

Exhibit 7

Alaska Wilderness League, *et al.*, Comments on Draft Air Permit
No. R10OCS030000 for Shell's Proposed Kulluk Drilling Operations
in the Beaufort Sea (Sept. 6, 2011)

**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—WORLD WILDLIFE FUND**

September 6, 2011

VIA EMAIL

Shell Kulluk Air Permit
EPA Region 10
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**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_x), particulate matter (PM), sulfur oxides (SO_x), and carbon monoxide (CO). For greenhouse gases, including carbon dioxide (CO₂), 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 CO₂e or more” 40 C.F.R. § 52.21(b)(49)(iv).¹ Any other new source will be major if it “will emit or have the potential to emit 100,000 tpy CO₂e” *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_x and 141,487 tpy of greenhouse

¹ CO₂e means “carbon dioxide equivalent.” It is a standardized measurement for the climate change forcing effect of various greenhouse gases. The CO₂e for a greenhouse gas is the concentration of CO₂ that would cause the same level of radiative forcing.

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_x—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 CO₂e, 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_x 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_x 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 CO₂e 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 CO₂. 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 CO₂e 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 CO₂e). 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 CO₂e 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_x. 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 SO₂,

NO₂, and PM.² 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

² EPA also finalized increments for PM_{2.5} 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_{2.5} increments. See 42 U.S.C. §§ 7411(a)(2), 7475(a), 7627(a)(1) and (a)(4)(D). Moreover, with respect to OCS sources, Congress clearly prohibited grandfathering by directing that even “existing OCS sources shall comply on the date 24 months” after promulgation of standards. 42 U.S.C. § 7627(a)(1). Application of the PM_{2.5} increment is important for Shell’s permit because Shell’s modeling indicates that Shell’s emissions could increase 24-hour PM_{2.5} concentrations by 17 µg/m³, Technical Support Document at 33, which substantially exceeds EPA’s newly enacted 24-hour PM_{2.5} increment of 9 µg/m³, 75 Fed. Reg. at 64,865.

source is expected to operate and thus made such requirements “applicable.”³ 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 NO₂ standard.

A new, 1-hour national ambient air quality standard (“NAAQS”) for nitrogen dioxide (NO₂) 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/m³ (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 NO₂ NAAQS alone was insufficient to protect human health. *Id.* at 6,479-81. Short term spikes in NO₂ concentrations are associated with a range of negative human health effects, including breathing problems and even death. *Id.* The new 1-hour NO₂ 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 NO₂ standard. 40 C.F.R. § 52.21(k). Shell has not made this demonstration.

³ 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 NO₂” 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 NO₂, 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 NO₂ 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 NO₂ 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 NO₂ 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 NO₂ 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 NO₂ 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 NO₂ impacts by using background data in a manner that understates health and environmental risks.

Shell has not demonstrated compliance with the 1-hour NO₂ 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 NO₂ 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 NO₂ standard itself. The 1-hour NO₂ NAAQS limit is 188 ug/m³ (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 NO₂ 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 NO₂ impacts. Shell, February 28, 2011, App. at 39.

The NO_x emissions created during combustion (as occurs in Shell’s ship engines and other equipment) are emitted partly as nitric oxide (NO) and partly as NO₂. Once in the atmosphere, NO interacts with ozone and is ultimately converted to NO₂. Both NO and NO₂ are harmful to human health and the environment. However, compliance with the final 1-hour NO₂ NAAQS is calculated by measuring NO₂ alone. *See* 75 Fed. Reg. at 6,474. The standard relies upon NO₂ as an indicator for ambient NO_x, 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 NO₂ standard. In predicting ambient air impacts, PVMRM significantly understates the extent to which NO will convert to NO₂ in the presence of ozone. PVMRM fixates on the short-term rates of conversion, even though nearly all NO is eventually converted to NO₂.

The use of PVMRM also contradicts—and undermines—the underlying assumptions of the NO₂ standard itself. In promulgating the 1-hour NO₂ standard, EPA elected to rely on NO₂—as opposed to other nitrogen oxides—as the overall indicator for ambient NO_x. 75 Fed. Reg. at 6,490. Although NO₂ was chosen as the indicator, EPA intended for the 1-hour standard to not only reduce NO₂ 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 NO₂/NO_x ratios, resulting in a substantial understatement of total concentrations.

Thus, in order to maintain consistency with EPA's declared purpose of using NO₂ as an indicator to reduce total NO_x, Region 10 must reject Shell's use of PVMRM.

iv. Shell has utilized NO₂/NO_x ratios that underestimate the expected maximum impacts of its operations.

Predictions of ambient 1-hour concentrations of NO₂ require data (or assumptions) about the initial, in-stack ratio of NO₂ to NO_x in the emissions generated by a pollution source. Characterizing a source's emissions with a reliable NO₂/NO_x ratio (or ratios) is therefore essential to the modeling of 1-hour NO₂ impacts. An underestimation of the proportion of NO_x emissions that are NO₂ leads to greatly understated projections of ambient NO₂ concentrations.

In accepting Shell's NO₂/NO_x 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 NO₂ 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 NO₂/NO_x 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 NO₂/NO_x 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 NO₂/NO_x ratios associated with the *Discoverer* operations. See *Discoverer Drillship Impact Evaluation for SO₂ and NO₂ 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 NO₂/NO_x 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 NO₂ 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 NO₂ 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 NO₂ 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_{2.5} 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_{2.5} NAAQS.

The 24-hour PM_{2.5} 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/m³. *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_{2.5} exposure causes cardiovascular problems, and can even cause death. *Id.* at 61,153-54. Compliance with the 24-hour PM_{2.5} 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_{2.5} standard. 40 C.F.R. § 52.21(k). Shell has not made this demonstration.

i. Shell understated maximum 24-hour PM_{2.5} 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_{2.5} 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_{2.5} 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/m³. Adding Shell's maximum modeled impact of 20.5 µg/m³ to Shell's background value of 17.0 yields 37.5 µg/m³.

ii. In its 24-hour PM_{2.5} analysis, Shell has understated its 98th percentile impact.

Even if Shell could calculate its 24-hour PM_{2.5} 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_{2.5} 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_{2.5} 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_{2.5}. Shell cannot demonstrate compliance with NAAQS until it has performed a sufficient secondary PM_{2.5} analysis.

In issuing the *Discoverer* permits in 2010 to Shell, Region 10 did not analyze Shell’s potential contribution to secondary PM_{2.5} formation. The EAB remanded Region 10’s PM_{2.5} analysis in order to ensure the proper accounting of secondary PM_{2.5} formation. In particular, the EAB was concerned with Region 10’s failure to follow EPA’s guidance on modeling PM_{2.5} 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_{2.5} precursors, some assessment of their potential contribution to cumulative impacts as secondary PM_{2.5} 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_{2.5} 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_{2.5} is necessary or not after determining whether PM_{2.5} 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_{2.5} 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_{2.5} 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_x. *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_{2.5} precursors is important. Shell’s modeling already indicates it may cause 24-hour PM_{2.5} 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_{2.5} 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_{2.5} formation, Region 10 should address additional factors. In particular, Region 10 acknowledges that secondary PM_{2.5} 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 NO₂ 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_x and 347 tons per year of PM₁₀; BP's Central Gas Facility emits close to 11,000 tons per year of NO_x and 305 tons per year of PM₁₀; and 14 sources emit over 1,000 tons per year of NO_x. 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 CO₂e. 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_{2.5}, *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 CO₂ and black carbon emissions could have on Alaska Natives. The information summarized above indicates the impact of CO₂ 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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**Attachments to Alaska Wilderness League, et al.'s Comments on the
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