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 <sup>99</sup> | Compliance Demonstration |
|---------------------------------|---------------------------|--------------------------|
| SCR for NO <sub>x</sub> control | 1.6 g/kW-hr               | Continuous monitoring    |
| Oxy-Cat for PM control          | 50%                       | Periodic monitoring      |
| Oxy-Cat for CO control          | 80%                       | Periodic monitoring      |

<sup>93</sup> *Id.*

<sup>94</sup> *Id.*

<sup>95</sup> *Id.*

<sup>96</sup> *Id.*

<sup>97</sup> *Id.*

<sup>98</sup> *Id.*

<sup>99</sup> *Id.* at 3.

| Control Device                                   | Restriction <sup>99</sup> | 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.”<sup>100</sup> 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   |
|------------------------------------|----------------|----------------------------|
| <i>Kulluk</i> 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

<sup>100</sup> *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<sub>x</sub> and PM emission factors used for this permit.<sup>101</sup> Specifically, the NO<sub>x</sub> and PM BACT limits for the *Discoverer* permit are equivalent to 26.6 lb/10<sup>3</sup> gal of NO<sub>x</sub> and 3.1 lb/10<sup>3</sup> gal of PM and are based on stack test data from the actual units onboard the *Discoverer*.<sup>102</sup> In comparison, the emission factors in the proposed permit for the *Kulluk* are 20 lb/10<sup>3</sup> gal of NO<sub>x</sub> and 3 lb/10<sup>3</sup> 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<sub>x</sub> and PM emission factors for these units are based on stack testing for *Discoverer* sources<sup>103</sup> 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<sub>x</sub> 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.”<sup>104</sup>

Please add a provision that discusses when the permit will be reopened for cause.<sup>105</sup> 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.

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

<sup>102</sup> *Discoverer* Proposed Permit Conditions J.1.1 and J.1.3 list a NO<sub>x</sub> BACT limit of 0.2 lb/mmBTU and a PM<sub>10</sub> 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/10<sup>3</sup>gal = 26.6 lb/10<sup>3</sup>gal NO<sub>x</sub>.  
0.0235 lb/mmBTU \* 0.1331 mmBTU/gal \* 1000 gal/10<sup>3</sup>gal = 3.1 lb/10<sup>3</sup>gal PM<sub>10</sub>.

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

<sup>104</sup> 40 C.F.R. § 55.6(b)(4).

<sup>105</sup> 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 NO<sub>2</sub> 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<sub>x</sub> and Daily PM Limits.**

EPA’s draft permit includes hourly emission limits for NO<sub>x</sub> and daily emission limits for PM in order to ensure compliance with the NAAQS.<sup>106</sup> 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<sub>x</sub> 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.<sup>107</sup> 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.

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<sup>106</sup> Draft Permit Condition D.6.

<sup>107</sup> Draft Permit Condition D.1.

Since the NO<sub>x</sub> 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 NO<sub>2</sub> compliance.<sup>108</sup> 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,<sup>109</sup> 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.*”<sup>110</sup> Because the proper functioning of these controls is essential to compliance with the NO<sub>2</sub> 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 NO<sub>2</sub> 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.

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<sup>108</sup> See <http://www.netl.doe.gov/publications/proceedings/02/scr-snct/gausssummary.pdf>.

<sup>109</sup> See *e.g.*, draft Permit Conditions at D.10 and D.11.

<sup>110</sup> 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.<sup>111</sup>

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.<sup>112</sup> The huge reduction in anticipated sulfur dioxide emissions that will result from this commitment is significant and will reduce not only localized emissions of SO<sub>2</sub> but will reduce PM<sub>2.5</sub> 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.<sup>113</sup> 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.<sup>114</sup>

The final rule states:

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

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<sup>111</sup> Section 504(a); 42 U.S.C. § 7661c(a).

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

<sup>113</sup> 71 Fed. Reg. 32450-32464 (June 6, 2006).

<sup>114</sup> 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 NRLM<sup>115</sup> 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.]<sup>116</sup>

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.<sup>117</sup> 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

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<sup>115</sup> Nonroad, Locomotive and Marine (NRLM).

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

<sup>117</sup> 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<sub>2.5</sub> leaves no room for uncertainty; modeled PM impacts are predicted to be at 97% of the 24-hour average PM<sub>2.5</sub> NAAQS.<sup>118</sup> 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.<sup>119</sup> If, as has been indicated by Shell previously<sup>120</sup>, 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 %.<sup>121</sup>

This means that the predicted 24-hour PM<sub>2.5</sub> concentration must be less than 29.8 µg/m<sup>3</sup> when considering the background concentration and the predicted 1-hour NO<sub>2</sub> concentration must be less than 160 µg/m<sup>3</sup>. Yet, the highest predicted 24-hour PM<sub>2.5</sub> concentration, with background, from the permit modeling was 34 µg/m<sup>3</sup>, well above 29.8 µg/m<sup>3</sup> (114 % of the 29.8 µg/m<sup>3</sup> level).<sup>122</sup> 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.<sup>123</sup>

### 2. AERMOD-COARE.

Region 10 solicited comments on the use of the non-guideline AERMOD-COARE model used in this draft permit.<sup>124</sup> 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.

<sup>118</sup> EPA Air Quality Impact Analysis, Table 11, p. 33.

<sup>119</sup> The quadrature sum is the square root of the sum of the squares.

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

<sup>121</sup> 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.

<sup>122</sup> EPA Air Quality Impact Analysis, Table 11, p. 33.

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

<sup>124</sup> 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 NO<sub>2</sub> NAAQS. Based on the results of the performance evaluation presented in the Model Clearinghouse review,<sup>125</sup> 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.”<sup>126</sup>

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),<sup>127</sup> EPA must include an assessment of potential shoreline fumigation impacts on pollutant concentrations.

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

<sup>126</sup> *Id.* at 12.

<sup>127</sup> *See*, Stmt. of Basis at 58.

### 3. NO<sub>2</sub>/NO<sub>x</sub> Ratios.

The Plume Volume Molar Ratio Method (PVMRM) algorithm used in the ambient analysis to determine the atmospheric conversion of NO<sub>x</sub> to NO<sub>2</sub> requires estimates of in-stack ratios of NO<sub>2</sub>/NO<sub>x</sub>. 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.<sup>128</sup> This is especially important given the fact that Shell is requesting approval for the least-conservative options for modeling 1-hour NO<sub>2</sub> 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 NO<sub>2</sub> 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.<sup>129</sup> 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”.<sup>130</sup> 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 NO<sub>2</sub>/NO<sub>x</sub> ratios based on the generic value proposed by EPA as “a reasonable upper bound based on the available in-stack data.”<sup>131</sup> The modeling for this permit, therefore, must be based on a NO<sub>2</sub>/NO<sub>x</sub> 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.<sup>132</sup>

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.

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<sup>128</sup> See 4/29/11 Shell modeling submittal for the *Discoverer* (“Alternate\_NO2\_Modeling\_Disco\_04\_29\_2011.pdf”)

<sup>129</sup> Ambient Air Quality Analysis at 20.

<sup>130</sup> *Id.*

<sup>131</sup> EPA Memo Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard (March 1, 2011).

<sup>132</sup> “Alternate\_NO2\_Modeling\_Disco\_04\_29\_11.pdf”

#### 4. Paired Data.

We strongly support Region 10's decision not to allow a PM<sub>2.5</sub> 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.<sup>133</sup>

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 NO<sub>2</sub> NAAQS, EPA is admitting that this type of analysis results in "a less conservative" estimate of impacts.<sup>134</sup>

While we support EPA's decision to not allow pairing of NO<sub>2</sub> 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 98<sup>th</sup> percentile NO<sub>2</sub> 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 98<sup>th</sup> 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

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

<sup>134</sup> EPA Memo Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO<sub>2</sub> 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 NO<sub>2</sub>, PM-2.5, or SO<sub>2</sub> 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.<sup>135</sup>

Period averages cannot be prorated in this manner. This is particularly true for pollutants such as NO<sub>2</sub> 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 NO<sub>2</sub>, PM<sub>2.5</sub>, and SO<sub>2</sub> 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."<sup>136</sup> 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 NO<sub>2</sub>. In the air quality impact analysis for the draft permit EPA proposes using NO<sub>2</sub> data from the Prudhoe Bay A-Pad monitoring site as

<sup>135</sup> EPA, Air Quality Analysis at 10.

<sup>136</sup> 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.<sup>137</sup> 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<sub>2.5</sub> data set for determining a background value and *CCP for NO<sub>2</sub>* and SO<sub>2</sub>.”<sup>138</sup> There is no further discussion in the air quality impact analysis or in EPA’s June 23, 2011 memo about the NO<sub>2</sub> 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 NO<sub>2</sub> NAAQS demonstration. In fact, annual average NO<sub>2</sub> 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.<sup>139</sup> EPA must use the dataset with the highest monitored 1-hour average and annual average NO<sub>2</sub> 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.<sup>140</sup> 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> <sup>141</sup>    | Shell <i>Discoverer</i> Beaufort         | ConocoPhillips Jackup Rig | Shell <i>Discoverer</i> Chukchi |
|--------------------------|---------------------------------------|--|---------------------------|---------------------------------|
| PM <sub>2.5</sub> 24hr   | Deadhorse                             | Badami                                   | Wainwright permanent      | Wainwright permanent            |
| PM <sub>2.5</sub> annual | Deadhorse                             | Badami                                   | Wainwright permanent      | Wainwright permanent            |
| PM <sub>10</sub> 24 hr   | Prudhoe Bay CCP                       | Prudhoe Bay CCP (Same as <i>Kulluk</i> ) | Wainwright permanent      | Wainwright permanent            |
| NO <sub>2</sub> 1 hr     | Prudhoe Bay A Pad                     | Badami                                   | Wainwright temporary      | Wainwright temporary            |
| NO <sub>2</sub> annual   | Prudhoe Bay CCP (text) Badami (chart) | Badami                                   | Wainwright temporary      | Wainwright temporary            |
| SO <sub>2</sub>          | Prudhoe Bay CCP                       | SDI                                      | Wainwright                | Wainwright                      |

<sup>137</sup> EPA, Air Quality Impact Analysis at 30, Table 9

<sup>138</sup> 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*).

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

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

<sup>141</sup> The technical review of Shell’s application provides still different information. It states that the NO<sub>2</sub> data is from Prudhoe Bay A Pad, the PM<sub>2.5</sub> data is from Deadhorse, and the PM<sub>10</sub> data is from Prudhoe Bay CCP, SO<sub>2</sub> 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).

|                |   |                                  |                                  |                                 |
|----------------|---|----------------------------------|----------------------------------|---------------------------------|
|                | <b>Shell <i>Kulluk</i></b> <sup>141</sup> | <b>Shell Discoverer Beaufort</b> | <b>ConocoPhillips Jackup Rig</b> | <b>Shell Discoverer Chukchi</b> |
|                |   |                                  | temporary                        | temporary                       |
| CO             | SDI                                       | SDI<br>(Same as <i>Kulluk</i> )  | Wainwright temporary             | Wainwright temporary            |
| O <sub>3</sub> | 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 Bases**<sup>142</sup>

| <b>Air Pollutant</b>      | <b>Shell <i>Kulluk</i></b> | <b>Shell <i>Discoverer</i> Beaufort</b> |
|---------------------------|----------------------------|---|
| NO <sub>2</sub> 1 hour    | 41                         | 9                                       |
| NO <sub>2</sub> annual    | 11                         | 1                                       |
| PM <sub>2.5</sub> 24-hour | 17                         | 6                                       |
| PM <sub>2.5</sub> annual  | 4                          | 3                                       |
| PM <sub>10</sub> 24-hour  | 53                         | 53                                      |
| SO <sub>2</sub> 1-hour    | 29                         | 13                                      |
| SO <sub>2</sub> 3-hour    | 29                         | 11                                      |
| SO <sub>2</sub> 24-hour   | 22                         | 4                                       |
| SO <sub>2</sub> 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<sub>2.5</sub> data set."<sup>143</sup> 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.<sup>144</sup> 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

<sup>142</sup> EPA, Stmt. of Basis at 33; EPA, Revised Stmt of Basis for *Discoverer* at 57.

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

<sup>144</sup> 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<sub>2.5</sub> data from Deadhorse “to better account for the potential impacts from existing onshore sources.”<sup>145</sup> 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 different<sup>146</sup> 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.<sup>147</sup>

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.<sup>148</sup> 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

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<sup>145</sup> EPA, Air Quality Impact Analysis at 32.

<sup>146</sup> See 2010-10-13d\_EPA meeting notes Re: Shell Ap Meeting at 3 (discussing the *Kulluk*).

<sup>147</sup> Shell June 29, 2011 permit submittal at 21.

<sup>148</sup> *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.<sup>149</sup>

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".<sup>150</sup> 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

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<sup>149</sup> 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).

<sup>150</sup> 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<sub>x</sub>, 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<sub>x</sub>) 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<sub>x</sub> 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.<sup>151</sup>

Shell is proposing to emit 240 tons per year of NO<sub>x</sub> and 40 tons per year of VOCs.<sup>152</sup> 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<sub>x</sub> and 1,100 tpy of VOC.”<sup>153</sup> 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.<sup>154</sup>

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.<sup>155</sup> 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<sub>x</sub> and VOC) in the North Slope where oil and gas operations are currently located. The ozone measurement programs

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<sup>151</sup> EPA, Basic Information on Ozone.

<sup>152</sup> EPA, Air Quality Impact Analysis at 34.

<sup>153</sup> *Id.* at 34.

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

<sup>155</sup> 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.<sup>156</sup>

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.<sup>157</sup> The agency expects to adopt a new primary 8-hour standard of between 0.060-0.070 parts per million (ppm) shortly.<sup>158</sup> 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.<sup>159</sup> 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.<sup>160</sup> Therefore, it is particularly critical that compliance with these emerging standards is ensured.

## 10. Secondary formation of PM<sub>2.5</sub>.

EPA's consideration of the secondary formation of PM<sub>2.5</sub> is inadequate. EPA presents a qualitative discussion of secondary PM<sub>2.5</sub> impacts in the air quality analysis for the draft permit.<sup>161</sup> EPA determined that a quantitative photochemical modeling analysis was not needed to assess secondary PM<sub>2.5</sub> 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<sub>2.5</sub> from onshore sources.<sup>162</sup>

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

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

<sup>157</sup> 75 Fed. Reg. 2938 (Jan. 19, 2010).

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

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

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

<sup>161</sup> EPA, Air Quality Impact Analysis at 20-22.

<sup>162</sup> EPA, Ambient Air Quality Analysis at 20.

<sup>163</sup> 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.<sup>164</sup> 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  $\text{NO}_2$  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.<sup>165</sup>

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<sup>164</sup> 2001-05-01c\_Kaktovik QAPP (May 2011).

<sup>165</sup> *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 NO<sub>2</sub> as well as exposure to Ozone, PM<sub>2.5</sub>, and PM<sub>10</sub>, 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.<sup>166</sup> 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 . . .”<sup>167</sup>

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

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

<sup>167</sup> *Id.* at 15.

would cause or contribute to a violations of the ozone NAAQS.”<sup>168</sup> 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.

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<sup>168</sup> Ambient Air Quality Impact Analysis at 34.