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February 17, 2010

Via Electronic Mail

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Shell Chukchi OCS Air Permit
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Re: Shell Gulf of Mexico/Shell Offshore Inc.'s Application for a Chukchi Sea Clean Air Act Permit.

Dear Ms. Helm and Mr. Nair:

Thank you for the opportunity to comment on Shell's Clean Air Act (CAA) modified proposed permit application, and the Environmental Protection Agency's (EPAs) proposed permit and statement of basis for that permit. Because of our continuing and unified interest in minimizing the impacts of air pollution and global warming in our Arctic communities and surrounding environment these comments are submitted jointly on behalf of the Alaska Eskimo Whaling Commission (AEWC), the Inupiat Community of the Arctic Slope (ICAS), and the North Slope Borough (NSB).

At the outset, we wish to express our sincere thanks to you for visiting the North Slope and discussing this proposed permit with representatives from each of our organizations. Your efforts are reflected in this improved proposed permit, and reflect a good faith effort to give meaningful consideration to the comments and concerns we shared with you on October 20, 2009. In particular, we want to acknowledge the following improvements:

> **Significant Emission Reductions**. In response to NSB's October 20, 2009 comments on the originally proposed permit, EPA has worked with Shell to reduce Carbon Monoxide (CO) emissions by 41%, Nitrogen Oxides (NO_x) by 39%, Particulate Matter ($PM_{2.5}$ and PM_{10}) by over 70%, Sulfur Dioxide (SO_2) by 99% and 48% of the Volatile Organic Compound emissions.

Exhibit 2
AEWC & ICAS

Transparency. EPA has provided a timely and transparent set of records on this permit action for us to review and better understand the proposed action in the Statement of Basis.

Source Testing. EPA's comprehensive source testing requirements allow for the collection of necessary data and demonstrate a commitment to human health and welfare in Alaska's North Slope.

Monitoring, Recordkeeping and Reporting. EPA has included a very comprehensive set of monitoring, recordkeeping and reporting requirements.

BACT/Emission Control. EPA has worked consistently with Shell to examine the best available control technology (BACT) and to substantially improve emission controls on Shell's operations. While there are still some unresolved issues (as indicated below), EPA has done an excellent job in requiring the reduction of emissions, ensuring the installation of emission controls, and providing for source testing, monitoring, and record keeping.

Relief Wells. EPA's Statement of Basis (SOB) requires Shell to include time spent drilling relief wells in the 168-day permit period. This is an important requirement as our position has consistently been that blowouts are a reasonably foreseeable event.

We are encouraged by your efforts and submit these comments to assist you in your ongoing review of Shell's proposed action. We hope that you will permit the proposed emissions only when their impact to the health and welfare of our people is minimized to the greatest extent possible.

As you know, AEWC is a non-profit organization representing Inupiat whaling captains in the eleven bowhead whale subsistence hunting villages of Barrow, Nuiqsut, Kaktovik, Pt. Hope, Kivalina, Wales, Savoonga, Gambell, Little Diomede, Wainwright, and Pt. Lay. Our whaling captains and their communities rely upon the health of the Chukchi and its surrounding waters to provide for marine life, which in turn sustain our people and our culture. AEWC works to safeguard the hunt of the bowhead whale and the subsistence way of life that Arctic waters support. AEWC's Inupiat and Siberian Yupik whaling captains have thousands of years of traditional knowledge about the Arctic ecosystem, and AEWC is also well versed in the current science regarding the health and status of the natural resources of the Arctic.

ICAS is a regional tribal government for eight villages on the North Slope that depend upon the marine mammals living in and migrating through Arctic waters. The Chukchi Sea is a unique and diverse marine environment with great cultural significance for the Inupiat who hunt and fish in this area. We have previously experienced oil and gas activities in the Arctic that caused direct conflicts with subsistence activities and the resources that have sustained the Inupiat for thousands of years. Because offshore oil and gas activities pose risks to the Inupiat subsistence activities and cultural preservation, they require careful review.

NSB has the largest territorial and coastal jurisdiction of any municipal government in the United States—an area larger than the State of Minnesota. NSB has multiple interests at stake in Shell's

proposed Chukchi Sea Exploration Plan underlying this CAA permit. First and foremost are NSB's interests related to the health and welfare of our residents, who are rightfully concerned

about potential health impacts associated with oil and gas development on the North Slope. These impacts may be direct, indirect or cumulative in nature and relate to the contamination and degradation of the natural environment upon which our residents rely.

Our communities include those that are onshore from Shell's proposed operations and those that rely upon the resources from the Chukchi Sea that will be impacted by Shell's proposal. The Chukchi Sea is a unique and diverse marine environment and Shell's proposed air emissions pose risks to our communities that are onshore from Shell's proposed operations as well as those that rely upon the resources from the Chukchi Sea. Emissions from the ocean-going vessels that Shell is proposing to use include major contributors to global climate change such as carbon dioxide (CO_2), and pollutants harmful to human health, such as nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter (PM).[1] EPA recognized that

> in 2001 marine diesel engines with per-cylinder displacement of 30 liters or more (a group roughly corresponding to the engines covered by the new IMO [International Maritime Organization] standards) contributed 6% of the NOx coming from all mobile sources in the U.S., as well as 10% of the PM, and 40% of the SOx. We further estimate that without new emission controls, these contributions would have increased by 2030 to 34% of the NOx coming from all mobile sources in the U.S., 45% of the PM, and 94% of the SOx.[2]

We are rightfully concerned about the ramifications of these emissions and the overall action as proposed, given the significance of its potential and disproportionate impacts on our people.

The people who will be affected by Shell's air emissions live in isolated areas, enjoy a lifestyle and diet that is radically different from other U.S. populations, have markedly higher rates of pulmonary disease than the general U.S. population, and may have genetic predispositions to disease that differ from other U.S. populations. As abundant public health data has demonstrated, these people—our people—are substantially more vulnerable to morbidity and mortality from air pollution than are other Americans. A human health impact assessment and more thorough ambient air modeling, and baseline emission assessments are needed to assure that human health is protected.

We commend Shell for recognizing the need and providing for the use of ultra low sulfur fuel to reduce emission in all of the 2010 exploration fleet. But, as demonstrated in the attached comments, considering that the proposed emissions are still significant, we have identified a

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[1] The International Council On Clean Transportation, Air Pollution and Greenhouse Gas Emissions from Ocean-going Ships: Impacts, Mitigation Options and Opportunities for Managing Growth (2007) (available at: http://www.theicct.org/documents/MarineES_ Final_Web.pdf).

[2] EPA, Program Announcement: International Maritime Organization Adopts Program to Control Air Emissions from Oceangoing Vessels (2008) (available at: http://www.epa.gov/ oms/regs/nonroad/marine/ci/420f08033.pdf).

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number of areas where the proposed permit needs revision to conform to CAA and its regulations. These areas include:

1. the need for EPA to regulate CO_2 emissions from Shell's proposed operations;

2. the need to apply BACT to all the vessels and engines associated with Shell's proposed activities at the drill site;

3. the need to more thoroughly apply BACT to those vessels and engines that are currently being regulated; and

4. the need to comply with several other environmental laws before a permit is issued to Shell.

Until these areas of concern are resolved, we ask that a permit not be issued for the proposed offshore oil and gas exploration emissions. There are demonstrated and required means to considerably reduce the air emissions associated with this action. These means should be implemented to assure compliance with federal law, and most importantly, to avoid unnecessary impacts to the health and welfare of our people.

Thank you again for the opportunity to comment. Please feel free to contact us if you have questions regarding these comments.

Sincerely,

Harry Brower
AEWC
Chairman

George Edwardson
ICAS
~~Chairman~~ President

Edward S. Itta
North Slope Borough
Mayor

cc by First Class or Electronic Mail

Senator Lisa Murkowski
Senator Mark Begich
Representative Don Young
Richard Albright, EPA, Region 10
Natasha Greaves, EPA, Region 10
Richard Albright, EPA, Region 10
Jeffrey Walker, Minerals Management Service
Bessie O'Rourke, NSB Attorney
Dan Forster, Director, NSB Planning
Taqulik Hepa, Director, NSB Wildlife
Karla Kolash, NSB Mayor's Office

Exhibit 2
AEWC & ICAS

AEWC, ICAS, AND NORTH SLOPE BOROUGH'S COMMENTS REGARDING SHELL GULF OF MEXICO AND SHELL OFFSHORE INC.'S REVISED APPLICATION FOR AN OCS PSD PERMIT UNDER THE CLEAN AIR ACT.

These unified comments are submitted jointly on behalf of the Alaska Eskimo Whaling Commission (AEWC), the Inupiat Community of the Arctic Slope (ICAS), and the North Slope Borough (NSB), who hereafter will collectively be referred to as "NSB."

STATUTORY AND FACTUAL BACKGROUND.

Statutory Background.

The prevention of significant deterioration (PSD) program was added to the Clean Air Act (CAA) in 1977. The PSD program helps ensure that national ambient air quality standards (NAAQS) are attained. It requires new major stationary sources to obtain preconstruction permits in areas where the NAAQS have been attained (attainment areas).[1] In 1990, Congress decided to regulate air pollution in the Outer Continental Shelf (OCS) by amending the CAA to include the OCS program which regulates offshore entities by requiring them "to attain and maintain Federal and State ambient air quality standards and to comply with the" PSD program.[2] EPA has promulgated regulations to control air pollution on the outer continental shelf (OCS) for this purpose.[3]

Under the PSD program if an OCS source is located 25 miles beyond a state's seaward boundary that source is "subject to the New Source Performance Standards (NSPS), in 40 C.F.R Part 60."[4] If the OCS source qualifies as "a major stationary source," then the standards promulgated under "Section 112 of the CAA if rationally related to the attainment and maintenance of federal and state ambient air quality standards or the requirements of Part C of Title I of the CAA" – i.e., the NESHAPs – apply to the source.[5] The potential for the OCS source to emit NSR pollutants[6] must be calculated and the OCS source must apply for a Title V operating permit.[7]

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[1] 42 U.S.C. § 7475.
[2] 42 U.S.C. § 7627(a)(1).
[3] *See* 40 C.F.R. part 55.
[4] EPA, Region 10, Statement of Basis for Proposed Outer Continental Shelf Prevention of Deterioration Permit No. R10OCS/PSD-AK-09-01 Shell Gulf of Mexico Inc. Frontier Discoverer Drillship Chukchi Sea Exploration Drilling Program at 12 (Aug. 14, 2009) (hereafter "EPA Stmt of Basis"); *see also* 42 U.S.C. § 7627(a)(1) (EPA "shall establish requirements to control air pollution from Outer Continental Shelf sources located offshore of the States . . . to attain and maintain Federal and State ambient air quality standards and to comply with the provisions of part C of subchapter I of this chapter").
[5] *Id.* (internal citations omitted).
[6] Here the relevant NSR pollutants are CO, NOx, PM, $PM_{2.5}$, PM_{10}, SO_2, VOC, and CO_2.
[7] *See* 40 C.F.R. § 71.5(a)(1)(i).

The "PSD program includes a requirement" that the permit applicant evaluate "the effect that the proposed emissions are expected to have on air quality related values such as visibility, soils, and vegetation."[8] Before issuing a Prevention of Significant Deterioration (PSD) permit to a major new stationary source (source), the EPA must conduct a Best Available Control Technology (BACT) analysis for each pollutant that the source has the potential to emit pollutants in significant quantities.[9]

Factual Background.

The communities along the North Slope of Alaska compared to many communities in the United States have fewer combustion sources. While these communities are recipients of air pollution from other areas, they are relatively pristine areas. Shell has proposed a large oil and gas exploration undertaking involving a drill ship, a fleet of support vessels including two ice breakers and aircraft traveling to and across the Arctic Ocean from July through October. Among the other known impacts associated with this action, the exploration activities will emit tons of health harming and climate changing pollutants into the air.

Additionally, prior oil and gas operations have impacted air quality. As EPA notes, "[o]zone levels" and the levels of "ozone precursors (i.e., NOx and VOC)" in areas where "oil and gas operations are currently located" are "higher than the levels that have been collected at the Wainwright monitoring site."[10] Thus, demonstrating the impacts such operations can have.

Shell is proposing "to operate the Discoverer drillship and associated fleet in the Chukchi Sea" and seeks "a portable major source permit to allow for operation of the Discoverer and its associated fleet at" one or more of Shell's leases that it obtained during Lease Sale 193.[11] Shell is proposing a "maximum of 168 drilling days (5.5 months), beginning in July of each year" and "[d]rilling is planned to begin no earlier than July of 2010 and continue seasonally (i.e. July to December each year) until the resources under Shell's current leases are adequately defined."[12]

It is noteworthy that Shell is also currently proposing operations for the Beaufort Sea in 2010 during the same timeframe as its Chukchi Sea operations and the company owns many more leases in these areas. Thus, the overall, cumulative impacts of Shell's proposed and likely future operations on the air quality of the North Slope must be accounted for.

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[8] EPA, Region 10, Statement of Basis for proposed Outer Continental Shelf Prevention of Deterioriation Permit No. R10OCS/PSD-AK-09-01, Shell Gulf of Mexico Inc. Frontier Discoverer Drillship Chukchi Sea Exploration Drilling Program at 17 (January 8, 2010) (hereafter "EPA Re-Proposed Stmt of Basis").
[9] 42 U.S.C. § 7475(a)(4).
[10] EPA Stmt of Basis at 76.
[11] EPA Re-Proposed Stmt of Basis at 3-4.
[12] *Id.* at 9.

I. EPA Needs To Address Carbon Dioxide And Other Greenhouse Gas Emissions In The Draft Permit.

Before issuing a PSD permit, the Clean Air Act requires that the EPA conduct a BACT analysis and include emissions limitations for "each pollutant subject to regulation" under the Act.[13] Carbon dioxide is a pollutant under the CAA,[14] and as described below is regulated under the Act and therefore needs to be included in the BACT analysis.

A. Shell Will Emit Significant Amounts of CO_2 and Other Greenhouse Gases That Must be Regulated as Part Of Shell's Permit.

The proposed permit for Shell's Chukchi Sea exploratory drilling program does not address carbon dioxide (CO_2) or other greenhouse gases (GHGs) to be emitted from the proposed OCS sources. However, greenhouse gas emissions from oil and gas sources can be significant. The Arctic has already witnessed temperature increases that are twice as large as global averages and is poised to continue warming temperatures at greater levels than the rest of the world.[15] The effects of global warming are acute in the Arctic where melting glaciers and rising sea levels threaten local species and coastal communities. In the Exploration Plan for the Chukchi exploration, Shell noted that the US Fish and Wildlife Service has recognized that climate change threatens the survival of marine mammals who depend upon sea ice.[16] Reducing greenhouse gas emissions is imperative to slowing and stopping these dramatic events from further harming the people and ecosystem of the Arctic.[17]

The Discoverer drillship and its associated support vessels will contribute large amounts of heat-trapping carbon dioxide, an estimated 20,000 tons, to the air each year from the Discoverer itself and about 55,000 tons per year from the Discoverer and its support

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[13] 42 U.S.C. § 7475(a)(4).

[14] *Massachusetts v. EPA*, 549 U.S. 497 (2007).

[15] *See* International Panel on Climate Change, Climate Change: 2007 Synthesis Report, at 30 (available at: http://www1.ipcc.ch/ipccreports/assessments-reports.htm) (Attachment 1).

[16] Shell, Exploration Plan 2010 Exploration Drilling Program, OCS Lease Sale 193, Chukchi Sea, Alaska at 373 (July 2009) (hereafter "Shell 2010 Exploration Plan").

[17] In Shell's 2010 Exploration Plan the corporation highlights MMS's position that Shell's CO_2 emissions represent an "extremely small amount" of global greenhouse gases and thus the cumulative effects of Shell's CO_2 emissions are insubstantial. However, this position ignores the importance of incremental regulatory steps toward redressing harms caused by global warming. In *Massachusetts v. EPA*, the Supreme Court rejected the argument that mobile source emissions were such an insignificant amount of global greenhouse gases that regulation of those emissions could not redress the petitioners' injury from global warming because of the importance of incremental steps. 549 U.S. at 524-525.

vessels.[18] Its annual carbon dioxide emissions would be akin to the annual carbon dioxide emissions from 11,000 cars.[19] Marine diesel engines – such as those employed by Shell – when looked at cumulatively significantly degrade air quality, which is why there is an international agreement to reduce these emissions.[20]

Methane (CH_4) emissions will also result from vented sources during Shell's exploration drilling program. Methane is of particular concern as a greenhouse gas since it is over 20 times more effective at trapping heat in the atmosphere than carbon dioxide over the same 100-year period.[21] In fact, the CO_2 and CH_4 emissions from Shell's exploratory operations are hardly insignificant when considering the grave impacts to the Arctic Region from changes to the climate.

EPA must regulate these significant CO_2 emissions from Shell's operations.[22] In Alaska, the oil and gas industry emits 15.3 million metric tons of CO_2 emissions each year.[23] By conducting CO_2 and GHG BACT analyses for Alaskan oil and gas sources that emit PSD thresholds of CO_2 and other GHGs, the agency could reduce a significant amount of these pollutants that are emitted. In doing so, the EPA would take an important step toward slowing the acute effects of global warming in the Arctic.

B. Greenhouse Gases are Pollutants Subject to Regulation Under the CAA and Therefore Must be Included in Shell's Permit.

As EPA has recently recognized, CO_2 and other greenhouse gases clearly fall within the Clean Air Act's definition of "air pollutant." The CAA defines "air pollutant" to include "*any* physical, chemical, biological, radioactive . . . substance or matter which is emitted into or otherwise enters the ambient air."[24] Further, the CAA specifically includes carbon dioxide in a list of "air pollutants." Section 103(g) of the CAA directs EPA to conduct a research program concerning "[i]mprovements in nonregulatory strategies and

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[18] Shell EP EIA at 36.

[19] Based on EPA MOBILE6.2 fuel economy numbers, an average passenger vehicle emits approx. 5 metric tons of CO_2 equivalent per year. "Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle", EPA420-F-05-004 February 2005 (available at: http://www. epa.gov/otaq/climate/420f05004.htm) (Attachment 2).

[20] EPA, Program Announcement: International Maritime Organization Adopts Program to Control Air Emissions from Oceangoing Vessels (2008) (available at: http://www.epa.gov/ oms/regs/nonroad/marine/ci/420f08033.pdf) (Attachment 3).

[21] EPA Methane Information (available at: http://www.epa.gov/methane/index.html) (Attachment 4) ("Methane is of particular concern as a greenhouse gas since it is over 20 times more effective at trapping heat in the atmosphere than carbon dioxide over the same 100-year period.").

[22] Shell EP EIA at 36.

[23] Shell EP EIA at 53.

[24] 42 U.S.C. § 7602(g) (emphasis added).

technologies for preventing or reducing multiple air pollutants, including . . . . . ***carbon dioxide***, from stationary sources, including fossil fuel power plants."[25]

EPA is required to regulate emissions of air pollutants, including carbon dioxide, under a number of the Clean Air Act's major substantive provisions, when, in EPA's judgment, such emissions cause or contribute to air pollution which "may reasonably be anticipated to endanger public health or welfare."[26] Examples include: section 111 establishing new source performance standards for categories of stationary sources; and section 202 establishing standards for emissions from new motor vehicles. EPA requires that major sources monitor, record, and report emissions of CO_2 pursuant to section 821 of the CAA.[27] Further, the Act's definition of "welfare," specifically includes effects on "climate" and "weather."[28] Section 165(a)(2) of the CAA provides that a major emitting facility is "subject to the best available control technology for each pollutant subject to regulation under [the Clean Air Act] emitted from, or which results from, such facility."[29]

Section 165(a)(2) of the CAA provides that a major emitting facility is "subject to the best available control technology for each pollutant subject to regulation under [the Clean Air Act] emitted from, or which results from, such facility."[30] EPA has taken several actions that indicate carbon dioxide and other greenhouse gases are subject to regulation under the Act, i.e., promulgating monitoring and reporting requirements and approving a state implementation plan that regulates carbon dioxide.[31]

EPA has recognized the need for regulation of greenhouse gas emissions announcing on September 30, 2009 a proposal requiring large industrial facilities that emit at least 25,000 tons of greenhouse gases a year to obtain construction and operating permits covering these emissions.[32] These permits must demonstrate the use of best available control technologies and energy efficiency measures to minimize greenhouse gas emissions. EPA has also finalized a rule to require mandatory reporting of greenhouse

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[25] 42 U.S.C. § 7403(g)(1) (emphasis added).
[26] 42 U. S. C. § 7521(a)(1).
[27] *See*, 40 C.F.R. § 75. Section 821 of Pub.L. 101-549 stated that: "(a) Monitoring.--The Administrator of the Environmental Protection Agency shall promulgate regulations within 18 months after the enactment of the Clean Air Act Amendments of 1990 to require that all affected sources subject to Title V of the Clean Air Act shall also monitor carbon dioxide emissions according to the same timetable as in section 511(b) and (c).
[28] 42 U.S.C. § 7602(h).
[29] 42 U.S.C. § 7475(a)(2).
[30] 42 U.S.C. § 7475(a)(2).
[31] *See* Prevention of Significant Deterioration (PSD): Reconsideration of Interpretation of Regulations That Determine Pollutants Covered by the Federal PSD Permit Program, 74 Fed. Reg. 51535, 51538 (to be codified at 40 C.F.R. pt. 52) (October 7, 2009) (discussing petitioners' arguments for why carbon dioxide is subject to regulation)
[32] *See* Fact Sheet -- Proposed Rule: Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule (available at: http://www.epa.gov/NSR/fs20090930action.html) (Attachment 5).

gas emissions, such as carbon dioxide, from "large sources" in the United States.[33] Under the rule, EPA proposes to require facilities that emit 25,000 metric tons or more per year of greenhouse gas emissions to submit annual reports to EPA. These reporting standards should apply to the current proposal because Shell is proposing to emit approximately 55,000 tons of CO_2 per year.[34]

Recently, the Environmental Appeals Board (EAB) remanded two PSD permits where the permitting agencies failed to articulate a rationale basis for not conducting a BACT analysis for CO_2.[35] In both *Deseret* and *Northern Michigan*, the EAB determined that the permitting authorities had not provided sufficient information in the administrative record as to why a BACT analysis was not required for CO_2. In doing so, the EAB rejected the permitting authorities' arguments as to why CO_2 is not subject to regulation.

In *Deseret*, EPA Region 8 argued it was constrained by the historical agency interpretation that "subject to regulation" meant a pollutant had an actual emission limitation or control, which were not present in section 821's monitoring and reporting requirements. Region 8 also argued that section 821 is not actually part of the CAA because it was not written into the U.S. Code.[36] The EAB flatly rejected Region 8's argument, stating it was at odds with the agency's prior stance on section 821. In doing so, the EAB suggested that CO_2 is subject to regulation under section 821:

> the preamble as a whole augers in favor of a finding that the Agency expressly interpreted 'subject to regulation under this Act' to mean 'any pollutant regulated in Subchapter C of Title 40 of the Code of Federal Regulations for any source type.'[37]

The permitting agencies in *Deseret* and *Northern Michigan* could not provide an adequate explanation why CO_2 is not subject to regulation because there simply is not one. Between section 821 of the CAA and Delaware's emissions limitations on electrical generators, CO_2 is definitively regulated under the CAA and must be subject to a case-by-case BACT analysis for new sources that will emit the pollutant in significant amounts. In the absence of a BACT analysis for Shell's operations, the EPA must provide a legally defensible justification as to why CO_2 is not subject to regulation under the Act.

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[33] *See* Background information on the Proposed Mandatory GHG Reporting Rule (available at: http://www.epa.gov/climatechange/emissions/ghgrulemaking.html) (Attachment 6).
[34] Shell EP EIA at 36.
[35] *See In re: Deseret Power Electric Cooperative*, PSD Appeal No. 07-03, 14 E.A.D. --- (Nov. 13, 2008); *In re: Northern Michigan University Ripley Heating Plant*, PSD Appeal No. 08-02, 14 E.A.D. --- (Feb. 18, 2009).
[36] EPA is reconsidering its interpretation of this provision, *see* PSD: Reconsideration of Interpretation of Regulations That Determine Pollutants Covered by the Federal PSD Permit Program, 74 Fed. Reg. 51535-51549 (Oct. 7, 2009).
[37] *In re: Deseret Power Electric Cooperative*, PSD Appeal No. 07-03, Slip Op. at 3.

C. Shell's Permit Must Require BACT for the CO_2 Emissions To Remain in Line with EPA's Proposed Regulatory Changes.

On December 15, 2009, EPA formally announced that greenhouse gases "endanger both the public health and the public welfare of current and future generations."[38] Although EPA's endangerment findings were promulgated under Clean Air Act section 202(a), which deals with transportation sources, the agency's findings were clear: human activities are increasing the concentrations of greenhouse gases in our atmosphere and are contributing to global climate change, which "may reasonably be anticipated both to endanger public health and to endanger public welfare."[39] In reaching this conclusion, the agency relied upon evidence that demonstrated greenhouse gases pose a risk to food production and agriculture, forestry, water resources, sea level rise and coastal areas, energy infrastructure, and settlements, and ecosystems and wildlife.

As a result of this finding, EPA will be issuing regulations that control CO_2 emissions. It is likely that EPA will finalize the light-duty vehicle rule by the end of March 2010.[40] Once this rule is finalized, there will be no argument that the greenhouse gases are not subject to regulation under the Clean Air Act, and the PSD permitting requirements will be triggered.[41] At that point, which will almost certainly be before EPA finalizes Shell's permit, Shell's operations will be subject to BACT for greenhouse gases.

EPA has recognized that the promulgation of the light-duty vehicle rule will require PSD facilities to regulate GHGs, so the agency has developed temporary applicability thresholds at 25,000 tons per year.[42] Because Shell's operations will emit greenhouse gases in excess of the proposed tailoring threshold,[43] we request that the permit include BACT for these greenhouse gases. This step is necessary to protect the marine life and habitat that has supported North Slope communities since time immemorial.

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[38] 74 Fed. Reg. 66496 (2009) (to be codified at 40 C.F.R. ch. I) (Dec. 15, 2009).
[39] *Id.* at 66497.
[40] Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 74 Fed. Reg. 55292, 55300 (to be codified at 40 C.F.R. pt. 51, 52, 70, and 71) (Oct. 27, 2009) ("as soon as GHGs become regulated under the light-duty motor vehicle rule, GHG emissions will be considered pollutants "subject to regulation" under the CAA and will become subject to PSD and title V requirements.")
[41] *Id.* at 51545.
[42] Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 74 Fed. Reg. 55292, 55305 (to be codified at 40 C.F.R. pt. 51, 52, 70, and 71) (Oct. 27, 2009 ("The first phase entails the establishment of applicability thresholds at the 25,000 tpy CO2e levels, and significance levels at between 10,000 and 25,000 tpy CO2e..")
[43] *See* Shell EP EIA at 36 (estimating that the Discoverer will emit an estimated 20,000 tons of carbon dioxide while the Discoverer and its support vessels will emit about 55,000 tons per year.)

This would not be the first permit to include a BACT analysis for CO_2. A combined petroleum refinery and IGCC power plant completed a CO_2 BACT analysis for its permit.[44] This analysis was performed *almost a year ago* in light of the rapid changes in the political, regulatory and legal framework. Certainly at this point in time, when CO_2 regulations are eminent, at the very least Shell needed to undertake a BACT analysis and delineate technologies that could be used to control its CO_2 emissions in the very likely event such measures are required.

II. Compliance With The New NAAQS For Nitrogen Dioxide Is Also Necessary.

On February 9, 2010 EPA issued a final rule to strengthen its national ambient air quality standard for nitrogen dioxide.[45] With this action EPA established a new 1-hour standard at a level of 100 parts per billion (ppb) to supplement the existing annual standard of 100 $\mu g/m^3$. According to EPA's fact sheet on this regulatory action:

> "[t]his level defines the maximum allowable concentration anywhere in an area. It will protect against adverse health effects associated with short-term exposure to NO_2, including respiratory effects that can result in admission to a hospital."[46]

EPA must include a modeling demonstration for this new NAAQS in its final permit for Shell's Chukchi Sea operations. Even though the effective date of the new NAAQS may not occur until after the final permit is issued, EPA cannot ignore the imminent requirement of this very important new health-based standard.[47] It is imperative that EPA require Shell to demonstrate compliance with the new 1-hour NAAQS for NO_2 for its operations in the Chukchi Sea since the regulation will be effective ***before*** Shell's operations begin. Shell must be able to demonstrate compliance with all requirements that are effective during its period of operation.

There is precident for sources complying with regulatory requirements prior to final agency action. As mentioned earlier, the Hyperion Energy Center in EPA Region 8 voluntarily conducted a BACT determination for CO_2 that was completed because the source "recognize[s] adding CO_2 emissions is an important issue, on which the political, regulatory, and legal framework may be changing."[48]

We would like to see Shell commit to demonstrating compliance with EPA's new 1-hour

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[44] Hyperion Energy Center BACT Analysis for CO_2 (March 2009) (available at: http://www.hyperionec.com/files/HEC_CO2_BACT_Analysis.pdf) (Attachment 7)
[45] Final Rule Nitrogen Dioxide NAAQS, 75 Fed. Reg. 6474 (Feb. 9, 2010).
[46] "Fact Sheet Final Revisions to the National Ambient Air Quality Standards For Nitrogen Dioxide" (available online at http://www.epa.gov/air/nitrogenoxides/pdfs/20100122fs.pdf) (Attachment 8).
[47] The effective date of the rule is April 12, 2010.
[48] Hyperion Energy Center Best Available Control Technology (BACT) Analysis for Emissions of Carbon Dioxide, March 2009, at 2 (Attachment 7).

NAAQS for NO_2, prior to EPA's issuance of a final permit, in recognition of the important health protection measures that such a demonstration will provide. It is important to the residents of the NSB communities that EPA uphold the highest standards of health protection possible.

III. BACT Must Be Applied To All The Vessels And Emission Units That Shell Intends To Use In Order To Ensure Compliance With The Clean Air Act.

The Clean Air Act requires Best Available Control Technology (BACT) for both the Discoverer, an OCS source, and its support vessels. Thus, before issuing a Prevention of Significant Deterioration (PSD) permit to a major new stationary source (source), the EPA must conduct a BACT analysis for each pollutant that the source has the potential to emit in significant quantities.[49]

In the draft PSD permit for Shell's Chukchi operations, BACT has been applied to select emission units on-board the Discoverer and to the support vessel only while it is attached to the Discoverer. BACT has not been required for the Discoverer's propulsion engine or the other numerous vessels that are associated with Shell's proposed operations (hereafter ancillary fleet or ancillary vessels). These vessels include two icebreakers, a resupply ship, and an oil response fleet (composed of one offshore management ship and three 34-foot work boats) as well as all the vessels Shell has represented will remain more than 25 miles away from the Discoverer. This is significant because the ancillary vessels account for at least 95 percent of Shell's overall emissions for five of the criteria air pollutants and the emissions from Discoverer's propulsion engine have yet to be calculated.[50]

The ancillary vessels and Discoverer's propulsion engine must be regulated as part of the emissions from the "OCS source." Issuing a permit that fails to require BACT for these vessels and engines would result in violations of section 328 of the CAA, contravene Congress's clear intention to regulate the emissions from vessels associated with drill ship exploration, would be counter to the goals of the PSD program which include protecting public health and welfare, and areas of "regional natural" value,[51] and a misapplication of 40 C.F.R. § 55.2.

A. The Discoverer Becomes An OCS Source Before The Anchors Are Set.

In the revised proposed OCS PSD permit for Shell's Chukchi Sea exploratory drilling program, EPA has specifically requested comment on when the Discoverer is considered

[49] 42 U.S.C. § 7475(a)(4).
[50] *See*, Appendix A, EPA Re-Proposed Stmt of Basis at A-1: Summary of Annual Emissions for the Discoverer and the Associated Fleets. (*i.e.*, the Discoverer is projected to emit 51.23 tons/year of NO_x while the associated fleet is projected to emit 1,137.04 tons/year of NO_x. Overall, Shell's operations will emit 1188.27 tons/year of NO_x, of which the associated fleet is responsible for 95.7%)
[51] 42 U.S.C. § 7470.

to be an OCS source and has proposed Options 1 and 2.[52] We appreciate the agency's consideration of alternative interpretations of when the Discoverer becomes an OCS source. We encourage EPA to adopt Option 3 as described below.

We developed Option 3 as an alternative interpretation of when the Discoverer becomes an OCS source to ensure compliance with the plain language of the Clean Air Act in the statutory definition of OCS source. [53] Our review of the options set forth by EPA revealed that Option 1 reflects the same definition of OCS source that EPA proposed in the August 2009 draft permit and Option 2 reflects the interpretation Shell has advocated for in its comments.[54] Since neither of these options complies with the statutory definition of OCS source, we encourage EPA to adopt Option 3.

1. We Present Option 3 As The Appropriate Interpretation Of When The Discoverer Becomes An OCS Source.

Under Option 3 the Discoverer becomes an OCS source when it enters the 25-mile radius of the drill site. Congress intended to regulate drill ship exploration that has the potential to emit air pollutants, is authorized by OCSLA, and is "in or on waters above the Outer Continental Shelf."[55] The propulsion engine on the Discoverer is intrinsic to its operations and will transport the ship within the 25-mile radius surrounding the drill site when Shell is moving on to and off the site and moving between lease blocks.[56] Shell's application also states that the rig may need to leave the drill-site and return due to adverse ice conditions or other factors.[57] Thus, the statutory definition of OCS source includes the Discover's propulsion engine as the ship moves within the 25-mile radius of the drill site. These movements of the Discoverer are akin to the type of pre-construction activities that are routinely regulated by EPA under the PSD program.

Option 3 addresses several of our concerns with the previous interpretation of when the Discoverer becomes an OCS source as put forth by EPA last August. It also addresses the concerns raised below with the two options currently provided for consideration. More importantly, it is critical that emissions that can be regulated under the Act are subject to regulation now, because this permit will set the bar for the myriad of other

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[52] EPA Re-Proposed Stmt of Basis at 20 - 21.
[53] 42 U.S.C. § 7627(a)(4)(C).
[54] Shell's comments on the original draft permit included a suggestion that the Discoverer does not become an OCS source until the anchoring process is complete. *See* EPA Stmt. of Basis at 20.
[55] 42 U.S.C. § 7627(a)(4)(C).
[56] *See* Air Sciences, Outer Continental Shelf Pre-Construction Air Permit Application Revised Frontier Discoverer Chukchi Sea Exploration Drilling Program Prepared for Shell Offshore Inc. at 25 (Feb. 2009) (hereafter "Shell Revised OCS App.") (The potential to emit does not include "the Discoverer propulsion emissions for the approximate four hours of time to bring the Discoverer the final 25 miles to the drill site and move it away").
[57] Shell Revised OCS App. at 4.

offshore oil and gas exploration activities that we see coming down the pike.[58] Shell's permit demonstrates the incredibly significant impact just one operator can have on air quality in the Arctic and why it is essential that as many of the emissions from these operations are regulated under the Clean Air Act as possible. It is for this reason that we have been encouraging the EPA to ensure that the emissions from the Discoverer's propulsion engine as well as the emissions from all vessels that are a part of Shell's operations be subject to BACT.

EPA impermissibly excluded an entire category of unattached vessels that are authorized under the OCSLA – *i.e.*, all the equipment and activities that are authorized under the OCSLA but are not attached to the seabed. In the preamble to the regulatory definition of "OCS source," EPA explains why it chose to require that vessels be attached to the seabed:

> Section 328(a)(4)(C)(ii) defines an OCS source as a source that is, among other things, regulated or authorized under the OCSLA. The OCSLA in turn provides that the Department of the Interior ("DOI") may regulate "all installations and other devices permanently or temporarily attached to the seabed, which may be erected thereon for the purpose of exploring, developing, or producing resources therefrom, or any such installation or other device (other than a ship or vessel) for the purpose of transporting such resources." 43 U.S.C. § 1333(a)(1). Vessels therefore will be included in the definition of "OCS source" when they are "permanently or temporarily attached to the seabed" and are being used "for the purpose of exploring, developing or producing resources therefrom."[59]

The preamble highlights that EPA developed the requirement that vessels be attached to the seabed because of its (mistaken belief) that DOI only has the authority to *regulate* attached vessels under the OCSLA. OCSLA negates this.

Vessels authorized under OCSLA include not only those attached to the seabed but also those involved with exploration, development, and production.[60] Those activities, as defined under OCSLA, require a number of vessels that are *never* attached to the seabed. For example, "exploration" includes seismic testing with ships,[61] "development" includes "geophysical activity,"[62] and "production" includes "transfer of minerals to shore."[63]

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[58] For example, BP is proposing work on the Liberty prospect, and both ConocoPhillips and Statoil are anticipating submitting exploration plans in the near future.
[59] 57 Fed. Reg. 40792, 40793 (Sept. 4, 1992).
[60] 42 U.S.C. § 7627(a)(4)(C).
[61] 43 U.S.C. § 1331(k).
[62] 43 U.S.C. § 1331(l).
[63] 43 U.S.C. § 1331(m).

2. Options 1 And 2 Do Not Ensure That All Of Shell's Emissions Are Regulated Once The Discoverer Is An OCS Source.

We encourage EPA to adopt Option 3 for regulating the Discoverer as an OCS source because, as discussed below, neither Option 1 nor Option 2 comport with the statutory definition of OCS source or would be protective enough of the air quality in the Arctic.

Option 1 is the same definition of OCS source that EPA included in the August 2009 proposed permit.[64] Under this option, the Discoverer becomes an OCS source at the point in time when a single anchor is placed at the drill site and ceases to be an OCS source at the time when the last anchor is removed.[65] Option 1 fails to regulate the emissions from the Discoverer when it engages in pre-construction activities – namely mudline cellar construction.

Option 2 provides that the Discoverer becomes an OCS source when an on-site company representative declares that the Discoverer is "secure and stable in a position to commence exploratory activity at the drill site."[66] EPA developed Option 2 in response to Shell's suggestion that until the anchoring process is complete, the Discoverer is not "erected" for the purposes of exploring for resources within the regulatory definition of OCS source.[67]

Presumably, both Options 1 and 2 are based on the narrow regulatory definition of OCS source, which only includes vessels 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 section 4(a)(1) of OCSLA (43 U.S.C. § 1331 et seq.); or

(2) Physically attached to an OCS facility, in which case only the stationary source aspects of the vessels will be regulated.[68]

The regulatory definition is far more narrow than the broad and inclusive statutory definition, which provides:

> The terms "Outer Continental Shelf source" and "OCS source" include any equipment, activity, or facility which--
>
> (i) emits or has the potential to emit any air pollutant,

[64] EPA Re-Proposed Stmt of Basis at 21.
[65] *Id.*
[66] *Id.*
[67] *Id.* at 20.
[68] 40 C.F.R. § 52.2.

(ii) is regulated or authorized under the Outer Continental Shelf Lands Act (43 U.S.C.A. § 1331 et seq.], and

(iii) is located on the Outer Continental Shelf or in or on waters above the Outer Continental Shelf.

Such activities include, but are not limited to, platform and drill ship exploration, construction, development, production, processing, and transportation. For purposes of this subsection, emissions from any vessel servicing or associated with an OCS source, including emissions while at the OCS source or en route to or from the OCS source within 25 miles of the OCS source, shall be considered direct emissions from the OCS source.

However, when EPA promulgated the OCS CAA regulations the agency replaced Congress's inclusive definition of "OCS source" with an exclusive one. Options 1 and 2's basis in the overly narrow regulatory definition instead of the more inclusive statutory definition is unlawful.

As we previously explained, Congress's broad definition of "OCS source" is unambiguous and left EPA with no authority to restrict the definition of "OCS source" to only those vessels that are attached to the seabed floor. This is unlawful for the reasons described by the Supreme Court in *Massachusetts v. EPA*. There, the Court rejected EPA's interpretation that excluded carbon dioxide from the Clean Air Act's broad definition of "air pollutant."[69] The Court found that the inclusive and "sweeping" language in the statutory definition of "air pollutant," specifically "includes any," was unambiguous and precluded EPA's restriction of the definition that excluded "carbon dioxide."

Just as the EPA had in *Massachusetts*, the agency has attempted to interpret and restrict a statutory definition that is unambiguous. The statutory definition of OCS source is an inclusive definition because Congress chose broad language, specifically, "The term[] . . . OCS source' *include[s] any* equipment, activity."[70] EPA has impermissibly restricted the statutory definition of "OCS source" to vessels that are "permanently or temporarily attached to the seabed," in both the regulatory definition of OCS source and its application of the regulatory definition to the Discoverer.[71]

Congress emphasized that the definition is inclusive, not exclusive, when it suggested some of the activities that would fall within the definition: "[s]uch activities include, *but are not limited to*."[72] Because Congress only required that an OCS source meet the three

[69] *See Massachusetts v. EPA*, 549 U.S. at 528-529 (stating that the CAA definition of "air pollutant" is unambiguous because Congress used inclusive language).
[70] 42 U.S.C. § 7627(a)(4)(C) [emphasis added].
[71] 40 C.F.R § 55.2.
[72] 42 U.S.C. § 7627(a)(4)(C) [emphasis added].

elements listed in (i) - (iii),[73] EPA did not have the authority to limit the definition to those vessels that are attached to the seabed. Nothing in the statutory definition of OCS source suggests that the time at which a drill-ship becomes an OCS source hinges upon whether the vessel is attached to the seabed. In fact, the Discoverer meets the three statutory elements days before the anchoring process even begins, triggering the statute's jurisdiction.

With respect to Option 2, it is clear that Shell suggested Option 2 as a way for it to *avoid* having to control the emissions from the Discoverer's propulsion engine. Shell's application for the August 2009 proposed permit stated that the propulsion engine will be shut down before the first anchor is dropped.[74] However, in comments on the August 2009 proposed permit, Shell, MMS, and AEWC highlighted a major problem with this proposal: it prohibited Shell from using the propulsion engines during the anchoring and tensioning process and throughout the exploratory drilling operations:

- MMS "expressed concern" that the permit prohibited the Discoverer from using the propulsion engines after the anchoring process was complete.[75]

- AEWC stated that EPA should consult with the coast guard to determine if it is safe for Shell to discontinue the propulsion engine while setting anchors, especially in rough sea conditions.[76]

- Shell also stated that it would try to comply with the permit requirement not to use the propulsion engines during the anchoring process but if that proved to be dangerous, Shell would request a permit modification.[77]

Based upon these concerns, it is likely that at some point, EPA will have to allow Shell to use the propulsion engine during the anchoring and tensioning process. If this is true, then its emissions must be regulated under the Clean Air Act.

Furthermore, EPA itself has noted that the Discoverer can safely drill before all eight anchors are placed.[78] Thus, Option 2 presents a scenario for regulation that is even more restrictive than that provided in the regulatory definition of OCS source since it requires both attachment to the seabed floor and a declaration of position. Basing the regulation

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[73] 42 U.S.C. § 7627(a)(4)(C).
[74] Shell Revised OCS App. at 6.
[75] Letter from John Groll, MMS to EPA at 2 (Oct. 2, 2009) (Attachment 9).
[76] *See* AEWC comments at 14 (Attachment 10) (available at: http://www.epa.gov/region10/pdf/permits/shell/chukchi_aewc_icas_nsb_combined_102009.pdf) ("Typically large vessel propulsion engines continue to operate while anchors are set and are started prior to releasing anchors, this way the captain has full control of the vessel while anchors are set and released. Setting a large drillship adrift in heavy ice conditions without an operational propulsion systems does not appear to be a safe plan.")
[77] EPA Stmt. of Basis at 20.
[78] EPA Re-Proposed Stmt. of Basis at 19 (citing United States Patent No. 4,509,448).

of the Discoverer on this Option would readily be found to violate not only the plain language of the statute but also EPA's regulation.

B. Shell's Ancillary Vessels Supporting the OCS Source (the Discoverer) are Considered Direct Emissions From the Discoverer for Purposes Of BACT Regulation.

In section 328 of the Clean Air Act, Congress directed EPA to promulgate regulations to control air pollution over the Outer Continental Shelf (OCS) and provided a broad definition of OCS source.[79] The Conference Report accompanying this provision explains:

> Marine vessels emissions, including those from crew and supply boats, construction barges, tugboats, and tankers, which are associated with an OCS activity, will be included as part of the OCS facility emissions *for the purposes of regulation.* Air emissions associated with stationary and in-transit activities of the vessels will be included as part of the facility's emissions for vessel activities within a radius of 25 miles of the exploration, construction, development or production location. This *will ensure* that *the cruising emissions from marine vessels are controlled and offset as if they were part of the OCS facility's emissions*.[80]

Thus, the legislative history evinces Congress's intent to count marine vessel emissions as direct emissions from an OCS source not solely for the purposes of a potential to emit calculation, but also for the "purposes of regulation." The Senate Report confirms Congress's intent to regulate emissions from vessels:

> [A]ll emissions from marine vessels (including engine emissions) which service or are associated with an OCS source, are subject to the same permitting, enforcement, monitoring, reporting, and offset requirements which would apply if these vessels were located in the corresponding onshore (State waters) area. This is intended to include emissions generated while vessels are traveling within the same air basin. These requirements should apply to vessel emissions occurring while at the OCS source, or when en route to or from the OCS source and to or from the corresponding onshore area.[81]

Despite the clear statutory language of the CAA and intent of Congress, the emissions from Shell's ancillary vessels are not being controlled.

The Discoverer clearly meets the definition of an "OCS source" under section 328 of the Act. In order to be subject to the PSD program, the emissions from the Discoverer's

[79] 42 U.S.C. § 7627(a)(4)(C).
[80] 136 Cong. Rec. S16895-01 (Oct. 27, 1990) (emphasis added).
[81] S. Rep. 101-228, 1990 U.S.C.C.A.N. 3385 (Dec. 20, 1989).

engines (minus the propulsion engine) *and* the ancillary vessels were added together and Shell's operations were determined to be a "major source" and thus, subject to regulation under the PSD program.[82] But when it came time to apply control technologies to Shell's operations, the ancillary vessels (aside from the supply vessel when it is attached to Discoverer) were excluded.

Application of BACT to all the ancillary vessel and propulsion engine emissions is necessary because they are "emissions from [] vessel[s] servicing or associated with an OCS source,"[83] here the Discoverer, "including emissions while at the OCS source"[84] and such emissions "shall be considered direct emissions from the OCS source."[85] These emissions "will be included as part of the OCS facility emissions *for the purposes of regulation*."[86] Therefore, since Shell's ancillary vessels are associated with the Discoverer (irrespective of whether they are OCS sources in and of themselves), they are to be considered for regulatory purposes as direct emissions from the source.[87] The statutory definition of "OCS source" does not exempt any activities or parts of an OCS source from the control technologies requirements.[88]

Presumably BACT was not applied to the ancillary vessels based on EPA's application of its regulatory definition of "OCS source,"[89] to Shell's proposed operations. The regulatory definition as applied here violates the plain language of the statute.[90]

1. EPA's Interpretation of OCS Source is Inconsistent with Its Implementation of the PSD Program.

The EPA's application of the term "OCS source" in Shell's permit is also inconsistent with the agency's administration of the PSD program as a whole. In its PSD regulations, EPA defined a "stationary source" – *i.e.*, one that is subject to regulation under the program – as "any building, structure, facility, or installation," which in turn is defined as

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[82] *See* Appendix A, EPA Stmt of Basis at A-1. The supporting vessels will emit the following percentages of the total projected project emissions for each criteria pollutant: 98% of CO, 97% of NOx, 97% of $PM_{2.5}$, 98% of PM_{10}, 99.8% of VOC, and 85.7% of lead. Shell estimated that the ancillary vessels have the potential to emit significant amounts of criteria pollutants in an overwhelmingly greater amount than the Discoverer.
[83] 42 U.S.C. § 7627(a)(4)(C).
[84] 42 U.S.C. § 7627(a)(4)(C).
[85] 42 U.S.C. § 7627(a)(4)(C).
[86] 136 Cong. Rec. S16895-01 (Oct. 27, 1990) (emphasis added).
[87] We also point out that the ancillary vessels are authorized under the Outer Continental Shelf Lands Act (OCSLA) because Minerals Management Service (MMS) must approve Shell's exploration plan and issue a permit to commence exploration before Shell's operations – which the supporting vessels are an essential part of – can commence. *See* 43 U.S.C. § 1340(b).
[88] 42 U.S.C. § 7627(a)(4)(C).
[89] *See* 40 C.F.R. § 55.2.
[90] *See* 42 U.S.C. § 7627(a)(4)(C).

"all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control)."[91]

This is an incredibly broad interpretation of the activities that are covered under the PSD program. Indeed, the EPA has determined that facilities a mile or more apart are the same source for purposes of the PSD program.[92] Therefore, it is arbitrary for EPA on the one hand to implement the PSD program broadly on-shore, while narrowing the same program significantly when the activities are occurring offshore. This interpretation is also contrary to Congressional intent that OCS sources comply with the same requirements as non-OCS sources.[93]

IV. The Potential To Emit Calculations Fail To Account for All of Shell's Proposed Operations.

As an initial matter, we commend EPA for its clarification of how and why nonroad engines are a part of the Potential to Emit calculations for OCS activities.[94] We agree that "the exclusion of nonroad engines from the general definition of 'stationary source' in Section 302(z) of the CAA is overridden by the more specific provisions in Section 328 of the CAA and 40 C.F.R. § 55.2."[95]

Our concerns with the existing PTE calculations are with the exclusion of the Discoverer's propulsion engine and other vessels and contingencies from Shell's overall potential to emit calculations. With respect to the Discoverer's propulsion engine, as discussed previously, because this engine is part of the drill rig and used in the "construction" and "transportation" of the drill rig, its potential to emit needed to be calculated so BACT could be applied to its emissions.[96] Similarly, a Marine Mammal Observer vessel is listed as part of Shell's proposed operations. It does not appear that the emissions from this vessel were included in the PTE.

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[91] 40 C.F.R. § 52.21.

[92] *See* EPA, Memorandum from Douglas E. Hardesty to Robert R. Robichaud, Re: Forest Oil Kustatan Facility and Osprey Platform Construction Permitting Applicabilitv Determination (Aug. 21, 2001) (Attachment 11) (2.8 miles); EPA, Memorandum from Director to Clyde B. Eller, Re: Shell Oil Company Wilmington Complex Specification of "Source" (May 16, 1980) (Attachment 12).

[93] *See* Senate Report 101-228, 1990 U.S.C.C.A.N. 3385, 3463 (December 20, 1989) (explaining that "[t]his section of the bill is intended to ensure that air pollution from OCS activities does not degrade the air quality in coastal regions of the United States. This is to be achieved by applying the same air quality protection requirements as would apply if the OCS sources were located within the corresponding onshore area.")

[94] EPA Re-Proposed Stmt of Basis at 22-23.

[95] *Id.* at 23.

[96] 42 U.S.C. § 7627(a)(4)(C).

Emissions associated with emergency situations, namely oil spills, were not included in the PTE. An oil spill or some other similar emergency situation would result not only in additional, unaccounted for vessel emissions but also emissions from, for example, in situ burning of spilled materials. Major sources of air pollution cannot automatically escape regulation or liability for excess emissions resulting from foreseeable or unforeseeable circumstances.

Under the PSD program, EPA has maintained a longstanding policy that the Clean Air Act does not allow automatic exemptions for excess emissions during startup, shutdown, and malfunction (SSM) events.[97] Recently, the Tenth Circuit in *Arizona Public Service Co. v. U.S.* highlighted that the agency's "longstanding policy makes clear that excess emissions resulting from malfunctions are violations of the Clean Air Act, for such emissions can interfere with attainment of the national air standards."[98] The EAB relied upon this policy to remand a PSD permit that included a provision exempting a coal-fired steam electric generating station from otherwise applicable emissions limits during SSM events.[99]

Just as startup, shutdown, and malfunction events can be foreseen and planned for at a coal-fired power plant, they can be foreseen and planned for as part of an oil spill response event at an off-shore drilling site. Indeed, several legal requirements mandate that Shell meticulously plan for a response to an oil spill.[100] Because an oil spill is such a likely, and not merely an unforeseeable event, Shell is employing an entire "oil spill response" (OSR) fleet as part of its proposed operations. One of the OSR vessels, the Nanuq, will be positioned about 5,000 meters away from the Discoverer and will be used to conduct "on-water drills" for training, approximately 8-hours at a time, no more than once per day.[101]

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[97] *See, i.e., Indeck-Elwood, LLC*, PSD Appeal No. 03-04, Slip Op. at 66 (Sept. 27, 2006) ("Indeed, EPA has, since 1977, disallowed automatic or blanket exemptions for excess emissions during startup, shutdown, maintenance, and malfunctions by defining most periods of excess emissions as "violations" of the applicable emission limitations."), citing *In re Tallmadge Generating Station*, PSD Appeal No. 02–12, at 24 (EAB, May 21, 2003) (stating that EPA has issued several guidance documents over the years "clearly expressing the Agency's long-standing position that automatic exemptions for excess emissions during startup and shutdown periods cannot be reconciled with the directives of the CAA.").

[98] 562 F.3d 1116 (10th Cir. 2009); *See also* 72 Fed. Reg. at 25,702, 25,705; State Implementation Plans: Policy Regarding Excessive Emissions During Malfunctions, Startup, and Shutdown (Sept. 20, 1999) (hereinafter Herman Memorandum); Policy on Excess Emissions During Startup, Shutdown, Maintenance, and Malfunctions (Feb. 15, 1983) (hereinafter Bennett Memorandum).

[99] *Indeck-Elwood, LLC*, PSD Appeal No. 03-04, Slip Op. at 71, 76 (Sept. 27, 2006).

[100] *See e.g.*, Shell Chukchi Sea ODPCP (available at: http://www.mms.gov/alaska/ref/ProjectHistory/2009_Chukchi_Shell/2009_0623_Shell_cplan.pdf) (Attachment 13).

[101] EPA Re-Proposed Stmt. of Basis at 48.

Shell's response to an oil spill would release a large quantity of emissions that are unaccounted for in the draft Revised Permit. By moving the entire OSR fleet to the drill site, cleaning up oil, and conducting other response activities, the OSR fleet will release air emissions by using the propulsion engines, generators, and other equipment. Moreover, Shell has suggested that it will burn spilt materials (*i.e.*, oil and/or gas) as a method to clean up a spill, certainly resulting in even more significant air emissions.[102] To provide Shell with an automatic exemption for these excess emissions would be contrary to EPA's longstanding policy under the PSD program and would violate the Clean Air Act. Excess emissions resulting from an oil spill response could have the potential to violate the national ambient air quality standards and other Clean Air Act requirements, thus Shell's permit must account for these emissions.

Specifically, the OSR fleet's activities and the impacts of burning spilt materials resulting from an oil spill response must be included in the potential to emit analysis. "Potential to emit" means "the maximum capacity of a source to emit a pollutant under its physical and operational design."[103] By employing and training the OSR fleet, Shell has included an oil spill response within the operational design of the OSR fleet. Because these activities fall within the operational design, they increase the maximum capacity of Shell's operations and must be accounted for in the PTE.

The EPA concludes that

> There are other vessels that will be associated with Shell's exploratory drilling program, such as an oil tanker, a barge, and shallow water landing craft. Based on Shell's application submittals, none of these vessels will be operating within 25 miles of the Discoverer while the Discoverer is an OCS source. Emissions from these other vessels are therefore not included in determining the potential to emit of Shell's exploration drilling program.[104]

Shell needs to explain whether these vessels will be used within 25 miles of the Discoverer in the event of an oil spill or other emergency situation. If so, the emissions from these vessels must be included in Shell's PTE.

As EPA explained, "determining a project's PTE is essential for determining . . . the scope of PSD review, in particular, the pollutants that are subject to application of BACT, analysis of ambient air quality impacts from the project, . . . and analysis of impacts on

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[102] Shell, Oil Discharge Prevention and Contingency Plan at § 1.7 pages 1-90-1-92, 3-23-3-24, 3-34-3-35, 3-37, 3-40-3-41 (available at: http://www.mms.gov/alaska/ref/ProjectHistory/2009_Chukchi_Shell/2009_0623_Shell_cplan.pdf) (Attachment 13).

[103] 40 C.F.R. § 52.21(b)(4).

[104] EPA Re-Proposed Stmt of Basis at 23.

soils and vegetation."[105] Due to the importance of the PTE calculations, it is imperative that these issues are addressed with Shell and a permit is proposed for public input that takes *all* of Shell's proposed emissions into account as required by the Clean Air Act.

1. A Calculation of Shut Downs and Start Ups in Light of Mitigation Measures that Will be Necessary to Protect Marine Mammals is also Necessary.

Shell states in its permit application that while "[s]ounds from the *Discoverer* have not previously been measured in the Arctic or elsewhere," "mitigation as described for seismic activities including ramp ups, power downs, and shut downs should not be necessary for drilling activities".[106] We disagree that the now typical mitigation measures for activities in the Arctic – *i.e.*, of powering or shutting down when marine mammals are sited and powering up when the marine life has moved on – will not be required of Shell for its drilling operations.

Shell is uncertain of the level of noise that will be emitted by the Discoverer. It includes estimates from 1987 from a drill ship and nearby support ship of "134 dB re 1 μPa at 0.2 km" and another estimate of icebreaker noise of "175 dB re 1 μPa (rms) and 181 dB re 1 μPa (rms), for drilling and icebreaking, respectively" which Shell reduced by "15dB."[107] Putting the need for measurements from the Discoverer aside, the numbers Shell has provided indicate that ramp downs or shut downs may be required to mitigate impacts to marine mammals from its operations. Thus, we ask that EPA ensure that ramp downs and ramp ups, and shut downs and start ups be taken into account in determining the emissions from Shell's operations, as well as the necessary best available control technologies.

V. In Several Instances A BACT Analysis Was Not Performed For Emissions Units And In Other Instances Improvements Are Required For The Analysis That Was Performed.

For all sources subject to BACT, EPA must establish an "emission limitation based on the maximum degree of reduction" for each pollutant that the source will emit in significant quantities.[108] To determine the appropriate emission limitation, the EPA may

[105] EPA Stmt of Basis at 28.
[106] Shell Chukchi Sea Marine Mammal Monitoring and Mitigation Plan at 3-4. We also point out that Shell notes elsewhere in its application that "[t]he presence of MMOs onboard drilling and support vessels will be a core component of compliance with the 4MP. The MMOs will be responsible for collecting basic data on observations of marine mammals and for implementing mitigation measures including vessel avoidance measures and factored into *decisions concerning operational shutdown*." Shell Revised OCS App. at 145 (emphasis added).
[107] Shell Chukchi Sea Marine Mammal Monitoring and Mitigation Plan at 3-4.
[108] 42 U.S.C. § 7479(3).

take into account, "energy, environmental, and economic impacts and other costs."[109] In doing so, the EPA must adequately justify and explain its decision to eliminate control technologies due to technical infeasibility or collateral impacts.[110]

In applying BACT here, EPA utilized the top-down approach.[111] As EPA explained in its New Source Review Workshop Manual:

> the top-down process provides that all available control technologies be ranked in descending order of control effectiveness. The PSD applicant first examines the most stringent--or "top"--alternative. That alternative is established as BACT unless the applicant demonstrates, and the permitting authority in its informed judgment agrees, that technical considerations, or energy, environmental, or economic impacts justify a conclusion that the most stringent technology is not "achievable" in that case. If the most stringent technology is eliminated in this fashion, then the next most stringent alternative is considered, and so on.[112]

Thus, BACT requires that EPA do more than summarily dismiss technologies and instead provide "a clearly ascertainable basis for a conclusion."[113] In *Knauf Fiber Glass*, the Environmental Appeals Board was unable to ascertain whether a PSD permit included the best available control technology for the source because the permitting authority did not provide proper documentation of the potential control technologies and a technical feasibility analysis. The EAB required the permitting authority to conduct a supplemental BACT analysis that included a list of control options, an explanation of the technical feasibility analysis, and justifications for eliminating control options.[114]

In Shell's draft and re-proposed permit, EPA purports to have set BACT for all required sources. EPA's has clearly conducted a more thorough BACT review for this re-proposed permit, but the re-proposed version still does not reflect a comprehensive BACT application. A rigorous analysis must be undertaken to arrive at BACT for *all* required sources. In situations like this, the EAB has emphasized that an agency's less than rigorous analysis is not BACT:

> If reviewing authorities let slip their rigorous look at 'all' appropriate technologies, if the target ever eases from the 'maximum degree of reduction' available to something less or more convenient, the result may be somewhat protective, may be superior to some pollution control

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[109] *Id.*
[110] *In re: Knauf Fiber Glass, GMBH*, 8 E.A.D. 121, 131 (Feb. 4, 1999) (remanding a PSD permit to the permitting agency).
[111] *See* EPA, New Source Review Workshop Manual (1990) (available at: http://www.epa.gov/ ttn/nsr/gen/wkshpman.pdf).
[112] *Id.* at B.2.
[113] *In re: Knauf Fiber Glass*, 8 E.A.D. at 134.
[114] *Id.*

elsewhere, but it will not be BACT.[115]

In Shell's draft and re-proposed permit, EPA has not yet met the rigorous BACT demands because the agency still has not: (1) adequately supported its decision to eliminate the best available control technology for several engines and pollutants; and (2) conducted BACT for the propulsion engines and ancillary vessels.

A. The Re-Proposed Best Available Control Technology (BACT) Emission Limits Do Not Necessarily Reflect the Maximum Level of Control that Can be Achieved.

1. NO_x BACT analysis for MLC compressor engines.

We appreciate the more detailed investigation of add-on controls for reducing NO_x emissions from the MLC engines and, in particular, the cost analysis of SCR on these engines as well as the information on CARB's PERP program and the associated BACT analysis for participating engines.

2. NO_x BACT analysis for smaller compression ignition internal combustion engines.

Again, we appreciate the more thorough look at BACT for these smaller engines, including the additional evaluation of re-powering and re-tooling options (e.g., cam shaft reengineering). Shell's upgrade of the one logging unit to a Tier 3 engine is a step in the right direction with a net decrease in emissions even considering the increased capacity of the unit. EPA's re-proposed BACT for the other smaller compression ignition engines on the Discoverer, however, remains "good combustion practices."[116] This BACT determination applies to the hydraulic power unit (HPU) engines, cranes, cementing units and logging winch, which collectively represent over 80 percent of the impact to maximum annual NO_x concentrations from Shell's exploration activities. We do not support EPA's conclusion that simply employing "good combustion practices" for all of these engines is the best available control technology.

In particular, we think EPA should reconsider the option for re-powering the two HPU units as BACT for these engines. The HPU's are prime candidates for re-powering to Tier 3 engines and, in fact, Shell indicates that the only technical consideration is the "additional effort [that] would be necessary to attach all the necessary hydraulic lines and other associated equipment."[117] The cost-effectiveness for these engines – at $10,000 per ton of NO_x removed - is favorable, contrary to Shell's conclusions. Shell states that:

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[115] *In re: Northern Michigan University Ripley Heating Plant*, PSD Appeal No. 08-02, Slip Op. at 16, 14 E.A.D. --- (EAB Feb. 18, 2009).
[116] *See* EPA Stmt of Basis at 63; EPA draft OCS PSD Re-Proposed Permit for Shell Chukchi Sea Operations, at Conditions G.3, H.3 and I.3.
[117] ENVIRON report: Diesel Engine Best Available Control Technology Analysis, December 2009, Project No. 0322090A, p. 21.

> "In conclusion, none of the engine replacement options evaluated are less than $10,000 per ton of NO_x removed. Given the very small quantity of NO_x that would be eliminated by these engine replacements, engine replacement is not cost effective and not BACT."[118]

Re-powering the HPU units is cost effective. There are two versions of Shell's BACT analysis contained in the permit record – one estimates a cost for re-powering the HPU units at $8,671 per ton of NO_x removed (clearly less than $10,000 per ton) and the other at just over $10,000 per ton ($10,580).[119] If $10,000 per ton is the threshold of consideration, as implied in Shell's assertion, then certainly this alternative must be more seriously considered. In fact, EPA did not even address this alternative in the statement of basis for the re-proposed permit. We disagree with Shell that the small quantity of NO_x emissions that would be removed justifies an argument for eliminating this alternative as BACT when, in fact, the HPU units contribute 30% of the maximum modeled NO_x concentrations from Shell's activities.[120]

If, however, EPA does not revise BACT for the HPUs to require re-powering of the engines to Tier 3 engines then it must at least consider re-tooling these and other engines as BACT instead of simply employing "good engineering practices". Specifically, the Cam Shaft Cylinder Reengineering (CCSC) kit suggested by us in our prior comments on the original proposed permit appears to be a cost-effective BACT alternative for the HPU engines as well as the two larger cementing units. Even considering the slightly higher cost per ton of NO_x reduction than for re-powering the HPUs, which includes Shell's estimated shipping costs for installing the re-tooling kits, we believe this is a viable option that could (and should) be considered as BACT for these units. The fact that this re-tooling option has had successful test results in Arctic conditions and there appear to be no issues with the use of ULSD further supports its use in Shell's specific application. If EPA believes this alternative is not cost-effective then it must provide a more thorough justification for this position including specific examples of cases where these levels of cost ($/ton of removal) were rejected as not cost-effective. Again, we do not agree with Shell's recommendation that these "small and infrequently used" engines do not warrant further consideration of BACT alternatives. The HPUs and cementing units make up 64% of the maximum-modeled NO_x concentrations from Shell's activities.[121]

The various engines covered by this general BACT determination continue to have

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[118] ENVIRON report: Diesel Engine Best Available Control Technology Analysis, December 2009, Project No. 0322090A, p. 23.

[119] There are two versions in the record of ENVIRON's report: Diesel Engine Best Available Control Technology Analysis, December 2009, Project No. 0322090A, see p. 15 Table 4-1 of both versions for the $8,671 and $10,580 cost estimates for replacing the HPUs.

[120] Shell supplemental material, September 17, 2009, Table 7-4: Discoverer Source Contributions at the Screening Maximum Impact Locations

[121] *Id.*

permitted emission rates, which are defined as BACT limits, as follows:

Unit	NO_x BACT Limit in g/kWh	Permit Condition
HPU Engine FD-12	13.155	G.2.2.1
HPU Engine FD-13	13.155	G.2.2.1
Deck Crane FD-14	10.327	H.2.2.1
Deck Crane DF-15	10.327	H.2.2.1
Cementing Unit FD-16	13.155	I.2.2.1
Cementing Unit FD-17	13.155	I.2.2.1
Cementing Unit FD-18	15.717	I.2.2.1
Logging Winch FD-19	4.0	I.2.2.1
Logging Winch FD-20	7.5	I.2.2.1

According to EPA and Shell, the hydraulic power units (HPU) will be used "very similarly" to the MLC compressor engines.[122] The HPU engines are 250 hp Detroit Diesel 8V-71 engines and the BACT limit is based on engine dynamometer test data reported in EPA's 2002 Diesel Health Assessment. The cementing unit engines (FD-16, FD-17, FD-18) and logging winch engine FD-19 are also Detroit Diesel 8V-71 engines (or from the same "family" of engines) with BACT limits also based on EPA's 2002 Diesel Health Assessment data.

The BACT limits for the FD-20 logging winch and the two deck cranes are based on manufacturer emission data and likely represent good combustion practices. These BACT limits are lower than for the other engines. EPA's proposed BACT limits for the Detroit Diesel 8V-71 engines may not reflect the "good combustion practices" that it determined were the best available controls. At a very minimum, EPA should quantify the reductions in NO_x emissions that can be expected from implementation of the good combustion practices defined as BACT instead of requiring the practices but enforcing an emission limit that is simply based on average engine operation for these 8V-71 engines. We support EPA's requirement to test theses engines (Conditions G.7, H.7 and I.7) to verify emission limits can be achieved; however, these data are needed prior to issuing a permit to set a BACT limit and determine BACT. In the event that the test data for these units demonstrate the ability to meet lower NO_x limits, EPA must revise the BACT limits accordingly.

Thus, for these reasons, EPA still has not adequately evaluated BACT for NO_x for the small compression ignition engines. We request that EPA re-consider its review of BACT for these engines, per 40 C.F.R. § 52.21(b)(12). EPA has failed to show that the proposed emission limits reflect the maximum degree of NO_x reduction that can be achieved from these engines (in fact, they appear to only reflect average operation of these engines) and has failed to consider all technically and economically feasible control options. NSB requests that EPA determine the level of control that reflects the maximum degree of NO_x reduction that can be achieved from these small engines and impose a NO_x

[122] *See* EPA Re-Proposed Stmt of Basis at 37.

emission limit that reflects that maximum degree of NO_x control.

3. PM BACT analysis for diesel generator engines.

EPA is proposing the use of oxidation catalysts (OxyCat) as BACT for the six generator diesel internal combustion engines.[123] EPA eliminated the use of catalytic diesel particulate filters (CDPF) as technically infeasible control options for these engines. EPA did not include any additional analysis of BACT alternatives for these engines in the re-proposed permit documents. NSB continues to believe that EPA should more thoroughly evaluate CDPF as BACT for these engines, particularly given that they contribute 30% of the maximum concentrations of PM from Shell's activities.[124] According to EPA, "[s]ince CDPF systems are not commercially available in combination with SCR systems for diesel engines such as the Discoverer's generator diesel IC engines, EPA believes CDPF systems are technically infeasible for this specific application."[125] Further, EPA assumes that even if CDPF technology were technically feasible, it would not be a cost-effective control option.[126]

Regarding EPA's reference to cost-effectiveness for CDPF control for the six generator engines, EPA must provide a comparative assessment of the economic impacts of applying this technology in similar applications. Shell provided a cost estimate for the use of CDPF control for the six generator engines of roughly $22,000 per year per ton of PM removed for all six engines.[127] In its application, Shell simply states "[t]his is not cost effective."[128] If EPA is going to eliminate the use of CDPF technology as an effective control option based on cost-effectiveness then it must present a detailed argument as to why $22,000 per ton of PM removed per year is not considered cost effective for these units. This argument must include an analysis of employing these technologies for Shell's proposed operations in the Beaufort Sea as well. EPA must compare the associated per ton costs with similar applications of CDPF.

According to EPA guidance, the applicant must demonstrate that costs of pollutant removal are "disproportionately high when compared to the cost of control for that particular pollutant and source in recent BACT determinations."[129] EPA and Shell have provided no such comparison analysis to support its claim that $22,000 is not cost effective. In fact, it does not appear that $22,000 per ton of PM removal per year is necessarily cost prohibitive. EPA estimates that the cost of several diesel retrofit

[123] *See* EPA Re-Proposed Stmt of Basis at 70; EPA draft OCS PSD Re-Proposed Permit for Shell Chukchi Operations at Condition C.2.
[124] Shell supplemental material, September 17, 2009, Table 7-4: Discoverer Source Contributions at the Screening Maximum Impact Locations
[125] EPA Re-Proposed Stmt of Basis at 69.
[126] *See* EPA Re-Proposed Stmt of Basis at 69, fn14.
[127] *See* Shell Revised OCS App. at Appendix C. No updated information was submitted for consideration in the re-proposed permit.
[128] *See* Shell Revised OCS App. at 47.
[129] Draft NSR Workshop Manual, at B.32 (October 1990).

programs: (1) the Urban Bus Retrofit and Rebuild program ($31,500/ton of PM reduced); (2) the 2007 Heavy-Duty diesel emission standards ($14,200/ton); and (3) the Non-road Tier 4 emission standards ($11,200/ton) indicate that "retrofits can be a cost effective way to reduce air pollution."[130]

Regarding EPA's determination that CDPF technology is technically infeasible, it is not sufficient to simply provide one manufacturer's statement that it is unaware of CDPF applications for these engine types.[131] In addition to comparing the proposed BACT determination to the BACT determinations of other permitted sources, the BACT analysis should also be based on a review of the maximum degree of emission reductions that can be achieved for the engines based on a rigorous investigation of all available control options. EPA and Shell must more thoroughly investigate the use of CDPF in application where Selective Catalytic Reduction (SCR) is also used to control NO_x in determining the BACT limits for these engines.

Several manufacturers have demonstrated commercial CDPF retrofit applications in conjunction with SCR to control NO_x emissions demonstrating that many of the technical considerations that Shell raises (e.g., backpressure on the engines, cross-sectional area for the catalyst matrix, filter element exchange frequency, etc.) can be overcome. These applications were for a wide range of engine sizes and a wide range of ages.[132] And there is recent research to support the effectiveness of integrated catalytic control systems for NO_x and PM reduction in both stationary and mobile applications for small and large engines.[133] However, even if these particular technologies are not directly applicable to the older generator engines proposed for use by Shell, it is still possible that the use of CDPFs is potentially feasible for these engines. Nothing in the permitting materials indicates with certainty that this particular technology is technically infeasible. Without such firm evidence EPA must insist that Shell perform the needed investigations to make a more solid determination.

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[130] EPA 420-S-06-002, Diesel Retrofit Technology: An Analysis of the Cost-Effectiveness of Reducing Particulate Matter Emissions from Heavy-Duty Diesel Engines Through Retrofits, March 2006, p. ii (Attachment 14).

[131] EPA Re-Proposed Stmt of Basis at 69: "D.E.C. Marine stated that they are not aware of any applications of CDPF systems on older heavy duty marine engines without modern electronic controlled fuel injection."

[132] *See, e.g.*, EPA's Emerging Technology list available at: http://www.epa.gov/otaq/diesel/prgemerglist.htm (Attachment 15).

[133] Gekas I P, "NOx Reduction Potential of V-SCR Catalyst in SCR /DOC/DPF Configuration Targeting Euro VI Limits from High Engine NOx Levels", Society of Automotive Engineers (SAE), Document Number: 2009-01-0626, April 2009 (Abstract available online at http://www.sae.org/technical/papers/2009-01-0626) (Attachment 16); Servati H B, Petreanu S,Marshall S E,Su H, Marshall R, Wu C-H, Hughes K, Simons L, Berrimann L, Zabsky J, Gomulka T, Rinaldi F, Tynan M, Salem J, Joyner J, "A NOx Reduction Solution for Retrofit Applications: A Simple Urea SCR Technology", SAE, Document Number: 2005-01-1857, April 2005 (Abstract available online at http://www.sae.org/technical/papers/2005-01-1857) (Attachment 17).

4. PM BACT analysis for the incinerator.

EPA is continuing to propose "Good Combustion Practices" as BACT for the incinerator.[134] This is the same BACT as proposed by Shell in its application.[135] EPA eliminated the use of add-on controls for the incinerator as technically infeasible. The Discoverer incinerator (TeamTec GS500C) is a small waste incinerator rated at 276 lb/hr, with a daily rating of 6624 lbs/day. Shell plans to incinerate domestic and other non-hazardous solid waste (trash) and liquid sewage sludge.[136] Shell describes this incinerator as a two-stage, batch-charged unit. The TeamTec GS500C unit is a small unit (approximately 8'x 6'x 7' in dimension) with an option for simultaneous combustion of sewage sludge and solid waste.[137]

Shell requested Owner Requested Restriction (ORR) limits for PM_{10} (8.2 lbs/ton) and $PM_{2.5}$ (7 lb/ton), which is a small fraction of the total AP-42, Table 2.2-1 PM_{total} emission factor for an uncontrolled multiple hearth sewage sludge incinerator (100 lb/ton). It is not clear how fine particulate matter will be controlled to this level without the use of additional controls.

Shell has also requested an ORR of 1,300 lb/day (20% incinerator capacity) in addition to the ORR limits for PM_{10} and $PM_{2.5}$.[138] Even at these ORRs the incinerator $PM_{2.5}$ emissions account for up to 30% of the 24-hour $PM_{2.5}$ (and PM_{10}) concentrations at maximum impact locations under Alternative Operating Scenario #2.[139]

Both Shell and EPA conclude that no additional control is BACT, but do not explain how these ORR emission factors will be achieved absent additional control. Vendor data and source test data is absent to confirm these ORRs can be achieved. We support the EPA's requirement to test the incinerator (FD-23) to verify whether emission limits can be achieved (Condition K.9); however, these data are needed prior to issuing a permit to set a BACT limit and determine BACT.

The permit does not include an alternative procedure if the test fails to achieve the ORRs. One option would be to further reduce the incinerator throughput, but it is not clear whether further reduction below a 20% operating capacity can support the vessel's waste generation. Another option would be to develop alternative waste handling strategies to reduce waste capacity including collection and backhaul, if needed, rather than on-site incineration. These alternative requirements should be clearly specified in the permit.

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[134] EPA Re-Proposed Stmt of Basis at 76; EPA draft OCS PSD Re-Proposed Permit Shell for Chukchi Operations at Condition K.2.
[135] Shell Revised OCS App. at 48 (2/23/09).
[136] Shell Revised OCS App. at 4.
[137] TeamTec Marine Product Brochure (Attachment 18).
[138] EPA Re-Proposed Permit Condition K.7.1
[139] Shell Supplemental Materials at Table 7-4 (9/17/09).

We request that EPA require Shell test this incinerator to verify what emission rate can be achieved, or provide vendor data to verify that the PM_{10} (8.2 lbs/ton) and $PM_{2.5}$ (7 lb/ton) ORRs can be met without any additional emission control. Additional control may be required to achieve these emission levels. Or alternative waste handling strategies may need to be adopted.

In the event that the test data for the unit demonstrate the ability to meet lower PM_{10} and $PM_{2.5}$ limits, EPA must revise the BACT limits accordingly. In fact, Shell's own findings in the RACT/BACT/LAER clearinghouse demonstrate that lower limits can be achieved on similar-sized units using "Proper Operation and Maintenance" practices. Specifically, similar waste combusting units permitted at the Kenai Refinery in Alaska with 350 lb/hr maximum throughput ratings have a BACT limit for PM_{10} of 0.2 lb/hr, or 1.1 lb/ton.[140,141] EPA should consider and evaluate this limit as an applicable BACT limit for the incinerator on the Discoverer.

We commend EPA for requiring a standard operating procedure/waste separation plan to instruct employees on how to segregate waste to ensure that hazardous/toxic material is not inadvertently incinerated (Re-Proposed Permit Condition K.8).

4. Incinerator SO_2 emissions.

Shell references AP-42, Table 2.1-12 as its source for a SO_2 emission factor yet it is not clear why Shell uses this "D" rated emission factor for a refuse combustor of 2.5 lbs/ton rather than the "B" rated emission factor of 28 lb/ton found in Table 2.2-1 for a multiple hearth sewage sludge incinerator (which is 11 times larger).[142] If Shell has reduced this emission factor based on fuel type, this must be explained.

5. Incinerator sewage combustion.

We request that EPA clarify the amount and type of sewage that will be incinerated in Discoverer incinerator versus treated by the Marine Sanitation Device (MSD) and discharged overboard as described in Shell's NPDES NOI. In our comments on the NPDES permit, we have requested additional information on the type and treatment levels achieved by the Marine Sanitation Device (MSD).

6. PM BACT analysis for boilers.

EPA is proposing "Good Combustion Practices" as BACT for the two boilers onboard the Discoverer.[143] EPA eliminated the use of add-on controls for the boilers as technically infeasible.

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[140] RBLC, AK-0053, 3/21/2000

[141] 0.2 lb_{PM10}/hr / 350 lb_{waste}/hr * 2000 lb/ton = 1.1 lb_{PM10}/ton_{waste}

[142] EPA Re-Proposed Stmt of Basis at A-13.

[143] EPA Re-Proposed Stmt of Basis at 74; EPA draft OCS PSD Re-Proposed Permit for Shell Chukchi Operations at Condition J.2.

As with the incinerator, we support EPA's requirement to test the boilers (FD-21 and FD-22) to verify that BACT emission limits can be achieved (Condition J.5); however, these data are needed prior to issuing a permit to set a BACT limit and determine BACT. We request that EPA require Shell test both units to verify what emission rate can be achieved, or provide vendor data to verify that the PM_{10} (0.0235 lb/mmBTU) and $PM_{2.5}$ (0.0235 lb/mmBTU) limits can be met without any additional emission control.

In the event that the test data for the units demonstrate the ability to meet lower PM_{10} and $PM_{2.5}$ limits, EPA must revise the BACT limits accordingly. EPA must also explain why the proposed BACT limits exceed AP-42 emission factors for this source. Table 1.3-1 in Section 1.3 of EPA's AP-42 compilation of emission factors lists "A" rated emission factors for NO_x and PM_{10} of 20 pounds per thousand gallons ($lb/10^3gal$) and 2 $lb/10^3gal$, respectively.[144] AP-42 emission factors represent an average of a range of emission rates. Therefore, units applying BACT would presumably be able to achieve much lower emission rates than what is presented as the average factor in AP-42. The proposed BACT limits for the two boilers, in comparison, are equivalent to 26.6 $lb/10^3gal$ of NO_x and 3.1 $lb/10^3gal$ of PM.[145] EPA must explain why the boilers on the Discoverer will not have BACT limits at least as stringent as the average emission rates established in AP-42.

7. VOC BACT analysis for vented sources.

EPA's Re-Proposed Statement of Basis at Section 4.1 concludes that "… BACT must be determined for *each emission unit on the Discoverer* which emits NOx, PM, $PM_{2.5}$, PM_{10}, SO_2, *VOC* and CO while the drillship is operating as an OCS source." [emphasis added]. EPA's Statement of Basis at Section 4.5 examines VOC BACT for combustion sources, but does not examine vented sources of VOC (e.g. mud degassing).

Mud degassing emissions can substantially contribute to VOC and greenhouse gas (GHG) emissions. Mud degassing systems are used to remove entrained formation gas from the mud to maintain higher mud density for well control. Drilling mud degassing

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[144] AP-42 emission factors are given a rating of "A" through "E" with "A" indicating a high level of confidence in the factor ("A" = Excellent. Factor is developed from A- and B-rated source test data taken from many randomly chosen facilities in the industry population. The source category population is sufficiently specific to minimize variability. Tests are performed by a sound methodology and are reported in enough detail for adequate validation).

[145] Re-Proposed Permit Conditions J.1.1 and J.1.3 list a NOx BACT limit of 0.2 lb/mmBTU and a PM_{10} BACT limit of 0.0235 lb/mmBTU, respectively. Based on the diesel fuel heating value in Shell's engineering calculations (Appendix B of Shell's Application on 2/23/09) of 0.1331 mmBTU/gal:

0.2 lb/mmBTU * 0.1331 mmBTU/gal * 1000 $gal/10^3gal$ = 26.6 $lb/10^3gal$ NO_x
0.0235 lb/mmBTU * 0.1331 mmBTU/gal * 1000 $gal/10^3gal$ = 3.1 $lb/10^3gal$ PM_{10}

units extract entrained gas from the mud at the surface and vent this gas directly into the atmosphere. Shell proposes to vent this gas directly to atmosphere through a 10" vent pipe. Shell concludes that it is not affordable to install a 2" flare nozzle atop the 10" mud degassing vent line to control the emissions, because the flare would cost $61,800. Shell estimates *only 136 lbs* of VOC are vented during the entire *drilling season*[146] resulting in an emission control cost of $965, 625 per ton. Based on Shell's very low emission estimate, EPA agreed no control would be required. Shell's extremely low emission estimate is not only inconsistent with MMS and industry emission factors, but is inconsistent with the need for a 10" vent pipe. Why would a 10" vent pipe be need for such an extremely low flow rate? Clearly, Shell's engineers recognize the Potential To Emit (PTE) is substantially higher.

We reviewed EPA's record on this BACT assessment in detail, and did not find any review of the published MMS emission factor for offshore drilling mud degassing systems that NSB identified and requested EPA to review in our last set of comments. As we previously explained, in 2007, MMS hired a consulting firm to develop offshore drilling mud degassing emission factors, among other emission factors, to improve offshore oil and gas emission estimates.[147] MMS's drilling mud degassing emission factors have been reviewed and accepted by both API[148] and The Climate Registry.[149] The standard total hydrocarbon (THC) emission factor for water-based mud from an offshore drilling mud system is ***881.84 lb*** THC/drilling day. The standard methane (CH_4) emission factor from an offshore drilling mud system is 0.2605 tons of CH_4 per drilling day.

Again, we request that EPA require Shell to revise its mud degassing emission computations using standard emission factors developed by MMS, accepted by the American Petroleum Institute and The Climate Registry. Shell's computations use a non-standard approach. Shell's emission estimate severely underestimates the GHG emission impact[150] and VOC emission contribution.

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[146] EPA Re-Proposed Stmt of Basis, at Section 3.4.12, Drilling Mud System (FD-32).

[147] Wilson, Darcy, Richard Billings, Regi Oommen, and Roger Chang, Eastern Research Group, Inc. *Year 2005 Gulfwide Emission Inventory Study*, U.S. Department of the Interior, Minerals Management Services, Gulf of Mexico OCS Region, New Orleans, December 2007, Section 5.2.10 (available at: http://www.gomr.mms.gov/PI/PDFImages/ESPIS/4/4276.pdf) (Attachment 19).

[148] American Petroleum Institute (API), Compendium of Greenhouse Gas Emission Methodologies for the Oil and Natural Gas Industry, August 2009 (Available at: http://www.api.org/ehs/climate/new/upload/2009_GHG_COMPENDIUM.pdf).

[149] The Climate Registry Oil and Gas Production Protocol, Draft for Public Comment, May 2009 (available at: http://www.theclimateregistry.org/downloads/2009/05/Oil-and-Gas-Production-Protocol.pdf).

[150] NOTE: Methane is of particular concern as a greenhouse gas since it is over 20 times more effective at trapping heat in the atmosphere than carbon dioxide over the same 100-year period.

If the MMS emission factor of 881.84 lb /drilling day is used over the 168 day drilling period (74 tons) the flare is cost effective at $834 per ton. Additionally the VOC estimate needs to be revised upward to reflect this higher number as well. We also request that EPA require Shell to calculate HAP emissions based on the substantially higher, revised VOC emission estimate.

If EPA has concerns about the quality of MMS's emission estimate, please explain what those concerns are, and provide an alternative emission factor that is more accurate. Or require Shell to test the vent to verify actual emissions.

B. A Proper BACT Analysis Must Include the Ancillary Vessels.

In its permit application Shell states that

> One interpretation of applicable regulations is that the anchor handler vessels and resupply ship are part of the *Discoverer* "stationary source" when they are (however briefly) connected to the *Discoverer*. As part of the stationary source, one might conclude that BACT must be applied to the emission units on these vessels. ***Shell has not conducted a detailed BACT analysis for these vessels because there is no way implementation of emission controls beyond good operating practices could be cost effective***.[151]

In order to reach the conclusion that good operating practices are the best available for controlling emissions from these vessels, a BACT analysis is required. We ask that Shell and EPA utilize the top-down approach for applying BACT to the ancillary vessels.

In doing so, the fact that equipment (including vessels) are leased by Shell cannot serve as adequate grounds for concluding that applying emissions controls would be economically infeasible. Both the CAA and EPA's regulations apply to "owners *or operators*,"[152] as well as "any equipment, activity, or facility."[153] Thus, it is not enough that the equipment is not owned by Shell since Shell is the operator. At the very least, Shell and EPA must disclose the costs to Shell of owning such equipment versus the costs of leasing it, what the savings are, and in light of all those figures whether it is economical to apply control technologies.

Just as in the August 2009 draft permit, EPA has failed to apply BACT to the Discoverer's propulsion engine and several of the support vessels, including Icebreaker #2. We applaud EPA for taking steps to require additional pollution control that will further reduce emissions. But these increased control requirements still do not reflect EPA and Shell's legal obligations under the CAA to apply BACT analysis to all of the

[151] Shell Revised OCS App. at 29 (2/23/09) (emphasis added).
[152] 42 U.S.C. § 7475 (emphasis added); 40 C.F.R. §§ 52.21(n), (o).
[153] 42 U.S.C. § 7627(4)(C); 40 C.F.R. § 55.2.

vessels that operate within 25 miles of the OCS source. Thus, EPA must apply BACT to all of Shell's sources, including all ancillary vessels.

EPA has determined that Icebreaker #2 is not "physically attached" to the Discoverer during the anchoring process, despite the fact that the two vessels are physically connected with an anchor line.[154] To reach this conclusion, EPA relied on the common meaning of "attached" but ignored common sense in applying the definition to the facts. EPA cites *The American Heritage Dictionary of the English Language*, 4th ed., (2006) for the definition of "attached" which is "to fasten, secure or join" or "to connect as an adjunct or associated condition or part."[155] EPA claims that the anchor line running between the vessels was not designed "to fasten . . . " or "to connect . . . " within the plain meaning. Regardless of the anchor line's design or intent, the anchor line in fact physically connects the vessels during the anchoring process. Because the vessels are physically connected, Icebreaker #2 falls within the plain meaning of "attached" and thus within the meaning of OCS source. Consequentially, EPA must regulate Icebreaker #2 as an OCS source.

VI. Specific Comments on Permit Conditions, Compliance Demonstration, Monitoring and Reporting Measures.

A. Source Testing.

We support EPA's continued requirements to verify that emission limits can be met by stack testing each emission unit.[156] Stack test data are critical to verify if permit limits can be met. While the stack testing requirements in the re-proposed permit are not as comprehensive as the original proposed permit, the requirements are a substantial improvement over the 2007 permit and we applaud EPA's more stringent emission verification approach.

We do not agree, however, that the reduced stack testing requirements be based on an operating range representing the most frequently-used loads. Rather, if EPA proceeds with less frequent testing for certain engines we strongly urge EPA to ensure that established load ranges will reflect maximum emissions scenarios. This is especially important for source testing of $PM_{2.5}$ emissions since compliance is demonstrated on a short-term averaging time.

Shell's September 17, 2009 comments to EPA on the proposed permit at p.9, request that EPA *remove* the stack test requirements for the: MLC Compressor Engines, HPU Engines, Cranes, Cementing and Logging Units, the Boilers and Utility Generators. Shell

[154] EPA Re-Proposed Stmt. of Basis at 21, FN 21.
[155] *Id.*
[156] *See* Re-proposed Permit Conditions: C.6 (Generator Engines), F.6 (MLC Compressor Engines), G.8 (HPU Engines), H.7 (Deck Cranes), I.7 (Cement Unit and Logging Winch), J.5 (Boilers), K.9 (Incinerator), L.4 (Supply Ship), N.10 (Icebreaker #1), O.12 (Icebreaker #2), and Q.7 (Oil Spill Response Fleet).

proposed that EPA rely on generic, average emission factors for these units, without any stack testing. We fully support EPA's decision to keep these critical stack testing requirements. We urge EPA to maintain the original, more comprehensive, testing requirements for a broader range of loads, as proposed in the original permit, but support testing over a fewer number of load ratings over elimination of testing all together. The NSB would like for EPA to assure that, if fewer tests are required, they be performed at loads that are most likely to result in maximum emissions, especially for source testing of $PM_{2.5}$ emissions.

We do not agree with Shell's assertion that the impacts of these particular engines are small.[157] The HPU engines, in particular, contribute almost one-quarter of the impact to maximum $PM_{2.5}$ concentrations and 30% of the impact to maximum NO_2 concentrations. This is the second largest contributor to both $PM_{2.5}$ and NO_2 impacts of all sources. The cementing units contribute over one-third of the impact to maximum NO2 concentrations and the deck cranes contribute one-fifth of the impact. All told, these engines, combined, make up over 40% of the impact to maximum concentrations of $PM_{2.5}$ and over 85% of the impact to maximum concentrations of NO_2.[158] Given that Shell's exploration activities are projected to consume over 70% of the available PSD Class II increment for NO_2 and 84% of the 24-hour $PM_{2.5}$ NAAQS it is critical that the largest contributors to these pollutant concentrations be required to verify that they can meet permit limits using stack testing – specifically, the main drill rig engines, HPU engines, cementing units and boilers for $PM_{2.5}$ and the HPU units, cementing units and deck cranes for NO_x.

Shell describes testing for these units to be "difficult, expensive and time-consuming" but nothing in their supplemental materials describes a situation that is impossible, even for the deck crane units.[159] Considerations of cost and convenience are not sufficient to preclude source testing of these engines. In fact, most of Shell's difficulties arise from testing during operation when, in fact, testing prior to operation is critical so that any needed modifications can be made to remedy failed tests. We support testing for all of these engines, including deck cranes, prior to operation and at loads reflective of maximum emission scenarios.

We also do not support the removal of stack testing requirements for the icebreakers. In particular, we think it's critical to include stack testing at 20% load for Icebreaker #1 unless EPA will be adding a permit requirement limiting operation time of Icebreaker #1 at 20% load. Icebreaker #2 is still required to perform source testing at four loads, including 20% load, and we see no reason why Icebreaker #1 should not be subject to the same testing requirements. In fact, Shell indicates in its supplemental materials that a

[157] November 23, 2009 letter from Shell to EPA Re Shell Preconstruction PSD Permit Application, Chukchi Sea, Alaska - Supplemental Application Support Materials in Response to November 17, 2009 Coordination and Consultation Meeting with Region 10
[158] September 19, 2009 letter from Shell to EPA Re Shell Gulf of Mexico Inc. comments on the August 2009 Proposed Discoverer / Chukchi OCS/PSD Permit to Construct, Table 7-4.
[159] *Id.* 191 at 10.

20% load often results in higher emission factors.[160] Without more assurance that Shell does not operate its icebreakers at these lower loads EPA must assume the icebreakers could, in fact, operate at these loads and must include permit conditions to test at these higher emission rate levels.

The re-proposed permit requires stack testing to be completed prior to each drilling season, but does not specify how far in advance the testing must be done, nor does the permit include a remedy for failed tests. Re-Proposed Permit condition B.7.8 requires all stack test results to be provided to EPA within 45 days of testing. However, if stack testing only occurs a few days prior to the drilling season, there will not be adequate time to analyze and remedy any test results that exceed the permit limits before drilling starts. With a 168 operating day limit per drilling season, a quarter of the drilling season could pass before EPA even receives the test results.

We request that EPA require all stack tests to be completed at least 180 days prior to each drilling season to ensure there is adequate time to analyze and remedy any test results that exceed permit limits. The permit must clearly state that any emission unit that fails to meet the permitted emission limit must not be operated until the unit is repaired or additional emission control is installed. Collecting test data, and merely reporting excess emissions if tests fail to meet permit limits, is not an acceptable solution, especially in the cases where the annual NO_x and 24-hour $PM_{2.5}$ NAAQS compliance margins are very tight. A failed test, unresolved, could result in a NAAQS exceedance. This is a very important point that was raised in our last set of comments; yet, we did not see any EPA analysis in the revised permit.

EPA's re-proposed permit included several conditions where one unit is tested to represent the emission performance of other like units (e.g. Condition C.6 that requires two of the Discoverer generator engines to be tested in the first year to represent the emissions of all six engines). In these cases, the permit must clearly state that if the representative unit fails the stack test, all like emission units correspondingly are assumed to have failed. All like units must be repaired or additional emission controls must be installed to meet the limit. Alternatively, additional stack tests on the remaining units could be performed to verify individual unit compliance to isolate the problem unit(s). EPA did not respond to this point in its Statement of Basis. Again, we recommend that EPA evaluate information on the unit year, model type and historical use to demonstrate that the equipment is of like equipment specification and has a similar operating history. EPA must demonstrate that the units are representative, or it must require each unit to be tested individually before the first drilling season.

EPA does not require source tests for the Discoverer's main propulsion engines. We question whether the main propulsion engines would actually be completely shutdown when the Discoverer is operating as an OCS source.[161] If, under further examination,

[160] *Id.* 192 at 9.
[161] *See*, *supra* at 12-15.

EPA determines the propulsion units will be operated under the Option selected by EPA for the OCS definition, source testing should be required.

1. Load factors, testing and monitoring.

Shell's application includes a number of assumed operating loads. Emissions are a function of load. EPA's proposed permit accepts these assumed loads and requires stack testing within the expected operating range (see, e.g., Conditions C.6.2, F.6.2, G.8.2, etc.). The re-proposed permit ensures that calculated emission rates used for compliance demonstration are based on the maximum emissions scenario for the range of loads tested, except for the boilers on the Discoverer. We request EPA revise the following permit condition to be more explicit regarding this point for the boilers. We request permit condition J.5.4 read:

> *For each boiler, **each load factor** and each pollutant, the permittee shall determine emission factors in the following units: lbs/MMBtu and lbs/gallon.*

Condition J.6.5 then requires the use of the highest emission factor calculated in the corresponding section (revised above) and will ensure all loads are considered when making this calculation of highest emissions.

We request that EPA include a recordkeeping requirement to track the operating loads during the first drilling season to verify actual operating load ranges. The permit should also include requirements for additional stack testing if actual operating practices include operating loads outside the currently assumed ranges.

2. Fuel and Electrical Output Monitoring.

We strongly support the continued compliance demonstration requirements for fuel monitoring in the re-proposed permit for the MLC compressor engines (FD 9-11), HPU engines (FD 12-13), deck cranes (FD 14-15), Cementing Units and Logging Winches (FD 16-20), Heat Boilers on the Discoverer (FD 21-22) and on the Icebreakers and for the Nanuq propulsion and non-propulsion engines (FD-N 1-4). NSB also supports the continued requirement that fuel flow meters measure the fuel flow rate with an accuracy equal to or better (less) than two percent of the meter's upper range value (see, e.g., Condition F.7.1.3).

Since the emissions inputs for the modeling analysis are based, in general, on multiplying the applicable emission factor by the associated operating factor (e.g., fuel usage rate) then the accuracy of this input is determined by the sum, in quadrature, of the fractional uncertainties associated with each factor.[162] If, as is indicated in Shell's September 17, 2009 comments (p. 11), the uncertainty in the stack test data is upwards of 15%, then Shell must be able to demonstrate compliance with the NAAQS considering a margin of

[162] The quadrature sum is the square root of the sum of the squares.

error no less than 15%.[163] This would mean the predicted 24-hour $PM_{2.5}$ concentration would need to be less than 29.8 $\mu g/m^3$ when considering the applicable background concentration. In fact, the highest predicted 24-hour $PM_{2.5}$ concentration from the permit modeling was 29.4 $\mu g/m^3$ with a background concentration of 11 $\mu g/m^3$.[164] EPA must establish permit limits that, when considering the accuracy of the emission factor and operating data, demonstrate compliance with the NAAQS with a margin of error no less than the accuracy of the input data.[165] The re-proposed permit, when considering the accuracy of data supplied by Shell, just barely demonstrates compliance with the short-term $PM_{2.5}$ NAAQS assuming the use of the revised 11 $\mu g/m^3$ background concentration.

EPA's re-proposed permit allows load monitoring to replace fuel monitoring for the Discoverer generator engines (FD 1-6) and for the internal combustion engines on its support icebreakers. Shell states load monitoring systems are already installed on these vessels, and is more accurate than fuel monitoring systems. While Shell has installed load monitoring capability on the currently contracted vessels, it has requested flexibility in Icebreaker #1 selection for future operating years, and, must explain how it will provide equivalent capability on future contract vessels.

The use of load monitors in place of fuel monitors means compliance assurance also rests on the accuracy of the assumed generator efficiency. Shell's supplemental materials claim that "typical generators convert over 90% of the energy coming from the engine into electrical load" and, further, that "any error in the assumed efficiency is likely to be on the order of 1-2%."[166] Shell then provided five examples of generator efficiencies that reflect engine generator sets of the same sizes as those proposed for the Shell project and that ranged from 92%-96%. EPA based its electrical power output limits for these units on an assumed efficiency of 92%. EPA justified the use of the low end of the efficiency range due to "the apparent age of the Discoverer's gensets and the lack of specific information regarding the efficiencies of the Discoverer's gensets."[167] Because of this and because the specifics of Icebreaker #1, in particular, are unspecified, we believe that an assumed generator efficiency of 90% would be more prudent. Without more specifics on the actual gensets used and because compliance with the $PM_{2.5}$ NAAQS is just barely demonstrated when considering the accuracy of the input data, EPA must consider the most conservative approach to ensuring compliance. Alternatively, EPA could require a minimum generator efficiency (based on technical data for the actual gensets used) of

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[163] The uncertainty in the calculated emission rate would be the square root of the sum of the squares of the fractional uncertainties, as follows:

$$q = ((2\%)^2 + (15\%)^2)^{1/2} = 15.1\%$$

[164] EPA Re-Proposed Stmt of Basis at Table 12a, Appendix B, Figures and Tables.

[165] As determined by the sum, in quadrature, of the fractional uncertainties for each variable.

[166] November 23, 2009 letter from Shell to EPA Re Shell Preconstruction PSD Permit Application, Chukchi Sea, Alaska - Supplemental Application Support Materials in Response to November 17, 2009 Coordination and Consultation Meeting with Region 10, p. 7 of 18.

[167] EPA Re-Proposed Statement of Basis at 35.

92% and include a corresponding permit condition and compliance demonstration requirements to ensure this minimum efficiency.

3. Relief well emissions.

EPA's re-proposed permit condition B2.3 requires Shell to include any time spent drilling a relief well from the total 168 day operating period. We agree that the time needed to drill a relief well should be deducted from the total 168 day operating period. We also agree that relief well drilling emissions must be included in PTE calculation.

Shell does not specify the time it will take to drill a relief well in the air permit application, but does conclude in its Beaufort Sea Oil Discharge Prevention and Contingency Plan (ODPCP) that a blowout can be controlled using the M/V Discoverer within a 34 day period.[168]

We request that EPA revise permit Condition B2.3 to read:

> *A 34 day period **must be reserved** out of the total 168 operating period to drill a relief well. All exploratory well drilling (planned wells and sidetracks) must be completed within 134 days, reserving at least a 34 day period to drill a relief well. Any time spent drilling a relief well shall be included in the time recorded in Conditions B.2.2.3 and B.2.2.4. If the relief well exceeds a 34 day period, excess emissions must be reported.*

EPA did not respond to our request to reserve the 34-day period for drilling a relief well in the revised permit. If that time is not reserved, and a relief well is drilled increasing the drilling days beyond 168 days (+34 days), an air quality violation is likely to occur.

4. Sulfur content of diesel fuel.

We commend Shell's actions to commit to the use of Ultra Low Sulfur Diesel Fuel (ULSD) for its OCS exploration activities in the Chukchi Sea north of the Bering Strait. The huge reductions in anticipated sulfur dioxide emissions that will result from this commitment – from over 180 tons per year down to 2 tons per year – is significant and will reduce not only localized emissions of SO_2 but will reduce $PM_{2.5}$ pollution from the project, as well. Specifically, on December 9, 2009 EPA received notice of the following:

> "Shell hereby commits to using only ultra-low-sulfur diesel (15 ppm) in any engine on the Discoverer (including its propulsion engines) and in any engine on any vessel in the associated fleet when operating North of the Bering Strait."[169]

[168] Shell Chukchi Sea ODPCP at 1-23, 4-7 (available at: http://www.mms.gov/alaska/ref/ProjectHistory/2009_Chukchi_Shell/2009_0623_Shell_cplan.pdf) (Attachment 13).

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

EPA's re-proposed permit, however, does not include a requirement to use ULSD fuel in the propulsion engines of the Discoverer, as committed to by Shell.

EPA's re-proposed permit condition B.4 requires ultra-low sulfur fuel (15 ppm sulfur) on all emission units *except* the main propulsion engines (Unit FD-7). We request that the main propulsion engines be required to use ultra-low sulfur fuel (15 ppm sulfur) in accordance with Shell's December 9, 2009 commitment and with EPA's June 6, 2006 Final Rule: Control of Air Pollution from Motor Vehicles and Nonroad Diesel Engines: Alternative Low-Sulfur Diesel Fuel Transition Program for Alaska.[170]

EPA's re-proposed permit condition B.4 requires testing to verify the ultra-low sulfur fuel (15 ppm sulfur) limit is met; however, EPA's proposed permit condition B.4.3 appears to allow Shell to burn fuel that exceeds the 15 ppm limit as long as any exceedance is reported to EPA. We request that proposed permit condition B.4.3 be revised to clarify that fuel that does not meet the 15 ppm standard cannot be used, and must be returned to the supplier. We do not find it acceptable to merely test the fuel sulfur content, and report any exceedances as a BACT approach. We request that EPA enforce its requirement to limit all actual fuel use to 15 ppm sulfur. Fuel that does not meet that standard should be returned to the supplier.

Condition B.4 should be revised to read:

> *The permittee shall not combust any liquid fuel with sulfur content greater than 0.0015 percent by weight, as determined by Condition B.4.1, in any emission unit on the Discoverer.*

Conditions B.4.3 and B.5.3 should be revised to read:

> *Fuel tests must verify the fuel sulfur content is 15ppm or less for that fuel to be used. Fuel exceeding 15ppm fuel sulfur must be returned to the supplier, unused.*

EPA's June 6, 2006 Final Rule: "Control of Air Pollution from Motor Vehicles and Nonroad Diesel Engines: Alternative Low-Sulfur Diesel Fuel Transition Program for Alaska"[171] requires marine vessels to comply with a 15 ppm fuel sulfur standard on June 1, 2010. Shell's proposed 2010 operations, therefore, need to comply with this standard.[172] The final rule states:

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

[170] 71 Fed. Reg. 32450-32464 (June 6, 2006).
[171] 71 Fed. Reg. 32450-32464 (June 6, 2006).
[172] EPA, Regulatory Announcement
http://www.epa.gov/otaq/regs/fuels/diesel/420f06040.htm (Attachment 20).

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

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

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

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

This rule further specifies that the 15 ppm sulfur standard applicable to locomotive and marine fuel (LM) be moved forward to 2010 to be implemented at the same time as the 15 ppm sulfur standard for nonroad (NR) diesel fuel. In this way there will only be one grade of NRLM[173] diesel fuel in the rural areas in 2010 and 2011 instead of two separate grades (i.e. 15 ppm and 500 ppm). The implementation dates for the NRLM diesel fuel sulfur standards are shown in Table II.B-1. [Table II.B-1 shows refiners and importers of fuel must meet the 15 ppm fuel sulfur standard on June 1, 2010.][174]

5. Prohibited activities.

Re-Proposed Permit condition B.8 prohibits flowing test wells, flaring gas and storing liquid hydrocarbons. This condition should also prohibit venting formation gas unless those emissions are accounted for in the permit and BACT is applied. EPA did not respond to this concern in the revised permit and needs to clearly prohibit gas venting or properly account for it.

6. EPA's re-proposed OCS/PSD permit must include requirements to make enforceable Shell's statements regarding the exploratory drilling program that were made in its permit application.

EPA's re-proposed permit for Shell's exploration activities in the Chukchi Sea includes

[173] Nonroad, Locomotive and Marine (NRLM).
[174] 71 Fed. Reg. 32450-32464 (June 6, 2006) (emphasis added).

important provisions to ensure that the permitted sources cannot be modified from the source parameters that were reflected in Shell's complete PSD permit application. EPA's proposed permit specifies the date of the PSD permit application, descriptions of the proposed sources that include the individual make and model, as well as the rated capacity. We strongly support the inclusion of these provisions and references to the representations made in the permit application in order to ensure that Shell cannot change its operation in ways that could change air pollutant dispersion or alter BACT analyses without limitation. As an added measure, we suggest that EPA include a provision in the permit stating that operation of the permitted sources must be in accord with the information provided in the PSD permit application initially submitted by Shell Offshore Inc. on December 19, 2008, revised on February 23, 2009 and again on September 17, 2009 and supplemented with the specific submittals identified in the administrative record for the proposed and re-proposed permit actions.

EPA must make it clear in the permit that if the required source tests show Shell's emission estimates are not in accordance with permit limits then the appropriate emission control must be installed ***prior to the next season***. EPA would also, then, need to revise the ambient air modeling to ensure NAAQS and increment compliance.

Further, EPA must require notification of any deviations from the information included in the permit application materials, and must make clear that any significant deviation from the representations made by Shell in its PSD permit application may be grounds for suspension or revocation of the permit. These types of permit provisions are commonly required in PSD permits, and provide a necessary assurance to the public and tribal, state and federal regulatory agencies that operation of significantly different sources, or significant modifications of the proposed sources, cannot occur without further evaluation.

B. Comments on the Ambient Air Quality Analysis and Supporting Data.

1. Ice management and anchor handling fleet.

EPA's re-proposed permit specifies the Tor Viking or Hull 247 as the anchor handler (Icebreaker #2) but continues to allow for the use of a generic ice management vessel (Icebreaker #1). Under the re-proposed permit conditions, Shell can use generic parameters for capacity (see, e.g., Conditions N.1.1 through N.1.4), emission rates (Conditions N.1.5 and N.1.6) and limits for volume source release heights (e.g., Condition N.9). We are not convinced that merely capping the capacities of various vessel parameters, requiring the vessels meet certain emission rates for $PM_{2.5}$, PM_{10} and NO_x and requiring a minimum volume source release height is enough to ensure that the use of different vessels will be able to ensure compliance with NAAQS. We continue to prefer that EPA require specific Ice Management vessels and establish permit limits and associated modeling requirements based on the use of those specific vessels. We strongly support the specific permit limits and modeling for the anchor handler (Icebreaker #2).

We support EPA's position that specific permit limits and associate compliance

demonstration requirements are needed for the anchor handler in order to ensure that the vessel's emissions are, in fact, properly represented by AP-42 emission factors. This is particularly important given that there are no stack test data available for PM emissions from these, or similar, engines.[175] If EPA will be allowing the use of the much-lower AP-42 emission factors for the anchor handler then it must include associated emission limits in the final permit.

The re-proposed permit requires stack testing of the support vessels to be completed prior to each drilling season (*see, e.g.*, Conditions N.9 and O.11), but does not specify how far in advance the testing must be done, nor does the permit include a remedy for failed tests.

Permit condition B.7.8 requires all stack test results to be provided to EPA within 45 days of testing. However, if stack testing only occurs a few days prior to the drilling season, there will not be adequate time to analyze and remedy any test results that exceed the permit limits before drilling starts. With a 168 operating day limit per drilling season, a quarter of the drilling season could pass before EPA even receives the test results. Permit conditions N.1.7 and O.1.7 requires Shell to notify EPA no later than 45 days prior to deployment to the Chukchi Sea of the ice management vessels selected. EPA requires 30 days notice on the testing which would appear to result in testing occurring as little as 15 days before the start of the drilling season. EPA must coordinate these timetables so that adequate time is allowed for to remedy any failed tests of the specified vessels

We request that EPA require all stack tests to be completed at least 180 days prior to each drilling season to ensure there is adequate time to analyze and remedy any test results that exceed permit limits. The permit must clearly state that any emission unit that fails to meet the permitted emission limit must not be operated until the unit is repaired or additional emission control is installed. Collecting test data, and merely reporting excess emissions if tests fail to meet permit limits, is not an acceptable solution, especially in the cases where the annual NO_x and 24-hour $PM_{2.5}$ NAAQS compliance margins are very tight. A failed test, unresolved, could result in a NAAQS exceedance. EPA did not respond to this concern in the revised permit, nor even evaluate optimized source test timing with Shell.

We are still concerned that ice management activities may be underestimated in the re-proposed permit analysis. EPA has not specifically addressed this concern. This is important since the icebreaker activities represent a large portion of the overall emissions from the exploration activities. Specifically, the ice management vessels' activity accounts for more than 90 percent of $PM_{2.5}$ emissions (and over 85 percent of NO_x emissions) from Shell's annual exploration drilling activities. The ice management vessels' emissions are dependent on ice conditions; heavier ice conditions result in heavier engine load factors and higher emissions. The Re-Proposed Statement of Basis

[175] See November 23, 2009 Shell Preconstruction Permit Application for Frontier Discoverer Drillship in Chukchi Sea, Alaska, beyond the 25-mile Alaska Seaward Boundary: Supplemental Application Support Materials Responding to R10 Pat Nair's Email and Discussion on November 17, 2009 in Seattle, Washington, p. 3 of 18.

(pp. 43-44) indicates that, "[b]ased on statistics on ice at the Sivulliq drill site in the Beaufort Sea, Shell estimates that ice breaking capability in its lease holdings in Lease Area 193 in the Chukchi Sea would only be required 38 percent of the time."

Assuming this is the same data used for the Camden Bay Exploration Plan, this estimate is based on 2003-2005 data.[176] The reference for this statement is a recent (2009) conversation between Air Sciences, Inc. and the "Arctic Wells Advisor" for Shell International Exploration and Production, Inc. Based on these 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.[177]

This indicates that there is a strong possibility that the 38% frequency of ice may grossly underestimate emissions from the icebreaker vessels. EPA must secure an unbiased source of data for this important assumption – something other than an estimate from Shell 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 and more recent data, if possible, should be incorporated into the analysis. The icebreaker vessels' emissions must be modeled to account for the maximum potential operation scenario under maximum ice conditions for the relevant time of year.

2. Oil spill response.

EPA does not address the potential air impacts from sources associated with potential oil spills in this permit. There are emissions estimates for oil spill response vessels in the inventory to account for emissions from these vessels associated with training and drills but EPA does not directly address the potential ambient air quality impacts from the pollutants that will occur in the event of an oil spill. The details of an oil spill response and ensuing emissions are known and therefore we ask that EPA consider these potential emissions along with Shell's potential to emit. EPA should complete a full evaluation of the potential air quality impacts from an oil spill scenario, including VOC and HAP emissions from evaporation, $PM_{2.5}$ and PM_{10} emissions from in-situ burning during cleanup operations and combustion emissions (NO_x and PM) from vessels during the response. Alternatively, EPA should clarify the applicability of USCG and ADEC guidelines and rules to Shell's operations (*e.g.,* related to spill scenarios for in-situ

[176] Shell EP EIA Appendix H at 206

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

burning, etc.) and how these will ensure protection of human health in the event of an oil spill.

If EPA will not be addressing an emergency oil spill response event directly in this permit then it needs to address how attainment of the NAAQS will be assured for this particular Air Quality Control Region (AQCR), in general. The CAA Section 110 requirements for States to prepare State Implementation Plans (SIPs) that detail provisions for attainment and maintenance of the NAAQS in the Air Quality Control Regions (AQCR) under its jurisdiction do not apply to the AQCR where Shell proposes to conduct its exploratory drilling program. EPA must clearly explain how it will be ensuring attainment of all NAAQS in this AQCR in the absence of a SIP for the region. Specifically, EPA must address how the enforceable measures of a Federal Implementation Plan may be needed in order to establish contingency plans for air pollution emergencies, such as may occur during an oil spill.

3. Hazardous Air Pollutants (HAPS).

The re-proposed permit is based on total hazardous air pollutant emissions from the proposed exploration drilling program of 3.5 tons per year, as quantified in Shell's permit application materials. Shell's estimates are based on "requested limits and other limits assumed under the permit application and supporting materials submitted to EPA."[178]

The emissions calculations included in Shell's application materials show HAP estimates for units FD-1 through FD-22, the ice management fleet and the OSR fleet. There are no HAP emissions estimates for the incinerator (FD-23), the fuel tanks (FD-24 through FD-30), the drilling mud system (FD-32) and the shallow gas diverter system (FD-33).[179] We remain concerned that this application still does not include estimates for individual HAPs as well as an assessment of total HAP emissions from all sources combined. We reviewed all the work materials EPA provided supporting the revised permit, and there is no indication that EPA completed a technical review of the HAPS inventory since the last permit issuance. EPA still relies on Shell's February 2009 estimate of 3.5 tons of HAPS, and as explained above, this number is underestimated because it uses non-standard industry and MMS venting factors. We request that EPA complete a thorough technical review of the HAPs inventory to ensure it has been properly computed, and as noted above, if EPA is concerned about the use of MMS venting factors, we recommend source testing to verify VOC/HAP emissions from these operations during the first season of operation to improve emission estimates.

4. Background concentrations

As with the first proposed permit, EPA and Shell are relying on data collected at the monitoring station in Wainwright, Alaska as representative of background concentrations

[178] EPA Re-Proposed Stmt of Basis at 27.
[179] *See* EPA Re-Proposed Stmt of Basis at 27, EPA Stmt of Basis at Section 4.5; *see also supra* at 42.

for the Shell exploratory drilling program. The Wainwright station was established by ConocoPhillips Alaska, Inc in late 2008 for the purposes of collecting pre-construction monitoring data for future permit applications. EPA is accepting data collected to-date from the Wainwright station in fulfillment of the preconstruction monitoring requirement of 40 CFR § 52.21(m). EPA justifies the use of these data as representative of background concentrations for Shell's exploratory drilling program in the re-proposed permit, as follows:

> EPA believes that it provides a conservative representation of air quality in the area covered by Shell's leases in Lease Area 193 because of the relative closeness of Wainwright to the Shell leases, the relative lack of air pollution sources in Wainwright and the area covered by Shell's leases, and the similarity of the meteorology in Wainwright and the area covered by Shell's leases.[180]

EPA has approved the use of the SO_2, NO_2, NO_x, NO, CO, and O_3 gaseous measurements and PM_{10} data collected from November 8, 2008 to June 30, 2009 as appropriate for use as representative background air quality levels for this proposed permitting action.[181] EPA's regulations require at least one year of pre-construction monitoring data unless "the Administrator determines that a complete and adequate analysis can be accomplished with monitoring data gathered over a period shorter than one year (but not to be less than four months)."[182] Instrumentation problems rendered all $PM_{2.5}$ data collected from November 8, 2008 through March 5, 2009 invalid.

Even though the bare-minimum requisite four months of $PM_{2.5}$ data have now been obtained we still believes Shell should be required to collect a full year worth of pre-construction monitoring data prior to beginning exploration activities. The fact that EPA's proposed (and re-proposed) permit for Shell's exploratory drilling program in the Chukchi Sea includes a requirement for post-construction monitoring of $PM_{2.5}$ (Condition R.1) undercuts the Agency's argument that sufficient pre-construction monitoring data exist. This same issue was raised to Shell in 2007[183] when we requested additional site-specific monitoring data to be collected for their proposed exploratory drilling program; Shell has had adequate time to collect the data. There should be no short cuts for failing to collect an adequate amount of pre-construction monitoring data and Shell should be held to the same regulatory standards as all other applicants. Nevertheless, if EPA will be accepting less than twelve months worth of pre-construction monitoring data for $PM_{2.5}$, we urge EPA to consider the fact that the background concentrations are based on a more limited data set than optimal and, therefore, must pursue conservative assumptions in defining background concentrations.

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[180] EPA Re-Proposed Stmt of Basis at 105.
[181] *Id.*
[182] 40 C.F.R. § 52.21(m)(1)(iv).
[183] Letter from Johnny Aiken, North Slope Borough, to Natasha Greaves and Dan Meyer, EPA Region 10 (May 11, 2007) (Attachment 21).

EPA's original proposed permit and modeling demonstration used a 24-hour average $PM_{2.5}$ background concentration of 8 $\mu g/m^3$. Shell then submitted monitoring data collected at the Wainwright monitoring station through July 31, 2009 to EPA (on September 17, 2009) which included higher recorded values than the previous record. Specifically, 24-hour average $PM_{2.5}$ concentrations collected in July included no less than eight days where the maximum recorded 24-hour average concentration was equal to or greater than the background concentration of 8 $\mu g/m^3$ used in EPA's and Shell's ambient air impact analysis. The highest 24-hour average concentration from July of 14 $\mu g/m^3$ was 75% higher than the background concentration used in the original proposed permit analysis. Use of any of the top three supplemental monitored concentrations as representative background concentrations in EPA's ambient air analysis would have resulted in modeled violations of the 24-hour $PM_{2.5}$ NAAQS.[184] Shell subsequently revised its operating scenarios and submitted new modeling to EPA demonstrating compliance with the NAAQS based on a background concentration of 14 $\mu g/m^3$. However, the 4th quarter monitoring report from Wainwright showed even higher 24-hour $PM_{2.5}$ concentrations – as high as 23 $\mu g/m^3$. Shell then proposed, and EPA agreed, that localized sources of dust could be impacting the monitored concentrations at the site.

Shell proposed the use of an offshore background concentration of 9 $\mu g/m^3$ based on several factors, including an adaptation of the data set to subtract out days with high winds, no precipitation and non-stabilized surfaces (i.e., no snow cover). EPA's re-proposed permit is based on a background concentration for "offshore" $PM_{2.5}$ concentrations of 11 $\mu g/m^3$. After a close look at the data set, we support adapting the data set to account for the fact that windblown dust is not a factor in offshore concentrations but we do not support a concentration as low as 9 $\mu g/m^3$. We strongly urge EPA not to go any lower than its proposed background concentration of 11 $\mu g/m^3$ in the final permit. Specifically, because at least one 24-hour average concentration of 11 $\mu g/m^3$ occurred on a day with no high-winds (see, e.g., data collected on July 14, 2009) it is imperative that EPA use, at least, this maximum monitored value as representative of background concentrations offshore. This is particularly important since, as we mentioned previously, we do not support the use of a pre-construction monitoring period less than a year. We also strongly support EPA's use of actual maximum monitored $PM_{2.5}$ concentrations at Wainwright as representative of background concentrations onshore when determining compliance with NAAQS onshore.

When EPA proposed the original permit Shell did not operate a collocated $PM_{2.5}$ sampler. We commented that:

> For PSD monitoring, EPA should require collocation at least at one site in the

[184] EPA Re-Proposed Stmt of Basis, Appendix B, Table 12a shows a max modeled 24-hour average concentration for $PM_{2.5}$ of 25.7 $\mu g/m^3$ (SOS #1). Considering the top three monitored concentrations at Wainwright, total predicted concentrations are as follows:

25.7 $\mu g/m^3$ + 14 $\mu g/m^3$ = 39.7 $\mu g/m^3$ (113% of 24-hour $PM_{2.5}$ NAAQS)
25.7 $\mu g/m^3$ + 13 $\mu g/m^3$ = 38.7 $\mu g/m^3$ (111% of 24-hour $PM_{2.5}$ NAAQS)
25.7 $\mu g/m^3$ + 11 $\mu g/m^3$ = 36.7 $\mu g/m^3$ (105% of 24-hour $PM_{2.5}$ NAAQS)

network[185] operating one-in-six days for a sampler operating on a one-in-three day schedule, or one-in-three days for a sampler running every day.[186] EPA must also require quarterly Performance Evaluation Program (PEP) audits of 100 percent of the network every quarter.[187] Since PSD monitoring sites operate for such a short relative period, it is extremely important to have tight Quality Assurance controls. These requirements should be spelled out in the Quality Assurance Project Plan (QAPP) written by the monitoring organization and approved by the overseeing entity (in this case, the Region). EPA must clearly identify the expectations for how the data being gathered will be used, and what is allowable for the precision and bias values in order to be able to apply the data with a reasonable level of confidence.

Given the fact that this particular PSD monitoring site has been collecting data for less than a year, it is extremely important to have a good measure of the precision and bias of the monitoring network to ensure that the monitoring that is done has tight Quality Assurance controls. There is no reference to a collocated sampler or to the requirement for Shell to operate a collocated sampler in the re-proposed permit or statement of basis. Supplemental materials included in the administrative record discuss the installation of a collocated sampler at Deadhorse but the details of the Quality Assurance Project Plan (QAPP), as they pertain to our original comments on the need for a collocated sampler, quarterly PEP audits, tight precision and bias goals, etc, are not addressed. A review of the QAPP for the Deadhorse monitoring location indicates that, in fact, there will be a collocated $PM_{2.5}$ sampler to evaluate precision and bias in CPAI-Shell's $PM_{2.5}$ network.

According to the PSD requirement for collocated monitors, 40 CFR Appendix A Section 3.2.5.5 states that, for collocated monitors, "[a] site with the predicted highest 24-hour pollutant concentration must be selected." EPA should discuss how this requirement is met, either through monitoring or modeling. The QAPP (p. 13 of 64) only mentions that "[a] station located in Deadhorse likely will have the highest concentrations in the network" but there is no concrete information in support of this claim. This requirement will help ensure the use of a collocated sampler that is best able to measure precision and bias for the network. Further, according to the project schedule, the first quarterly report for the collocated monitor is not due until 30 days after the end of the quarter. Since the collocated sampler was not operational until October 22, 2009 it appears that the report will not be available until mid-February, or about the time of the close of the comment period for the re-proposed permit. NSB would like assurance from EPA, in the final permit, that the precision and bias goals established in the QAPP are being met.

5. Ambient Air Boundary.

Shell has applied for a safety exclusion zone for the Discoverer drill ship and the U.S.

[185] 40 C.F.R. § 58 Appendix A §3.2.5.5.
[186] *Id.* § 58 Appendix A §3.2.5.7.
[187] *Id.* § 58 Appendix A §3.2.7.

Coast Guard (USCG) has proposed approval of such a zone.[188] According to the USCG proposal:

> "[t]he purpose of the temporary safety zone is to protect the DRILLSHIP from vessels operating outside normal shipping channels and fairways. Placing a temporary safety zone around the DRILLSHIP will significantly reduce the threat of allisions, oil spills, and releases of natural gas, and thereby protect the safety of life, property, and the environment."[189]

We would like to emphasize that nowhere in the proposal for the temporary exclusion zone does it state an intent to change the location of the ambient air boundary for the purposes of demonstrating compliance with Clean Air Act requirements, including compliance with NAAQS and PSD increments. In fact, if has been our longstanding position that regardless of the need for an exclusionary safety zone (to minimize the potential threats to life, property and the environment from allisions, oil spills, etc,) Shell must continue to demonstrate compliance with all CAA requirements at the location of maximum concentration regardless of the safety zone boundary, EPA cannot ignore predicted concentrations just because they occur within a USCG designated safety zone.

6. Increment Applicability.

We strongly support EPA's position on the need for demonstrating compliance with PSD increments on the OCS. Specifically, we agree with EPA's position, articulated in the statement of basis for the re-proposed permit (at pp. 18-19) that OCS permitting rules applicable to sources further than 25 miles beyond a state's seaward boundary apply in the same manner as the PSD requirements of 40 CFR 52.21 apply to onshore sources. Clearly this includes compliance with the PSD increments for Shell's exploration activities in Lease Area 193. Further, we agree that the required air analysis is <u>not</u> limited to the impacts of offshore sources to onshore areas. These are important distinctions and we would like to clearly support EPA's position as it moves forward with this and future OCS permitting actions.

7. Secondary $PM_{2.5}$ formation.

An important consideration in determining $PM_{2.5}$ impacts, which is not accounted for in the modeling for the proposed nor in the re-proposed permit, is the assessment of secondary $PM_{2.5}$ formation in the atmosphere. In addition to primary $PM_{2.5}$ emissions (directly emitted from combustion point sources and from fugitive sources), emissions of NO_x, VOCs, SO_2 and ammonia can form, after being emitted into the atmosphere, into $PM_{2.5}$ and this can potentially be a significant component of ambient $PM_{2.5}$

[188] Safety Zone; FRONTIER DISCOVERER, Outer Continental Shelf Drillship, Chukchi and Beaufort Sea, Alaska, 75 Fed. Reg. 803-807 (Jan. 6, 2010).
[189] 75 Fed. Reg. at 803

concentrations.[190] And while primary $PM_{2.5}$ emissions are generally a localized issue, secondary $PM_{2.5}$ emissions can be more regional in scale. Secondary $PM_{2.5}$ formation could be especially important considering the fact that the modeling results presented in the Statement of Basis predict $PM_{2.5}$ concentrations at over 84% of the 24-hour NAAQS and are barely within the appropriate margin of error when considering the accuracy of the data inputs for the analysis.[191]

The fraction of $PM_{2.5}$ concentrations in the ambient air that is due to the secondary formation of $PM_{2.5}$ (e.g., sulfates and nitrates), as opposed to directly emitted [primary] $PM_{2.5}$ (e.g., as a product of combustion) is dependent on many factors. However, the presence of strong temperature inversions that limit dispersion contribute to the formation of secondary $PM_{2.5}$ in the atmosphere and can increase secondary $PM_{2.5}$ formation. $PM_{2.5}$ concentrations, therefore, can be due to gaseous pollutants that form fine particles after reacting with other compounds in the air during meteorological inversions and it is important for EPA to consider these $PM_{2.5}$ precursor sources (*e.g.*, NO_x from the diesel combustion sources associated with Shell's exploration drilling program) in its OCS permitting. Because of the presence of strong temperature inversions on the North Slope, EPA should seriously consider the contribution from secondary $PM_{2.5}$ to total $PM_{2.5}$ concentrations from the permitted sources on the OCS.

EPA must address how it will account for secondary $PM_{2.5}$ impacts from permitted sources such as Shell's exploration activities. If it will not be directly addressing this issue in Shell's final permit then EPA, at the very least, should give an indication of how it is working to be able to address this important component of $PM_{2.5}$ in future permitting actions. EPA's Support Center for Regulatory Atmospheric Modeling (SCRAM) provides various resources for modeling the impacts of secondary $PM_{2.5}$. For example, EPA's recently-developed model based on the Community Multi-scale Air Quality (CMAQ) model in support of the development of the $PM_{2.5}$ NAAQS has been shown to "reproduce the results from an individual modeling simulation with little bias or error" and "provides a wide breadth of model outputs, which can be used to develop emissions control scenarios".[192] The Comprehensive Air quality Model with extensions (CAMx) is another tool available to assess secondary $PM_{2.5}$ formation. CAMx has source apportionment capabilities and can assess a wide variety of inert and chemically reactive pollutants, including inorganic and organic $PM_{2.5}$ and PM_{10}. The Regional Modeling System for Aerosols and Deposition (REMSAD) can also model concentrations of both inert and chemically reactive pollutants on a regional scale, "including those processes relevant to regional haze and particulate matter".[193] These are just some examples of

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[190] *See* Damberg, Policies for Addressing PM 2.5 Precursors (available at: http://www.epa.gov/ttnnaaqs/pm/presents/policies_for_pm25_precursors-rich_damberg.ppt) (Attachment 22).
[191] EPA Re-Proposed Stmt of Basis at Table 5-12.
[192] *See* Technical Support Document for the Proposed PM NAAQS Rule (available at: http://www.epa.gov/scram001/reports/pmnaaqs_tsd_rsm_all_021606.pdf) (Attachment 23).
[193] *See* http://remsad.saintl.com/ (Attachment 24).

current models, identified by EPA, with the capability to assess secondary $PM_{2.5}$ impacts. With adequate testing (using existing regional monitoring data to ensure accuracy) these models could be used in the permitting context for larger sources. An alternative to these grid models would be for EPA to develop a screening point source model - like CALPUFF - to look at near-field $PM_{2.5}$ primary and secondary impacts.

There have been several oil and gas Environmental Impact Statements that have already used (or are using) CMAQ or CAMx to estimate $PM_{2.5}$ concentrations. The Uinta Basin Air Quality Study in Utah and the Four Corners Air Quality Group Modeling Project in Colorado are examples of completed modeling studies of this type.[194] And both the Continental Divide and Hiawatha EISs in Wyoming are examples of projects using grid modeling to assess $PM_{2.5}$ concentrations.[195]

We strongly encourage EPA to address – in the statement of basis for the final permit issued to Shell - how it will account for secondary $PM_{2.5}$ formation from permitted sources in the region. The secondary $PM_{2.5}$ component could be critical to understanding the best way to mitigate potential $PM_{2.5}$ impacts.

8. Impacts to regional Ozone.

We appreciate EPA's more in-depth discussion of ozone in the re-proposed permit. And while we agree that emissions from one permit may not trigger the need for a comprehensive quantitative regional assessment of ozone, the fact that there are at least three OCS exploration projects being permitted in the region in the near future (e.g., Shell's Chukchi and Beaufort Sea programs as well as ConocoPhillips' proposed exploration in the Chukchi Sea) we strongly urge EPA to commit to a more comprehensive look at the cumulative impacts of these and other reasonably foreseeable sources on concentrations in the region. It is not ok to wait until monitoring shows a problem. Regardless of the source of background concentrations in the area (i.e., whether from transcontinental transport or from local sources) EPA must be able to ensure the public that no source will contribute to ozone exceedances. As EPA continues to permit additional sources of NO_x and VOC in the region, it must be able to determine the cumulative impacts of these sources on future ozone concentrations.

Background concentrations of ozone, as EPA points out, are already as high as 50 ppb (8-hour average) on the North Slope. This background level is already two-thirds of the way to the 8-hour average standard of 75 ppb and over 80% of the way towards the lower

[194] *See* Uinta Basin Air Quality Study (UBAQS) News Release at http://ipams.org/wp-content/uploads/2009/05/News-Release-UBAQS.pdf (Attachment 25); Four Corners Air Quality Task Force modeling info at http://www.nmenv.state.nm.us/aqb/4C/Modeling.html (Attachment 26).

[195] *See,* Continental Divide EIS documents at http://www.blm.gov/wy/st/en/info/NEPA/rfodocs/cd_creston.html and Hiawatha EIS documents at http://www.blm.gov/wy/st/en/info/NEPA/rsfodocs/hiawatha.html .

range of EPA's proposed revisions to the ozone standard.[196] EPA is proposing to strengthen the 8-hour average ozone standard, designed to protect public health, to a level within the range of 60-70 ppb. EPA's proposal is based on scientific information, including epidemiological and human clinical studies, showing effects in healthy adults at levels as low as 60 ppb.[197]

EPA's re-proposed permit indicates that it "*believes* that emissions from Shell's exploration operations will not cause or contribute to a violation of the NAAQS for ozone." [Emphasis added] Statement of Basis at 110. However, EPA has yet to complete any analysis of the proposed impacts from exploratory drilling programs on the OCS on ozone concentrations in the region. EPA should more thoroughly address the potential regional ozone impacts from the permitting actions of large air pollution sources on the OCS as it continues to receive applications for exploration activities. This is especially important considering EPA's proposed strengthening of the standard to better protect human health.

Traditionally, elevated ozone levels are thought to be a summertime problem that plagues large urban areas. However, "recent events that have occurred in rural southwest Wyoming in wintertime demonstrate this is not always the case."[198] This raises a potential concern with respect to potential regional ozone formation on the North Slope of Alaska during the non-summer months. According to a recent study by the National Oceanic and Atmospheric Administration, ozone rapidly formed in southwest Wyoming "when three factors converged: ozone-forming chemicals from the natural gas field, a strong temperature inversion that trapped the chemicals close to the ground, and extensive snow cover, which provided enough reflected sunlight to jump-start the needed chemical reactions." [199] The North Slope of Alaska also exhibits these three factors needed for ozone formation. First, industrial sources in the North Slope region have the potential to contribute tens of thousands of tons of NO_x emissions (80,000 TPY) and several thousand tons of VOC emissions (2,500 TPY) to the area each year.[200] These

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[196] 75 FR 2938, January 6, 2010

[197] EPA's Proposed Revisions to National Standards for Ground-Level Ozone, January 6, 2010, Fact Sheet, available online at http://www.epa.gov/air/ozonepollution/pdfs/fs20100106std.pdf. (Attachment 27)

[198] WYDEQ Sublette County Air Quality Information Page, *see e.g.*, http://deq.state.wy.us/out/downloads/PINEDALE%20April%2008%20Town%20Meeting.pdf) (Attachment 28); *see also* http://www.starvalleyindependent.com/2009/03/governor-concerned-over-southwest-wyoming-ozone-levels/. (Attachment 29).

[199] *See* NOAA's press release (available at: http://www.noaanews.noaa.gov/stories2009/20090118_ozone.html) (Attachment 30); January 18, 2009 for Schnell, R.C., et al. 2009. Rapid photochemical production of ozone at high concentrations in a rural site during winter. *Nature Geoscience* 1-3 (January 18, 2009) (available at: http://www.nature.com/naturegeoscience).

[200] *See* The North Slope Borough Region Emission Summary in Table 3.4.5-8 of the Beaufort Sea and Chukchi Sea Planning Areas Oil and Gas Lease Sales 209, 212, 217,

sources and Shell's proposed OCS activities are all contained within an area similar in size to a representative regional ozone study domain (e.g., 400-500 km by 400-500 km). In comparison, the NO_x inventory for the counties that include the Wyoming development field totals just over 60,000 TPY and VOC emissions total just over 10,000 TPY.[201]

Second, strong temperature inversions frequently occur in Alaska's North Slope region. Finally, extensive snow cover is persistent in the region from as early as September through June.[202] The Chukchi and Beaufort Seas exploration activities will occur, at least in part, during this period. While there may not be available sunlight in the dead of winter there is certainly abundant sunlight in the fall and spring in conjunction with snow cover and strong temperature inversions. The fact that the pollution sources and photochemical mechanisms for producing ozone are available and the possibility of elevated background concentrations from global transport of pollution is real means that EPA must more thoroughly investigate the effects of NO_x and VOC sources from the proposed exploration activities on the OCS and from existing and reasonably foreseeable NO_x and VOC sources in the region on ozone formation on the North Slope.

Even though monitored levels of ozone from the Wainwright monitor do not threaten compliance with the NAAQS, background concentrations as high as 50 ppb (based on daily average data from NOAA/GMD monitoring in Barrow[203]) have been observed. This level is equivalent to background concentrations currently observed in the active oil and gas development areas in the Uinta Basin in northeast Utah.[204] EPA has a regulatory obligation to ensure compliance with the NAAQS. Emissions will dilute as they transport away from their source of origin, but spreading of plumes is not always rapid and is highly dependent on the atmospheric stability at the time. Emissions from Shell's

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and 221 Draft Environmental Impact Statement, OCS EIS/EA MMS 2008-0055. Total permitted NOx emissions exceed 83,000 TPY and total permitted VOC emissions exceed 2,500 TPY (available at: http://www.mms.gov/alaska/ref/EIS%20EA/ArcticMultiSale_209/2008_0055_deis/vol4k5.pdf)(Attachment 31).

[201] Based on 2005 emissions data presented in meeting notes from Greater Yellowstone Area Clean Air Partnership Annual Meeting, Pocatello, ID, October 17-18, 2007 (available online at http://www.fs.fed.us/r1/gallatin/resources/air/gyacap/docs/GYACAP-Pocatello_2007_Meeting_Notes.doc) (Attachment 32).

[202] *See, e.g.*, the Barrow Snowmelt Date study performed by NOAA's Earth System Research Lab (available at http://www.esrl.noaa.gov/gmd/grad/snomelt.html) (Attachment 33).

[203] *See* World Data Center for Greenhouse Gases (available at: http://gaw.kishou.go.jp/cgi-bin/wdcgg/accessdata.cgi?index=BRW471N00-NOAA&select=inventory (Attachment 34).

[204] Background ozone concentrations in the Uinta Basin, Utah from recent (2008) EAs = 50 ppb (draft Big Pack EA UT-080-06-488, draft River Bend EA UT-080-07-772, draft Southam Canyon EA UT-080-08-342) (available at: http://www.blm.gov/ut/st/en/fo/vernal/planning/nepa_.html).

activities could certainly contribute to ozone formation in the region under the right conditions, as described above.

A study looking at future ozone concentrations in the Arctic from increased shipping traffic in the Arctic northern passages determined that ships' combustion engines could increase ozone concentrations in the region by 2-3 times in the decades ahead (with predicted peak concentrations reaching more than 60 ppb_v in July and August).[205] According to the same study, "the photochemical lifetime of ozone [in the Arctic] is rather long, and its deposition velocity on ice and water is small." Furthermore, "[i]n most regions of the troposphere, including the remote Arctic areas where background concentrations of pollutants are particularly low, the formation rate of ozone is limited by the amount of nitrogen oxides that are present in the atmosphere." Thus, it is conceivable that NO_x (and VOC) emissions from Shell exploration activities in the Chukchi and Beaufort Seas could contribute to elevated ozone concentrations in the region, even during the summer months.

We would like to see EPA require a more thorough evaluation of potential ozone impacts in the region from ongoing permitting activity on the OCS. Seeing as how monitored levels of ozone are already over 80% of the level at which EPA has concluded results in health impacts to adults, we are concerned that continued permitting of sources in the region without further analysis may result in adverse health impacts to the region.

VII. Compliance with other Environmental Laws And Requirements is A Necessary Step Toward Protecting the Arctic and the Communities Who Depend Upon It.

Prior to the issuance of any permit to Shell, there are several environmental laws that must be complied with.

A. Compliance With The National Environmental Policy Act is Imperative To Authorizing Hydrocarbon Exploration.

The National Environmental Policy Act (NEPA) is our Nation's "basic national charter for protection of the environment."[206] NEPA declares a national policy "to enrich the understanding of the ecological systems and natural resources important to the Nation,"[207] and makes it the "continuing responsibility" of all federal agencies to "preserve important historic, cultural, and natural aspects of our national heritage . . .." *Id.* § 4331(b)(4).

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[205] Granier, C., U. Niemeier, J. H. Jungclaus, L. Emmons, P. Hess, J.-F. Lamarque, S. Walters, and G. P. Brasseur (2006), Ozone pollution from future ship traffic in the Arctic northern passages, *Geophys. Res. Lett., 33*, L13807, doi:10.1029/2006GL026180 (available at: http://www.agu.org/pubs/crossref/2006/2006GL026180.shtml) (Attachment 35).

[206] 40 C.F.R. § 1500.1(a).

[207] 42 U.S.C. § 4321.

Shell's PSD permit application is related to the company's exploration plans in the Chukchi Sea. Shell is currently proposing exploratory operations in both the Chukchi and Beaufort Seas with very similar environmental impacts. We asked the Minerals Management Service (MMS) to analyze the impacts from these two Exploration Plans together under the National Environmental Policy Act (NEPA). Unfortunately, this request was not honored. Shell's air emissions received minimal consideration under NEPA because MMS deferred to the EPA's air permitting process.[208] In addition, MMS failed to analyze the impacts from the generation of secondary air pollutants.[209]

Acknowledging the hefty workload Region 10 already has, we ask that whenever possible the EPA provide assistance to MMS in analyzing and reviewing the impacts to air and water resources from proposed off-shore drilling operations in the Arctic. [210] It is critical that all the impacts of oil and gas exploration are analyzed as required under NEPA.

B. The Letter and the Spirit of Section 7 of the Endangered Species Act have yet to be Compiled with here.

We appreciate EPA consulting with the FWS and NOAA under the Endangered Species Act. We agree that MMS is the lead the agency for Section 7 consultations and as we are sure EPA is aware, MMS decided not to initiate the Section 7 consultation process to review Shell's Chukchi Exploration Plan. We are concerned that the isolated consultations on just the air emissions on these operations is insufficient to ensure against the jeopardy of listed species that may be affected by Shell's proposed operations. For this reason, we encourage EPA to work with MMS, FWS, and NOAA in ensuring full compliance with Section 7 of the Endangered Species Act.

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[208] MMS, Environmental Assessment for Shell's Chukchi Sea Exploration Plan at 18, 27-29, 90-92 (available at: www.mms.gov/alaska/ref/EIS%20EA/2009_Chukchi_2010EA/2009_EA2010_Chukchi_EP.pdf). Indeed, MMS explains that "By demonstrating compliance with the applicable NAAQS, AAAQS, and PSD increment standards at the edge of the *Discoverer*, in the immediate vicinity of its support vessels, and at the Chukchi Sea shoreline, the air quality impact analysis prepared for Shell's EPA permit application shows that Shell would not have a significant adverse impact at the nearest villages along the Chukchi Sea coast, Wainwright and Point Lay. Please refer to EA Section 3.4 on air quality for additional discussion." *Id.* at 90.

[209] *Id.*

[210] 40 C.F.R. § 52.21(s) ("[w]henever any proposed source or modification is subject to action by a Federal Agency which might necessitate preparation of an environmental impact statement pursuant to the National Environmental Policy Act, review by the Administrator conducted pursuant to this section shall be coordinated with the broad environmental reviews under that Act and under section 309 of the Clean Air Act").

C. EPA Must Conduct an Environmental Justice Analysis before Making a Decision on Shell's Permit Application.

Under Executive Order No. 12898, EPA must consider and address, when appropriate, "disproportionately high and adverse human health and environmental effects of [their] programs, policies, and activities on minority and low-income populations."[211] When issuing PSD permits, the EAB has required that the permitting agencies provide details about the required environmental justice analysis.[212]

In the statement of basis for the draft permit, EPA recognizes that the Alaskan Natives, a minority population, make up a significantly large portion of the potentially impacted communities.[213] As previously discussed in section III, Shell's operations will contribute to global warming effects that will harm the Arctic and threaten the livelihood of those native communities.

We appreciate EPA's efforts at meeting with affected North Slope communities and listening to their concerns regarding the proposed air and water permits in the Chukchi Sea. However, EPA's continued reliance upon Shell's compliance with the NAAQS to determine that Shell's air emissions will not harm human health and welfare is insufficient here.

Even though the NAAQS are supposed to protect human health with an adequate margin of safety, CAA § 109(b),[214] the standards often do not. EPA has failed to update the NAAQS every five years as required, thus the NAAQS do not always reflect the current state of technological and scientific knowledge about criteria pollutants. Even when EPA revises the NAAQS, the agency does not always adopt the most protective standard recommended by the Clean Air Scientific Advisory Committee to protect human health and welfare. In fact, the U.S. House Committee on Oversight and Government Reform documented how political considerations trumped health recommendations in the March 2008 determination of the NAAQS for Ozone.[215]

Particulate matter provides a compelling example that the NAAQS are insufficient to protect public health. In the most recent revision of the NAAQS for PM, EPA documented the health problems associated with exposure to particulate matter, including

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[211] *See* Exec. Order No. 12,898, Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations, 59 Fed. Reg. 7,629, 7,632-33 (Feb. 11, 1994).

[212] *See In re: Knauf Fiber Glass*, PSD Permit No. 97-PO-06, 8 E.A.D. 121, 175 (1999) (remanding PSD permit to the permitting agency to include the environmental justice analysis in the record).

[213] EPA Re-Proposed Stmt of Basis at 119.

[214] 42 U.S.C. § 7409(b).

[215] *See* Memo Re: Supplemental Information on the Ozone NAAQS, May 2008 (available at oversight.house.gov/documents/20080520094002.pdf) (Attachment 36).

chronic respiratory disease, asthma, lung cancer, and cardio-respiratory mortality.[216] EPA found that epidemiological studies revealed a linear relationship between health problems, notably cancer, and the ambient concentration of particulate matter. EPA could not determine a threshold for particulate matter concentrations under which no human health effects would occur.[217] This evidence suggests that any level of particulate pollution will have human effects, thus the PM NAAQS is not protective of human health. Due to the unreliability of the NAAQS, EPA cannot conclude that Shell's purported compliance with the NAAQS will protect the health and welfare of the native communities in the surrounding area.

Additionally, EPA has found that there are human health hazards associated with exposure to diesel exhaust. In the *Health Assessment Document for Diesel Engine Exhaust*, EPA explained that some of these health hazards include "acute exposure-related symptoms, chronic exposure related noncancer respiratory effects, and lung cancer."[218] Notably, EPA found that diesel engine exhaust is "likely to be carcinogenic to humans by inhalation" through environmental exposures.[219] EPA must consider whether or how these human health hazards will affect the native communities that are on-shore from Shell's operations. Thus, EPA must conduct an independent analysis to determine the impact of Shell's activities on the health and welfare of the native communities in the Chukchi Sea.

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[216] *See* EPA National Ambient Air Quality Standards for Particulate Matter; Final Rule. 71 Fed. Reg. 61144, 61154 (Oct. 17, 2006).
[217] *See* EPA National Ambient Air Quality Standards for Particulate Matter; Proposed Rule, 71 Fed. Reg. 2620, 2635.
[218] Health Assessment Document for Diesel Exhaust (available at http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=29060 at 1-3(May 2002)) (Attachment 37).
[219] *Id*. at 1-4 and 1-5.