

Exhibit 8

North Slope Borough, et al., Comments on 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 (Sept. 6, 2011)



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September 6, 2011

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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

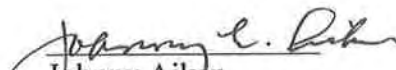
potential to emit (PTE) so the program qualifies for a minor source permit are unenforceable; even as currently drafted, Shell has not sufficiently restricted its emissions to qualify as a minor source; and, as a practical matter, the *Kulluk*'s proposed air emissions exceed those of the *Discoverer*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

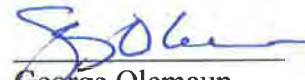
Shell's proposed air emissions pose risks to the environment and our communities that are not limited to the immediate proximity of their offshore sources. In addition to potential impacts to offshore resources and the subsistence activities that target those resources, impacts may be felt onshore. For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

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

Sincerely,


Edward S. Itta
NSB *Acting*
Mayor


Johnny Aiken
AEWC
Executive Director


George Olemaun
ICAS
Vice President

C. Ambient Air Quality Boundary.

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

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

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

D. OCS Source Definition.

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

1. Drillship Location.

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

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

³¹ EPA, Stmt. of Basis at 40.

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

³³ 40 C.F.R. § 55.2.

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

³⁵ 42 U.S.C. § 7627(a)(4)(C).

³⁶ *Id.*

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

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

2. Other Vessels.

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

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

1. Legal Authority.

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

³⁷ 40 C.F.R. § 55.2.

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

³⁹ Shell, Supp. Report at 28.

⁴⁰ EPA, Stmt. of Basis at 25-26.

⁴¹ 40 C.F.R. § 71.6(e).

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

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

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

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

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

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

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

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

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

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

⁴⁴ EPA, Stmt. of Basis at 26.

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

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

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

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

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

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

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

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

⁴⁷ 40 C.F.R. § 71.6(e).

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

⁴⁹ 40 C.F.R. § 71.2.

⁵⁰ 40 C.F.R. § 71.2.

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

⁵² 40 C.F.R. § 55.6(c)(2).

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

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

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

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

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

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

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

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

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

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

2. Compliance with the Increments.

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

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

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

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

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

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

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

3. Visibility Protection.

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

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

⁵⁹ 75 Fed. Reg. at 64,880.

⁶⁰ 75 Fed. Reg. at 64,865.

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

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

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

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

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

F. The Owner-Requested Restrictions Are Not Enforceable.

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

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

⁶³ CAA § 160(2) and 42 U.S.C. § 7470.

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

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

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

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

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

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

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

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

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

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

⁶⁹ *Id.* at 5.

⁷⁰ *Id.* at 6.

⁷¹ *Id.* at 6.

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

⁷³ *Id.*

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

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

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

⁷⁷ EPA, Stmt of Basis at 37.

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

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

1. Unenforceable Potential to Emit Restrictions.

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

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

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

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

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

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

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

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

⁸⁴ Shell, IHA Application at 17 (available at:

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

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

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

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

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

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

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

⁸⁶ EPA, draft *Kulluk* Permit at 35.

⁸⁷ 40 C.F.R. § 52.21(b)(4).

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

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

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

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

2. Unenforceable Emission Limits Used to Meet the NAAQS.

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

G. Additional Permit Conditions.

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

Table 5: Additional Required Permit Limits: Operating Parameters

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

⁹⁰ 40 C.F.R. § 52.21(r).

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

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

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

H. Source Testing and Monitoring Provisions.

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

1. Source Testing for all Emissions Units.

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

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

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

¹⁰⁶ Draft Permit Condition D.6.

¹⁰⁷ Draft Permit Condition D.1.

4. Paired Data.

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

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

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

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

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

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

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

5. Averaging of Emissions and Duration of Modeling.

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

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

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

6. Background Concentrations.

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

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

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

¹³⁵ EPA, Air Quality Analysis at 10.

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

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

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

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

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

8. Cumulative Impacts.

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

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

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

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

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

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

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

9. Ozone.

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

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

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

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

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

¹⁵¹ EPA, Basic Information on Ozone.

¹⁵² EPA, Air Quality Impact Analysis at 34.

¹⁵³ *Id.* at 34.

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

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