

**BEFORE THE ENVIRONMENTAL APPEALS BOARD  
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C.**

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**In re:** )  
 )  
**Shell Offshore, Inc.** )  
***Discoverer* Drillship** ) OCS PSD Appeal Nos. 11-02–11-04  
**OCS Permit No. R10OCS/PSD-AK-2010-01** )  
 )  
**Shell Gulf of Mexico, Inc.** )  
***Discoverer* Drillship** )  
**OCS Permit No. R10OCS/PSD-AK-09-01** )  
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**MOTION FOR LEAVE TO FILE A REPLY BRIEF IN SUPPORT OF THE IÑUPIAT  
COMMUNITY OF THE ARCTIC SLOPE’S PETITION FOR REVIEW**

The Environmental Appeals Board’s Order Governing Petitions for Review of Clean Air Act New Source Review Permits creates a presumption against the filing of reply briefs in new source review proceedings before the Board. Standing Order at 3, ¶ 3 (April 19, 2011).

Petitioner, Iñupiat Community of the Arctic Slope (ICAS), hereby moves the Board for leave to file a short reply brief in support of its Petition for Review of the major source air permits issued to Shell for its *Discoverer* drillship.

As Petitioner has previously articulated, these two air permits are important precedent setting permits for oil and gas operations offshore in the Arctic. ICAS appreciates the Board’s attention to these matters and the fact that the permits are much improved from those that were issued in 2010. However, there remain significant legal and factual issues with these permits.

Due to the arguments and facts presented by the Region in its response brief, ICAS feels it is appropriate and necessary to submit a concise reply brief (less than 10 pages and just over 3,000 words) and seeks leave to do so for the reasons articulated below.

First, in its response, Region 10 is relying on new information on methane emissions that was not put forth during the public comment period. Region 10 Response Brief at 15-16 (Docket No. 33) (discussing information the Region received in September). Therefore, ICAS requests the opportunity to comment on the information that was added to the record after the close of the comment period and the Region's arguments related to this new information. *See In re St. Lawrence County Solid Waste Disposal Auth.*, PSD Appeal No. 90-9, order at 3 n.3 (July 27, 1990) ("The close of the public comment period is an appropriate benchmark for closing the administrative record to receipt of new information").

Second, Region 10 has changed its position on several points and ICAS is proposing to respond to and highlight these points for the Board. The points include: 1.) the agency's argument in these proceedings that platforms are not vessels and its determination in the context of another OCS air permit that they are vessels; and 2.) the agency's new position that Shell's estimates of its methane emissions are the "absolute maximum" Shell can emit which is directly contrary to the agency's previous position that these emissions are subject to operational limits. The Region must make a reasoned permitting decision and an evolving rationale for its decisions indicates the need for a remand. *See e.g., See In re Austin Powder Co.*, 6 E.A.D. 713, 719-20 (EAB 1997) (remanding permit for region to clarify the differing rationales given for making a permit determination).

Third, Region 10 argues that ICAS is foreclosed from raising certain arguments in its Petition and ICAS is proposing to respond to those arguments. These include: 1.) whether the agency's limited consideration of the regional air pollutant Ozone in its new environmental justice analysis can be reviewed by the Board; and 2.) whether the Board can consider the

methane emission estimates provided by ConocoPhillips to Region 10 in deciding that Shell's methane estimates are neither the "absolute maximum," nor otherwise subject to an inherent limit. The Board takes such allegations of waiver seriously, *see e.g., In re Shell Offshore Inc.*, 13 E.A.D. 357, 394-95 (EAB 2007), and ICAS would like the opportunity to respond to the Region's points.

Fourth and finally, ICAS requests the opportunity to clarify a few of its positions that have been misconstrued or otherwise confused by the Region in its response. These positions include: 1.) the basis of ICAS's arguments regarding the OCS source; 2.) the need for further consideration of Ozone in light of the agency's new scientific findings; and 3.) why further analysis is necessary in the Region's environmental justice analysis to address the impacts from hourly NO<sub>2</sub> emissions in subsistence areas.<sup>1</sup>

### CONCLUSION

For these reasons, ICAS respectfully requests that the Board grant it leave to file the attached reply brief and exhibit in support thereof.

Respectfully submitted,

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<sup>1</sup> ICAS is not seeking leave to respond to any arguments put forth by the Region regarding the limited time it afforded for public participation on these permits. The agency's regulations are clear that it must provide 30 days and here Region 10 only provided 15 days per permit for public comment.

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Dated: November 23, 2011

*Attorneys for Petitioner  
Iñupiat Community of the Arctic  
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## CERTIFICATE OF SERVICE

I hereby certify that copies of ICAS's Motion for Leave to File a Reply Brief, the Proposed Reply Brief and Word Certification, and Exhibit 1 thereto were served by electronic mail upon the following entities:

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**BEFORE THE ENVIRONMENTAL APPEALS BOARD  
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
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<b>Shell Offshore, Inc.</b>	)	
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	)	
	)	

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**[PROPOSED] REPLY BRIEF IN SUPPORT OF THE IÑUPIAT COMMUNITY OF THE  
ARCTIC SLOPE’S PETITION FOR REVIEW**

The Iñupiat Community of the Arctic Slope (ICAS) submits the following limited points in support of its Petition for Review of the major source air permits issued to Shell Offshore, Inc. and Shell Gulf of Mexico, Inc. (hereafter Shell) for offshore oil and gas activities in the Beaufort and Chukchi Seas.<sup>1</sup> ICAS moves the Board for leave to file these points because they overcome the presumption against the filing of reply briefs in new source review cases. New Source Review Standing Order at 3, ¶ 3 (April 19, 2011). As these points and those raised in ICAS’s petition for review demonstrate, the Beaufort and Chukchi outer continental shelf (OCS) prevention of significant deterioration (PSD) air permits issued to Shell should be remanded to Region 10 of the Environmental Protection Agency (EPA).

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<sup>1</sup> On November 22, 2011, the Alaska Eskimo Whaling Commission (AEWC) moved the Board for leave to withdraw from these proceedings. Docket No. 36. Thus, this reply and the motion to submit it are provided only by ICAS.

## ARGUMENT

### A. The Agency's OCS Source Determination Is Based On Clear Errors.

#### 1. The Region has put forth an argument that is inconsistent with its own findings in the proceedings for another permit.

In responding to ICAS's argument that the Region's current interpretation of OCS source is attempting to give meaning to the term "erected thereon" in the context of a drillship when that term is designed to apply to other forms of exploration, ICAS Pet. at 14-15 (Docket No. 7), the Region contradicts itself. It argues that "erected thereon" does not apply to platform exploration because it "only applies in determining when a vessel is an OCS source." Region 10 Br. at 9, n.7 (Docket No. 33). The argument the Region presents here is inconsistent with the Region's determination that jack-up rigs (*i.e.*, platforms that are constructed and jacked-up at the drill site) are vessels. *See* Region 10, Statement of Basis for ConocoPhillips Jack-up Rig (BBB-113 at BBB9666-69); Internal EPA Email re: Jack Up Rig (CCC453 at CCC4869). Therefore, based on the agency's own interpretations "erected thereon" is given meaning in the context of other forms of exploration and different phases of the OCSLA process.

#### 2. The Region ignores the OCS source criteria from the Clean Air Act in its response brief.

In responding to ICAS's points regarding the determination of when the *Discoverer* becomes an OCS source, ICAS Pet. at 12-15, Region 10 ignores three of the six criteria that the drillship must meet. These criteria are that the source: 1.) has the potential to emit pollution; 2.) *is authorized under the Outer Continental Shelf Lands Act* (OCSLA); and 3.) is on the outer continental shelf (OCS) or the waters above the OCS. 42 U.S.C. § 7627(a)(4)(C) (emphasis

added).<sup>2</sup> The Region argues that the *Discoverer* cannot be an OCS source whenever it is attached to the seabed at one of Shell's leases blocks, because such an interpretation of OCS source is not tied to any criteria. Region 10 Br. at 9. This argument ignores the need for authorization under OCSLA, which the leasing of portions of the OCS meets.<sup>3</sup>

**B. The Permit Conditions Pertaining To Greenhouse Gases Are Not Practically Enforceable.**

**1. The methane emission estimates for Shell's *Discoverer* permits are not the "absolute maximum that the source could emit."**

In responding to ICAS's argument that the methane permit conditions in the permits are not practically enforceable, ICAS Pet. at 18-20, Region 10 has committed a clear legal error by arguing that Shell's methane emissions are sufficiently controlled because they represent the "unrestricted monthly PTE of 17 tons." Region 10 Br. at 13. The agency's guidance provides that:

An emission limitation alone would limit potential to emit *only when it reflects the absolute maximum that the source could emit without controls or other operational restrictions*. When a permit contains *no limits* on capacity utilization or hours of operation, the potential to emit calculation should assume operation at maximum design or achievable capacity (whichever is higher) and continuous operation (8760 hours per year).

1989 PTE Guidance (BBB2 at BBB000013). The methane emissions in the *Discoverer* permits, in the agency's own words, are "coupled with the *operational limit* on the duration of the operations *and other permit restrictions*." RTC at 29 (SSS4 at SSS294) (emphasis added); *id.* at 28 (*id.* at SSS293) (the methane emissions "are subject to *an operational restriction* limiting operations to the five months between July and November"); Final Chukchi Permit B.2.2 (SSS3)

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<sup>2</sup> Of course, as a vessel the drillship must also: 4.) be used for the purpose of exploring for or producing oil and gas, 5.) be attached to the seabed floor, and 6.) be erected thereon. 40 C.F.R. § 55.2.

<sup>3</sup> This interpretation also would be coterminous with the scope of the permit, which authorizes Shell to operate on a host of lease blocks.



(source wide requirement limiting drilling to 1,632 hours); Final Beaufort Permit (SSS2). As a result, the permit conditions pertaining to methane are not based on “the absolute maximum that the source could emit without . . . operational restrictions” as the Region now suggests. As such, based on the agency’s guidance, the blanket limitation on emissions in the permit is not enforceable.

Moreover, as these arguments illustrate the Region has changed its rationale for why it believes the methane permit condition is enforceable. In responding to comments, the Region advocated that the estimate was conservative, subject to operational limits, and comported with the agency’s guidance for grain terminals. RTC at 28 (SSS4 at SSS293). The agency now also argues that the methane estimate represents the absolute maximum the source can emit. Region 10 Br. at 13. When the agency changes its rationale for its permitting decision mid-course, such as it has done here, that decision should be remanded to the agency for clarification. *See In re Austin Powder Co.*, 6 E.A.D. 713, 719-20 (EAB 1997) (remanding permit for region to clarify the differing rationales given for making a permit determination).

**2. The new information in the record shows that Shell’s methane estimates are neither inherent physical limits nor conservative.**

Region 10 acknowledges that in response to comments it “requested Shell to re-examine its [methane] estimate” and provide new “well information previously-claimed by Shell as confidential” so that the agency could “confirm that the estimate of methane . . . is a reasonable upper-bound estimation.” Region 10 Br. at 15-16. At the same time, the Region requested additional information from ConocoPhillips pertaining to its methane estimate, which is much higher than Shell’s. Email from ConocoPhillips’ consultant to Doug Hardesty, Region 10 (DDD83 at DDD226-28). The Region argues that the Board should not consider this new information in deciding whether the methane permit provisions are enforceable, because the

methane potential to emit (PTE) was not contested during the comment period. Region 10 Br. at 15.

The Region's argument ignores that it was the agency in responding to comments who claimed it was relying upon "reasonable projections of potential emissions where inherent physical limitations exist" in order to liken Shell's permits to the guidance the agency issued for grain terminals. RTC at 28 (SSS4 at SSS293). In order to respond to this point, ICAS pointed out that Shell's methane emissions are not reasonable projections (or as conservative as the agency argues) when compared to ConocoPhillips' projections. The grain terminal guidance upon which the Region is relying hinges on the fact it "address[es] facilities for which *the theoretical use of equipment is much higher than could ever actually occur in practice.*" EPA Guidance on Grain Terminals (BBB4 at BBB84) (emphasis added).<sup>4</sup>

In the analogy that the Region is trying to draw to this guidance, the estimate of 17 tons of CO<sub>2e</sub> per month must be "higher than could ever actually occur in practice." *Id.* While there is no doubt the agency has increased the number originally provided to it by Shell, the data submitted by ConocoPhillips shows that both Shell and Region 10's estimates are not higher than could occur in practice. *See* Email from ConocoPhillips' consultant to Doug Hardesty, Region 10 (DDD83 at DDD226-28). ConocoPhillips' estimate is based on data from the actual drilling of wells as compiled by an industry trade group, *id.*, and this data is many times higher than the estimate Region 10 used for Shell's permit. *Compare* Region 10, Statement of Basis for ConocoPhillips Jack-up Rig at 35 (BBB113 at BBB9683) ("183 tons per month of CO<sub>2e</sub> (8.7 tons

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<sup>4</sup> ICAS further argued that the agency's guidance for grain terminals is not applicable here where the agency does not have the same amount of data from offshore wells upon which to make the educated assumptions that went into that establishing that guidance. ICAS Pet. at 19 n.10. And as just discussed, Petitioner questions whether there are "inherent limits" on these emissions or just "operational restrictions" the Region is pigeon holing into the grain terminal guidance.

per month of methane)”), with RTC at 29 (SSS4 at SSS294) (17 tons per month of CO<sub>2e</sub> or 0.798 tons per month of methane). Therefore, the ConocoPhillips data, which was already before the agency, can be considered by the Board. This data shows that the methane emission estimates used for Shell’s permits are not higher than could occur in practice and thus, not analogous to the estimates the agency relied upon in its guidance for grain terminals.<sup>5</sup>

**C. The Region Committed Clear Errors In Preparing Its Environmental Justice Analysis For The Two Permits.**

**1. ICAS’s environmental justice arguments regarding Ozone can be heard by the Board.**

ICAS argues that Region 10 committed clear errors in its environmental justice analysis in part because of the Region’s failure to grapple with its new scientific findings on the regional pollutant Ozone. ICAS Pet. at 22-25. Region 10 argues that ICAS cannot raise concerns about the Region’s consideration (or lack thereof) of the new scientific finding and Ozone standard, because these concerns were not raised about the environmental justice analysis in 2010. Region 10 Br. at 41. The Board’s order remanding the case provides that any new “petitions shall be limited to issues addressed by the Region on remand . . . .” *In re Shell Gulf of Mexico and Shell Offshore Inc.*, OCS Appeal Nos. 10-01-04, slip.op. at 82 (EAB Dec. 30, 2010) (hereafter *Shell II*). The agency did not prepare an environmental justice analysis in 2010, *id.* at 66 n.75 (“[f]inding no document in the record entitled Environmental Justice Analysis”), but it did in 2011. Additionally, the Board recognized in remanding the 2010 permits that the “administrative record pertaining to each of these issues will likely be significantly altered by the

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<sup>5</sup> Region 10’s decision that it can accept wildly different interpretations of methane emissions from drilling operations in the Chukchi Sea shows the agency’s decision-making lacks the considered judgment required by the Board. *See e.g., In re GSX Servs. of S.C., Inc.*, 4 E.A.D. 451, 454 (EAB 1992) (administrative record must reflect “considered judgment” necessary to support region’s permit determination).

remand of the Permits.” *Id.* at 9. While the Board was addressing claims raised by petitioner that were not resolved in 2010, the Board was correct that the record for these permits has changed significantly. Shell provided new air modeling results based on the use of a different air model, Shell altered its operations, new source review OCS permits were released for comment for additional proposed oil and gas activities in the Beaufort and Chukchi Seas, and the agency established new guidance for complying with the NAAQS. In light of all of these changes, ICAS should be allowed to raise concerns with the agency’s new environmental justice analysis that is based on this new record.<sup>6</sup>

**2. The fact that the new Ozone standard was not finalized should not change the Region’s need to consider its own scientific findings in its consideration of the impacts Ozone will have on local minority populations.**

The Region also argues that because it proposed to update the Ozone standard, but did not finalize the new standard before the permits were issued, this situation is distinct from *Shell II*. Region 10 Br. at 40. Of course, there are differences between these proceedings and those in *Shell II*, but a critical common element is that in both instances the agency itself made scientific findings (through its CASCA and otherwise) that an existing NAAQS relevant to the permits was inadequate to protect public health. *Compare Shell II*, slip op. at 79-80 (“the Region relied on compliance with the outdated science, embodied in the then-current NO<sub>2</sub> NAAQS, at the time the Permits were finalized to support its determination that the Alaska Native population would not experience disproportionately high and adverse human health or environmental effects and conducted no further environmental justice analysis. The Board cannot condone the Region’s failure to account for the updated scientific and technical reviews that accompanied the

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<sup>6</sup> ICAS raised issues for the Region to address in an environmental justice analysis in 2010, but that does not mean they should be foreclosed from raising additional concerns now that the agency has actually undertaken an analysis.

publication of the proposed and final 1-hour NO<sub>2</sub> NAAQS.”), *with* Environmental Justice Analysis (FFF8 at FFF564, FFF ) (mentioning Ozone only twice: once stating that “Region 10 continues to believe that emissions from the Discover and the Associated Fleet will not cause or contribute to a violation of the ozone NAAQS for the reasons discussed in the Statements of Basis supporting the 2010 Permits” and once stating that the permits “will not cause or contribute to air quality levels in excess of health-based standards for SO<sub>2</sub>, CO, PM<sub>10</sub>, PM<sub>2.5</sub>, Ozone or NO<sub>2</sub>”).

Once the agency issues scientific findings documenting the insufficiency of a NAAQS to protect human health, it can no longer rely solely on compliance with that NAAQS in its environmental justice analysis to ensure that a disproportionately high and adverse human health or environmental effect will not result. Yet, that is what the agency did here. For this reason, the Region committed a clear error.

**3. The Region’s environmental justice analysis does not sufficiently account for the impacts from NO<sub>2</sub> on local communities while engaged in subsistence activities.**

Region 10 erred by failing to analyze the adverse impacts to Iñupiat while engaged in offshore subsistence activities from *all* of Shell’s NO<sub>2</sub> emissions. The Board indicated in its remand order that because Iñupiat “spend ‘extended periods of time closer to the emissions sources’” this situation:

highlights a potential environmental justice consideration that may be unique to the OCS PSD permitting context that, as evidenced by the Board’s decision in *Ash Grove Cement*, would otherwise not likely be of concern in a traditional PSD permit proceeding.

*In re Shell II*, slip op. at 72 n.80 (internal citation omitted). The Region has failed to account for this unique situation in its environmental justice analysis.

Instead, the Region argues that because it produced a map of where subsistence activities occur and that the NAAQS will be complied with outside Shell's ambient air boundary, Region 10 Br. at 45, the Region has met its environmental justice obligations. These responses are insufficient based on the record before the Board. The record shows that serious questions were raised regarding whether the new 1-hour NAAQS will be complied with. The agency itself recognizes that in the Chukchi, Shell's emissions plus background will take hourly NO<sub>2</sub> emissions to 93 percent of the NAAQS. Technical Review Document (BBB108 at 9599). These concerns are sufficient to warrant consideration in the agency's environmental justice analysis to ensure that local communities will not be disproportionately impacted.

This is particularly true here where the operations at issue will result in air pollution from a number of vessels that are *not* counted in the overall PTE or air modeling for the operations. The agency did not consider what the impacts of these emissions plus those of Shell's emissions that are counted in its PTE will be in key subsistence areas. In its defense, the Region argues it has "limited information" about the non-PTE emissions. Region 10 Br. at 46.<sup>7</sup> Apparently, all the Region needed to do was ask for this information, since in reviewing Shell's exploration plan for the Chukchi Sea, the Department of Interior recently requested and received an inventory of these very emissions. Exhibit 1.<sup>8</sup>

Therefore, the Region's reliance on compliance with the NO<sub>2</sub> NAAQS is insufficient here where: 1.) compliance with the NAAQS is based on a small to non-existent margin of error; 2.)

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<sup>7</sup> The Region also argues that it "has no information" "regarding where these vessels [from the Associated Fleet] would be coming from and located vis-à-vis [sic] each other." Region 10 Br. at 47. However, this is patently wrong. The Region has Shell's exploration plans and oil spill prevention plans, both of which contain discussions about the configuration of Shell's operations and use of vessels and aircraft. *See e.g.*, BBB94; BBB95.

<sup>8</sup> ICAS takes no position on the completeness of this inventory and submits it only to demonstrate that this information could have been available to Region 10 for use in its environmental justice analysis.

there are emissions from the operations for which the agency has not accounted for in its permitting; 3.) local communities spend substantial time offshore (closer to the sources of pollution) engaged in subsistence activities; and 4.) those communities are minority, low income communities. In a situation such as this, the agency's assessment of the impacts to the health of local communities and determination of whether a disproportionate impact will result requires careful consideration and an actual analysis that is missing from the record here. Thus, the Region committed clear error in considering NO<sub>2</sub> in its environmental justice analysis.

### CONCLUSION

For the foregoing reasons and those contained in its Petition for Review, ICAS respectfully requests that the board remand the Chukchi and Beaufort air permits for the *Discoverer* to Region 10.

Respectfully submitted,

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Dated: November 23, 2011

*Attorneys for Petitioner  
Iñupiat Community of the Arctic  
Slope*

## WORD CERTIFICATION

Petitioner Iñupiat Community of the Arctic Slope hereby certifies that its proposed Reply Brief in support of its Petition for Review of Permit Nos. R10OCS/PSD-AK-09-01 (Chukchi Permit) and R10OCS/PSD-AK-2010-01 (Beaufort Permit) is less than 7,000 words. Petitioner certifies that their proposed reply brief contains 3,095 words and is therefore, well within the word limit imposed by the Board's November 4, 2011 Order. Docket No. 27.

Respectfully submitted,

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Dated: November 23, 2011





## Shell Exploration & Production

November 14, 2011

U.S Department of the Interior  
Bureau of Ocean Energy Management  
Alaska Continental Shelf Region  
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RE: 3<sup>rd</sup> Set of Responses to Requests for Additional Information, dated October 28, 2011, for the revised Chukchi Sea Exploration Plan

Dear Mr. Johnston:

On October 28, 2011 Shell Gulf of Mexico Inc. (Shell) received a second request for additional information (RFAI) from the Bureau of Ocean Energy Management (BOEM) containing 17 RFAIs regarding the revised Chukchi Sea Exploration Plan (EP). On November 4, 2011, Shell provided responses to 15 of 17 RFAIs. Also on November 4<sup>th</sup>, Shell received from BOEM a clarification request on the content of our pending responses to the remaining two RFAIs (#1 and #3). On November 9, 2011 Shell responded to RFAI's #1 and #3, plus responded to BOEM's November 4<sup>th</sup> clarification request. Shell received a second request for clarification on November 10, 2011 regarding the same RFAIs (#1 and #3), for which we have prepared the following response (*i.e.*, 3<sup>rd</sup> set of responses to October 28<sup>th</sup> RFAIs).

**Economy.** Please see Attachment 1 to this letter, in which Shell addresses the content of the expansion of this RFAI as described in BOEM's November 10<sup>th</sup> letter. Shell's response fully addresses the content of the expanded RFAI. However, as noted in attached, Shell will not provide estimated annual income ranges for the positions that will be filled as a part of its exploration program, as that information is confidential.

**Sound.** Shell provides the outstanding references/reports plus appendices on the enclosed CD. Shell has responded fully to this request, and notes that agency representatives with the former Minerals Management Service/BOEM have been contributing review participants of the Joint Monitoring Program Draft/Final Comprehensive Reports since Shell began contributing its activities to these reports in 2006. Last, the 2006-2007 Joint Monitoring Program Final Comprehensive Report is available on the National Marine Fisheries Service, Office of Protected Services website [http://www.nmfs.noaa.gov/pr/pdfs/permits/arctic\\_seismic\\_report.pdf](http://www.nmfs.noaa.gov/pr/pdfs/permits/arctic_seismic_report.pdf).

**Air Quality.** Please see Attachment 2 to this letter for the Chukchi Sea non-OCS vessel emissions inventory calculations. This attachment should be used for the purpose of assessing air emissions beyond those specifically evaluated in the context of the permit review for the OCS source (*e.g.*, EPA air permit review) and in the Chukchi Environmental Impact Analysis. The assumptions used for vessel emissions are the same as those in Shell's previous correspondence with BOEM on November 9<sup>th</sup>. When utilizing the emissions data provided in Attachment 2, it is


BOEM  
November 14, 2011  
Page 2

important to note that the emissions from vessels operating more than 25 miles from the *Discoverer* during drilling operations will be dispersed over a large area because the vessels are expected to be moving during the activities in question, with the result that the impact of these emissions at any one location would be negligible. To the extent that any of the vessels would be stationary for any extended period of time outside the 25 mile area, they would be anchored and not using their propulsion engines, minimizing emissions and emissions impacts.

Based on conversations with BOEM following receipt of its November 10<sup>th</sup> letter, Shell will be finished shortly with printing final copies of the revised Chukchi Sea EP and is prepared to deliver to BOEM.


If there are any questions or comments, please contact me at (907) 646-7112 or at [Susan.Childs@shell.com](mailto:Susan.Childs@shell.com) or Pauline Ruddy at (907) 771-7243 or e-mail [Pauline.Ruddy@shell.com](mailto:Pauline.Ruddy@shell.com).

Sincerely,

A handwritten signature in cursive script that reads "Susan Childs". The signature is written in black ink on a light-colored background.

Susan Childs  
AK Venture Support Integrator, Manager

Attachments/Enclosure  
Attachment 1 – Shell Economy Response  
Attachment 2 – Chukchi Sea Non-OCS Vessel Emissions  
Enclosure – Chukchi Sea RFAI References CD

 <p><b>Air Sciences Inc.</b> ENGINEERING CALCULATIONS</p>	PROJECT TITLE: Shell Offshore, Inc.		BY: R. Steen		
	PROJECT NO: 180-20-4		PAGE: 1	OF: 1	SHEET: VesselEmis
	SUBJECT: Chukchi Sea Non-OCS Vessel Emissions		DATE: November 9, 2011		

**Total Fuel Burn Chukchi Sea**

Vessel Name	Mobilization				Anchor Handling/Towing			Resupply				
	Assumed Transit Speed (knots)	Program Area Boundary to Drilling Site (approximate)	Fuel Burn (gallons/day)	Days to Site	Fuel Burn to Site (gal/season)	Days	Fuel Burn (gallons/day)	AH/Towing Fuel Burn (gal/season)	Resupply Trips	Resupply RT Transit Days (@ 9 knots)	Fuel Burn (gallons/day)	Resupply Fuel Burn (gal/season)
Anchor Handler	9	150	1,183	0.7	822	9	1,420	12,781	NA			
Ice Management Vessel	9	150	1,376	0.7	956	3	688	1,720	NA			
OSV	9	150	3,936	0.7	2,733	3	4,723	11,808	8.5	1.5	3,936	50,184
OSV	9	150	3,936	0.7	2,733	3	4,723	11,808	8.5	1.5	3,936	50,184
Nanuq	9	150	5,800	0.7	4,028	NA			NA			
Shallow Water Landing Craft	9	150	1,500	0.7	1,042	NA			NA			
OST	9	150	8,400	0.7	5,833	NA			NA			
OSR Barge and Tug	9	150	3,408	0.7	2,367	NA			NA			
Containment Barge & Tug	9	150	3,408	0.7	2,367	NA			NA			
Discoverer	9	150	8,400	0.7	5,833	NA			NA			
<b>Total</b>					28,713			38,117				100,368

Vessel Name	During Drilling-Not Resupply			Demobilization				Total			
	Days	Fuel Burn (gallons/day)	Fuel Burn (gal/season)	Assumed Transit Speed (knots)	NM from Drilling Site to Prog Area Boundary (approximate)	Fuel Burn (gallons/day)	Days to Program Area Boundary	Fuel Burn from Site (gal/season)	IM/AH Total Fuel Burn (gal/season)	Other Vessels Total Fuel Burn (gal/season)	Total Fuel Burn (gal/season)
Anchor Handler	0		0	9	150	1,183	0.7	822	14,424		14,424
Ice Management Vessel	54	688	37,153	9	150	1,376	0.7	956	40,784		40,784
OSV				9	150	3,936	0.7	2,733		67,459	67,459
OSV				9	150	3,936	0.7	2,733		67,459	67,459
Nanuq				9	150	5,800	0.7	4,028		8,056	8,056
Shallow Water Landing Craft				9	150	1,500	0.7	1,042		2,083	2,083
OST	2	8,400	12,600	9	150	8,400	0.7	5,833		24,267	24,267
OSR Barge and Tug	100	1,704	170,400	9	150	3,408	0.7	2,367		175,133	175,133
Containment Barge & Tug	100	1,704	170,400	9	150	3,408	0.7	2,367		175,133	175,133
Discoverer				9	150	8,400	0.7	5,833		11,667	11,667
<b>Total</b>			390,553					28,713	55,209	531,256	586,465

Notes:  
 Anchor Handling (AH) assumed to be within 25-mile radius for entire season  
 Ice Management (IM) assumed to be within 25-mile radius for 46 days so 54 days remain of a 100-day season (best estimate)  
 AH is assumed to take 3 days per well.  
 Shallow water landing craft will most likely already be on the North Slope.  
 The Discoverer will propel itself to the drilling location.  
 Barge & tug combinations emissions assumed at 50% power during drilling and outside 25-mile radius  
 OST traverses the program area twice per season (300 NM).  
 Emission factors provided below are from the EPA permit application

Values in blue are input, values in black are calculated

Pollutant	Emission Factors		Emissions		
	IM/AH	other vessels	IM/AH	other vessels	Total
	lb/gallon	lb/gallon	ton/season	ton/season	ton/season
NOx	0.05	0.59	1.38	156.72	158
PM	0.008	0.041	0.22	10.89	11
SO <sub>2</sub>	0.00021	0.00021	0.01	0.06	0
CO	0.023	0.1046	0.63	27.78	28
VOC	0.004	0.0188	0.11	4.99	5
CO <sub>2</sub> e	22.5	22.5	621.1	5,976.63	6,598

Conversion
2000 lb/ton