Shell Gulf of Mexico Inc.
3601 C Street, Suite 1000
Anchorage, AK 99503

Shell Chukchi Air Permit
EPA Region 10
1200 6th Ave. Ste. 900, AWT-107
Seattle, WA 98101

February 1, 2010

Re: Shell Gulf of Mexico Inc. Comments on the January 2010 Proposed Discoverer / Chukchi OCS/PSD Permit to Construct

Dear EPA,

Shell Gulf of Mexico Inc. provides the attached comments on the above-referenced permit. These comments consist of support for EPA conclusions provided in the January 2010 Statement of Basis and a request for changes in the compliance conditions of the proposed January 2010 permit to eliminate some unnecessary requirements having no effect on the BACT or impact analyses.

We remain available to EPA to discuss or expand on any of these comments.

Sincerely,

Susan Childs

Enclosure

cc: *Lance Tolson*
Duane Siler
Kirk Lilley
Keith Craik
Neal Hennegan
Nicole St Amand
Rick Fox
Mark Schindler – Octane LLC.
Rodger Steen – Air Sciences Inc.
Eric Hansen – Environ International
Jeffrey Walker - Minerals Management Service

1.0 BASELINE $PM_{2.5}$ DATA COLLECTED AT WAINWRIGHT

This information supplements Attachment D of the December 9, 2009 supplement, *Baseline $PM_{2.5}$ Concentrations Representative of the Chukchi Sea and the use of Wainwright Data* and Shell's December 16 table of *Wainwright $PM_{2.5}$ & PM_{10} Baseline Data and Effect of Local Fugitive Dust Sources* which is the same as Table 5-10 of EPA's January 8, 2010 Statement of Basis (SB). In the SB, Table 5-11, EPA concludes that a conservative maximum 24-hour regional onshore 24-hour concentration is 23 $\mu g/m^3$ with a period average of 3.3 $\mu g/m^3$ and a conservative regional offshore 24-hour concentration is 11 $\mu g/m^3$ with a period average of 2.8 $\mu g/m^3$. This supplementary information provides additional evidence for these conclusions and for the inference that the highest onshore measurements reflect localized effects of fugitive dust and are not representative of regional concentrations on or offshore. As a result, the Chukchi Sea concentration estimates provided in EPA's Table 5-11 are truly conservative.

A revised fourth quarter 2009 data report (August, September and October 2009)[1] and a monthly data report for November and the beginning of December, 2009[2] are now available and the data are included as an attachment hereto. These data were collected at the Search and Rescue (S&R) Station, which was decommissioned in early December, when primary status was assigned to the Permanent Station. The Permanent Station became semi-operational in late September and there are intermittent records of both $PM_{2.5}$ and PM_{10} concentrations from this station until early December when station power issues were resolved and more regular data became available. During this overlap period when data were collected at both stations there are several concurrent measurements of $PM_{2.5}$ and PM_{10}. These data were collected at the Permanent Station by the same methods and by the same team as for S&R Station, and have passed through some, but not all the same QC processes as for the S&R Station. The contractor considers the data "defensible."[3] These additional data records serve to supplement the record by 1) adding five weeks of S&R station data, 2) removing four contaminated $PM_{2.5}$ 24-hour samples collected in September at S&R, and 3) showing large inconsistencies between the two stations on at least two days in October with much lower readings at the Permanent Station, thereby implicating the data from S&R as being locally influenced on those two days.

The local fugitive dust analysis provided by Shell on December 16, 2009 is updated with the additional five weeks of data and with the elimination of the 4 contaminated samples of September 2009 and the results are provided in Table 1. The updated results show lower $PM_{2.5}$ and PM_{10} average concentrations for the non-precipitation days, both with and without high

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[1] Conoco Phillips Alaska, Inc., *Wainwright Near-Term Ambient Air Quality Monitoring Program Fourth Quarter Data Report August through October 2009 Final –Revision 02 prepared by AECOM, Inc.*, December 2009.

[2] Conoco Phillips Alaska, Inc., *Wainwright Near-Term Ambient Air Quality Monitoring Program Monthly Preliminary Data Summary November and December 2009 Final prepared by AECOM, Inc.*, January 2010.

[3] E-mail from Bopray, Doug; AECOM to Tim Martin, Air Sciences Inc, sent Friday, January 08, 2010 1:37 PM, Attachment B.

winds and no change for the precipitation days. Thus, the period average concentrations are lower with more data.

More importantly, Table 2 contains a comparison of the coincidental sampling, S&R Station to Permanent Station. The $PM_{2.5}$ comparison is in the three columns on the right. All comparisons are within 4 $\mu g/m^3$ except two that are from October 7 and 8. It is also evident from the PM_{10}, the three columns on the left, that these two days also experienced large concentration differences between the S&R Station and the Permanent Station. Since both stations would read the same regional baseline concentration plus any local influences, it is likely that the Permanent Station was sampling regional baseline, while the S&R station was sampling regional baseline plus some strong local influence seen with both the $PM_{2.5}$ and PM_{10} data. Therefore, it is likely that the October 7 and 8 $PM_{2.5}$ measurements of 15 $\mu g/m^3$ and 23 $\mu g/m^3$ respectively are not representative of regional onshore baseline. If these readings were to be eliminated from the EPA table (and Table 1, below), the highest onshore 24-hour measured concentration would be 14 $\mu g/m^3$ (July 3, 2009), much lower than the presently listed and highly conservative 23 $\mu g/m^3$.

Table 1: Updated Analysis of PM Measurements Likely Affected by Local Fugitive Dust Sources

	Daily $PM_{2.5}$ Concentration ($\mu g/m^3$)			Daily PM_{10} Concentration ($\mu g/m3$)		
	# Days	Average	Maximum	# Days	Average	Maximum
Precipitation Days [3]						
Non-High Wind Days [1]	51	2.7	7.0	54	13.4	54.0
High Wind Days [2]	6	3.8	7.0	4	13.8	28.0
Non-Precipitation Days [4]						
Non-High Wind Days [1]	165	2.6	11.0	156	13.7	91.0
High Wind Days [2]	38	5.0	23.0	40	18.5	114.0

[1] Days with less than 4 hours of winds greater than 10 meters/second.

[2] Days with at least 4 hours of winds greater than 10 meters/second.

[3] These days fall within the two day periods (on that day or on the previous day) where there is total precipitation > 0.01"

[4] These days fall within the two day periods (on that day or on the previous day) where there is total precipitation < 0.01"

Table 2: Comparison of S&R and Permanent Station PM Measurements

	Daily PM_{10} Concentration ($\mu g/m^3$)			Daily $PM_{2.5}$ Concentration ($\mu g/m^3$)		
Date	S&R	Permanent	Difference	S&R	Permanent	Difference
09/26/09	10	NA	---	0	4	4
09/27/09	7	NA	---	0	3	3
09/28/09	6	NA	---	-1	2	3
09/29/09	12	NA	---	0	3	3
09/30/09	51	NA	---	0	3	3
10/01/09	13	NA	---	-1	-2	-1
10/02/09	22	NA	---	1	-2	-2
10/03/09	21	NA	---	3	-2	-4
10/04/09	7	NA	---	1	-1	-2
10/05/09	19	NA	---	1	-1	-2
10/06/09	69	NA	---	3	-1	-4
10/07/09	44	-1	-45	15	-1	-16
10/08/09	52	-1	-53	23	3	-20
10/09/09	3	7	3	0	0	0
10/10/09	6	2	-3	1	NA	---
10/11/09	12	9	-3	3	NA	---
10/12/09	2	1	-1	1	NA	---
10/13/09	3	0	-3	0	NA	---
10/14/09	6	6	0	1	NA	---
10/15/09	12	16	4	1	NA	---
10/16/09	19	28	8	1	NA	---
10/17/09	11	15	4	1	NA	---
10/18/09	6	6	0	0	NA	---
10/19/09	3	2	-1	1	NA	---
10/20/09	3	3	0	1	NA	---
10/21/09	7	6	-1	1	NA	---
10/22/09	7	7	-1	4	NA	---
10/23/09	8	9	1	3	NA	---
10/24/09	3	0	-3	0	NA	---
10/25/09	1	-2	-3	0	NA	---
10/26/09	4	1	-3	0	NA	---
10/27/09	21	24	3	4	NA	---
10/28/09	11	17	6	2	NA	---
10/29/09	2	1	-1	0	NA	---
10/30/09	2	1	-1	1	NA	---
10/31/09	2	1	-1	1	NA	---
11/01/09	1	0	-1	-1	NA	---
11/02/09	3	1	-2	1	NA	---

	Daily PM_{10} Concentration ($\mu g/m^3$)			Daily $PM_{2.5}$ Concentration ($\mu g/m^3$)		
Date	S&R	Permanent	Difference	S&R	Permanent	Difference
11/03/09	2	1	-1	0	NA	---
11/04/09	5	3	-2	2	NA	---
11/05/09	4	2	-2	2	NA	---
11/06/09	4	2	-2	2	NA	---
11/07/09	4	2	-2	2	NA	---
11/12/09	6	2	-4	3	NA	---
11/13/09	4	0	-4	1	NA	---
11/14/09	3	2	-1	2	NA	---
11/15/09	3	4	1	1	NA	---
11/16/09	3	4	1	1	NA	---
11/17/09	Invalid	4	---	2	NA	---
11/18/09	Invalid	5	---	4	NA	---
11/19/09	5	5	0	3	NA	---
11/20/09	6	6	0	2	NA	---
11/21/09	6	7	1	1	NA	---
11/22/09	5	6	1	2	NA	---
11/23/09	6	10	4	3	NA	---
11/24/09	5	5	0	2	NA	---
11/25/09	5	4	-1	2	NA	---
11/26/09	5	7	2	1	NA	---
11/27/09	7	12	5	4	NA	---
11/28/09	6	5	-1	2	NA	---
11/29/09	7	7	0	2	NA	---
11/30/09	8	11	3	2	NA	---

2.0 STACK TESTING OF CRANE EMISSIONS IS UNNECESSARY

Condition H.7 of the proposed permit requires stack testing of both crane engines for NO_x, CO, PM, VOC and visible emissions. Shell requests that these testing requirements be deleted because the tests would provide little meaningful information. Furthermore, these tests are particularly difficult to conduct for the cranes because of their location and the transient nature of their loads. The emission factors provided by the manufacturer (Caterpillar) and used in the application are sufficient to define a maximum for the crane engine emissions. The Caterpillar 343 specifications, provided in the application, contain the manufacturer's statement: "The nominal values of NO_x, CO, HC, and PM [in the emission factor tables] have been multiplied by 1.2, 1.8, 2.0, and 1.5 respectively to take into account measurement and engine variability. Thus the Caterpillar estimates already are higher than average expected engine emissions by 20 percent for CO, and 100 percent for PM. When the engines are maintained according to manufacturer's recommendations, as required in permit condition B.12, their emissions should be well below these engine specification estimates and these manufacturer's listed emission factors are appropriately conservative estimates of the crane emissions. Testing is unnecessary because it is highly likely the testing will show emissions below these specification estimates.

The crane engines are mounted on girder pedestals 10 meters above the deck so that it is particularly difficult to access the engines and accordingly the testing carries safety risk for the testers. More importantly, the cranes operate only very intermittently while lifting and depositing loads. There is no simple way to provide a constant load to these engines, needed for stack testing, without disassembling them, which changes their operating configuration, which in turn could change the emissions during the stack test.

3.0 STACK TESTING OF SMALL SOURCES WITH KNOWN EMISSION RATES IS UNNECESSARY

Stack testing is generally needed only when the uncertainty in emissions is large, e.g., for large emission units, even with well defined manufacturer-specified emissions by model; or when uncertainty is high from smaller units. In the case of the Discoverer, Shell agrees that it is appropriate to test the Discoverer generator engines, ice management fleet and Nanuq propulsion engines, and ice management fleet generator engines because they are large (>1,000 hp). A maximum of two of each model will be sufficient to define the emissions from each engine model type. Shell also believes that it is appropriate to test the incinerators (on the Discoverer and ice management fleet), because even though they are small, the feedstock composition is uncertain and therefore the emissions are uncertain. However, the remainder of the engines are under 600 hp and potentials to emit (PTE) are under 12 tons per year for all pollutants. Furthermore, their emission rates have been defined in the application as

"conservative," and by permit condition B.12, these emission units will be maintained according to manufacturer's recommendations, so stack testing would reasonably be expected to confirm that the emission are below the application-provided values. Examples of conservatism in emission estimates includes the use of Tier 2 and Tier 3 emission limits for FD-9, 10, 11, 19, and 20, which are the maximum allowable emission rates for the engine class. Actual emissions will be below these limits. Another example is the use of maximum emission factors from a series of stack tests for a particular model of engine for FD-12, 13, 16, 17, and 18. Actual emissions can reasonably be expected to be lower for a properly maintained unit of the same model.

Furthermore, all engines will be fueled by ultra low sulfur diesel (ULSD), which is a highly refined fuel that minimizes particulate emissions.

Shell believes that there is no need to test the boilers because the combustion process of boilers is simple, the emission rates are well defined and emissions rates determined from stack testing are already provided by the manufacturers. These well-defined emission rates are used in the application materials. PTE from each boiler is low at under 3 tons per year per pollutant. Furthermore, they will be fueled by ULSD, which is a highly refined fuel and tends to minimize particulate emissions.

The proposed permit also requires testing of the same emission units on the ice management fleet in multiple years. Shell believes that this is not necessary. With proper maintenance, and a definition of the emissions from testing of two of the same model units, the initial tests will be valid for the duration of Shell's operations.

Stack testing of emission units on vessels and in international waters is difficult, carries safety risks, and is extremely time-consuming and expensive. It should only be required when the need is justified. Shell believes that the plan stated above is appropriate and reasonable for demonstration of compliance and asks that the testing beyond this plan be removed from the permit.

4.0 DISCOVERER GENERATOR COMPLIANCE AS A SET OF SOURCE UNITS

Shell has requested, and intended the compliance conditions of the Discoverer's primary generators (FD-1 through 6) to be on an aggregate basis rather than on an individual basis as is currently listed in permit conditions C.4.1, C.4.2, C.4.3. The impact modeling assumes that all emissions are exhausted from a single stack, so it is immaterial to both emissions quantification and impact assessment that the emissions are limited on an aggregate basis. Shell requests that C.4 be modified to limit emissions on an aggregate basis.

5.0 GENERATOR EFFICIENCY INCREASE FOR THE HULL 247 ANCHOR HANDLER

The generators specified for the Hull 247 have mechanical to electrical conversion efficiency of 95 percent, as shown on Attachment C. Shell requests that this higher efficiency be used for calculation of the energy production allowance, permit condition O.5, instead of the presently assumed 92 percent.

6.0 MODIFY FUEL METER LOCATIONS

For every fuel metering compliance requirement, the meter location is currently defined as "Each fuel meter shall be located as close as practical to the fuel intake of the engine" Because of space constraints that in some cases make physical location close to the engine difficult, Shell would prefer this to be "Each fuel meter shall be located so that there are no fuel inflows or outflows between it and the engine or engine group." This applies to F.7.1.1, G.9.1.1, H.8.1.1, I.8.1.1, J.6.1.1, N.11.4.1, O.13.4.1, Q.8.1.1. This change should provide the same assurance of accurate fuel metering as in the current proposed permit.

Additionally, there are several source groups for which there is an aggregate fuel consumption limit. With an aggregate limit, there is no compliance value gained by having separate meters for each source and for these Shell requests that the phrase "or the combined set" be added to all of the fuel meter conditions such that they read: "Equip each of the units [specify units] or the combined set, with a diesel fuel flow meter." These include F.7.1, G.9.1, H.8.1, I.8.1, and J.6.1, N.11.4, O.13.4, Q.8.1.

7.0 MODIFY THE SUPPLY VESSEL DEFINITION

Shell contracts the use of the supply ships on a short-term basis and wishes to increase the range of acceptable supply ship generator sizes (Table 4 of proposed permit) while continuing to meet the impact limitations that are provided in the proposed permit. Shell proposes to restrict the supply ship to a total of 7,784 hp from the propulsion and utility generator IC engines (the sum of the engine capacities listed in Table 4), excepting any emergency generator, while also restricting the propulsion power to no more than 7,200 hp (also listed in Table 4). In this way, the generators capacity can be greater than 584 hp, if propulsion engine horsepower is reduced correspondingly below 7,200 hp. The emissions and thus the ambient impacts during transit to and from the Discoverer will be the same as or less than already demonstrated since the gross power limit will not change. The emergency generator will be less than 200 kW capacity, and Shell accepts the restriction on the emergency generator that it not be exercised while within 25 miles of the Discoverer.

Regarding the supply ship status when tied to the Discoverer and defined as part of the OCS source, Shell asks for the 12-hour time restriction (L.1.1) and the generator capacity limit of 292 hp (L.1.2) to be replaced by an equivalent energy consumption restriction equivalent of 3,504 hp-hr (292 hp x 12 hours). Using the assigned supply ship IC engine heat rate of 7,000 Btu per hp-hr, and fuel heat value of 133,098 Btu per gallon, compliance with this energy restriction can be tracked through fuel usage and will be limited to approximately 184 gallons per day when part of the OCS source.

In this way, the daily maximum emissions from the supply ship while part of the OCS source will not change, nor will the 24-hour impacts. With the change in limit from 12 hours to an energy production of 3504 hp-hrs per day, it is possible to produce the associated emissions in a period of 8 hours or less, which would increase the eight-hour and one-hour CO emissions and impacts. The estimated maximum CO impacts for the one-hour and eight-hour periods are provided in Shell's September 17, 2009 Comments, Table 7 of Attachment B and they are a maximum of 395 $\mu g/m^3$. Given a NAAQS of 40,000 $\mu g/m^3$ and 10,000 $\mu g/m^3$ for the one-hour and eight-hour standards respectively, assuming an increase in the emissions from the supply ship by a factor of 12 (representing all the emissions from 12 hours of operation packed into one hour), with the impacts also increasing by a factor of 12, the resulting ambient CO concentration would only be 4740 $\mu g/m^3$, still well below the standards. Thus possible increase in CO emissions from the supply ship while attached to the Discoverer will not threaten the CO NAAQS.

8.0 DEFINITION OF OCS SOURCE

Shell urges EPA to adopt Option 2 in the final permit for defining the Discoverer as an OCS Source.

> Option 2: For the purpose of this permit, the Discoverer is an "OCS Source" between the time the Discoverer is declared by the Discoverer's on-site company representative to be secure and stable in a position to commence exploratory activity at the drill site until the Discoverer's on-site company representative declares that, due to retrieval of anchors or disconnection of its anchors, it is not longer sufficiently stable to conduct exploratory activity at the drill site, as documented by the records maintained pursuant to Condition B.2.2.

Statement of Basis at 21. As a matter of law, the Discoverer could be considered an OCS Source only when it is stabilized and ready to proceed with drilling activities. This definition, rather than Option 1, under which the Discoverer would be an OCS source when even one anchor is emplaced, is required by the definition of "OCS Source" in 40 C.F.R. 55.2:

> OCS source means any equipment, activity, or facility which: (1) Emits or has the potential to emit any air pollutant; (2) Is regulated or authorized under the Outer Continental Shelf Lands Act ("OCSLA") (43 U.S.C. § 1331 et seq.); and (3) Is located on the OCS or in or on waters above the OCS. This definition shall include vessels only when they are: . . . 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.

The referenced section 4(a)(1) of OCSLA states:

> The Constitution and laws and civil and political jurisdiction of the United States are hereby extended to the subsoil and seabed of the outer Continental Shelf *and to all artificial islands, and all installations and other devices permanently or temporarily attached to the seabed, which may be erected thereon for the purpose of exploring for, developing, or producing resources therefrom,* or any such installation or other device (other than a ship or vessel) for the purpose of transporting such resources, to the same extent as if the outer Continental Shelf were an area of exclusive Federal jurisdiction located within a State.

43 U.S.C. 1333(a)(1) (emphasis added). As interpreted by the federal courts, section 4(a)(1) covers "any artificial island, installation, or other device if (a) it is permanently or temporarily attached to the seabed of the OCS, and (b) it has been erected on the seabed of the OCS, and (c) its presence on the OCS is to explore for, develop, or produce resources from the OCS." *See, e.g., Diamond Offshore Company v. A&B Builders, Inc.*, 302 F.3d 531, 541 (5th Cir. 2002). Under this analysis, a jack-up rig that has been jacked-up on the OCS is within this definition, because it is literally both "attached" and "erected." *DeMette v. Falcon Drilling Co., Inc.*, 280 F.3d 492, 498 (5th Cir. 2002).

In *Diamond Offshore*, the Court of Appeals noted, in denying summary judgment to plaintiff (a welder injured by drilling mud on the *Ocean Concorde* submersible) who contended the vessel had become an OCSLA "situs" by the time he was injured, that:

> After the *Ocean Concorde* was towed to its ultimate location, it would then be anchored to the seabed. The evidence does not indicate whether [plaintiff] was welding . . . during towing or while the *Ocean Concorde* was attached to the seabed by its anchors. . . . Since there is no evidence that the *Ocean Concorde* was connected to the ocean floor by its anchors or through its drilling mechanism, and there is no evidence of any other contact with the seabed, the second requirement that the *Ocean Concorde* was "erected" on the OCS at the time of [plaintiff's] alleged injury is clearly not satisfied.

302 F.3d at 541. Thus, it is clear from the Fifth Circuit's analysis that a drilling vessel does not become an OCS facility unless and until it is "erected" on the seabed and ready and able to explore for resources. This is consistent with OCSLA section 4(a)(1)'s requirement that a facility

or installation be both "attached" to the OCS and "erected" on the OCS for the purpose of drilling before it is subject to the jurisdictional provisions of OCSLA.

The Discoverer will not be "erected" and ready to drill until it is correctly located and stabilized. Shell cannot begin the drilling process until the Discoverer is moored under tension and its central turret system, around which the vessel rotates to face wind and ice, has been stabilized and the Discoverer's on-site company representative declares the vessel to be secure and stable and ready for drilling personnel to commence drilling operations. [4]

The transition to OCS source status under this definition will be clearly documented. The drilling contractor must complete an International Association of Drilling Contractors (IADC) form to document changes in the status of the Discoverer. When the vessel is believed to be stable and on location, the drilling contractor will indicate on the form that the vessel's status has changed from "rig up" to "operations." However, initial completion of the IADC form does not mean that the vessel is ready to drill. Shell's representative will examine data from instruments that measure the vessel's stability and its location and then, if the Discoverer is stable and correctly located, will sign off on the IADC form (which is then archived and available for later review).

Similarly, when it is time to detach the Discoverer from the seabed at a drill site, Shell will cease all drilling activity and remove all physical connections through the drill stem to the seabed before any anchor can be removed. The change in status from operations to "rig down" will be documented in the IADC activity report and must be approved in writing by the Shell representative. This determination will document the timing of the change whereby the Discoverer would no longer be stable enough for drilling and therefore is no longer "erected" on the OCS for purposes of exploration.

By contrast, Option 1, under which "the Discoverer is an 'OCS Source' during all times between placement of the first anchor on the seabed to removal of the last anchor from the seabed at a drill site," is not a defensible or appropriate definition because it overlooks entirely the OCSLA requirement that the vessel be erected on seabed for the purpose of drilling. The Statement of Basis offers as a potential rationale for this option that:

> Once the Discoverer is attached by an anchor to the seabed at a drill site, the Discoverer is at that location for the purpose of exploring, developing or producing resources from the seabed and its activities are more closely aligned with the activities of a stationary source than of a vessel transiting the sea. Under this approach, connection of the Discoverer to the seabed by an anchor at the drill site would be considered both attachment to and erection on the seabed.

[4] For a detailed description of the procedure for sequentially setting and tensioning the Discoverer's anchors to make it ready for drilling, see Attachment I to Shell's Supplement to Application for Discoverer / Chukchi OCS / PSD Permit, Devember 13, 2009.

Statement of Basis at 21. However, under this definition, if the Discoverer arrived at the drill site and temporarily dropped an anchor for emergency reasons, e.g., to ride out a storm or avoid moving ice floes, or temporarily moved off the well location and anchored temporarily after suspension of drilling, the Discoverer would be considered an OCS source. This is clearly not a satisfactory test in light of the requirement that an OCS source be "erected" for the purpose of oil and gas exploration. With a single anchor down, the Discoverer remains mobile around the anchor location and is by definition not at a fixed location or stable and ready to drill. To define the vessel as an OCS source in that unstable and movable condition is not consistent with Congress' intent that an OCS source be functionally equivalent to a "fixed structure." [5]

We note that, in issuing the proposed Kulluk minor source permit in June 2008, Region 10 rejected Shell's view that the Kulluk should be deemed an OCS source only when all anchors had been placed. Instead, Region 10 defined that drill ship as an OCS source "when it is attached to at least one anchor and that anchor is attached to the seabed." Response to Comments (June 18, 2008) at 13 (citing Supplemental Statement of Basis (Feb. 20, 2008) at 4-5). But Option 1 is neither supported nor compelled by that prior determination. Region 10's analysis of the issue in connection with the Kulluk permit was extremely rudimentary. Indeed, in the Kulluk permit process, EPA did not consider either in the SSOB or the RTC the definition of "OCS Source" in 40 C.F.R. 55.2, under which a vessel must be both attached and erected for the purpose of drilling before it is an OCS source. Nor did EPA there even consider the statutory limit on its jurisdiction, as set out section 4(a) of OCSLA, such that EPA can regulate only "installations and other devices permanently or temporarily attached to the seabed, which may be erected thereon for the purpose of exploring for, developing, or producing resources therefrom." 33 U.S.C. 1334(a)(1). As the more searching analysis presented herein confirms, a one-anchor-down test is contrary to EPA's regulations, to the plain language of OCSLA, and to Congress' intent in amending OCSLA in 1978.

[5] While the 1978 legislative amendments to section 4(a)(1) of the original OCS Act of 1953 substituted "installations and devices permanently or temporarily attached to the seabed" for the prior term "fixed structures" for purposes of OCSLA jurisdiction, the conference committee report made clear that "The intent of the managers in amending section 4(a)of the 1953 OCS Act is technical and perfecting and is meant to restate and clarify and not change existing law." House Conference Report No. 95-1474, 95th Cong., 2d Sess. at 80, reprinted in 1978 U.S.C.C.A.N. 1674, 1679. Thus, Congress had in mind attachments to the seabed that are similar to fixed structures – not mere anchor lines and certainly not a single anchor line -- as triggers for the OCSLA jurisdiction that, in turn, creates EPA's regulatory authority under section 328 of the Clean Air Act.

ATTACHMENT A

Wainwright PM Data (S&R Station) With Precipitation and Wind Information – September through Early December 2009

Table A-1: Wainwright PM Data (S&R Station) With Precipitation and Wind Information – September through Early December 2009

Date	24-Hour $PM_{2.5}$ Conc ($\mu g/m^3$)	24-Hour PM_{10} Conc ($\mu g/m^3$)	Precip - Day of (inches)	Precip - Previous Day (inches)	Hours per Day with Winds > 10 m/sec
09/01/09	4	20	0	0.1	0
09/02/09	3	21	0.01	0	0
09/03/09	INVALID	19	0	0.01	8
09/04/09	6	24	0	0	4
09/05/09	INVALID	50	0	0	7
09/06/09	3	18	0.09	0	0
09/07/09	1	8	0.03	0.09	0
09/08/09	INVALID	6	0	0.03	0
09/09/09	INVALID	4	0	0	4
09/10/09	2	5	0.01	0	0
09/11/09	3	7	0	0.01	0
09/12/09	2	4	0.12	0	0
09/13/09	2	3	0.27	0.12	0
09/14/09	0	3	0	0.27	0
09/15/09	1	3	0.01	0	0
09/16/09	1	3	0	0.01	1
09/17/09	9	8	0	0	11
09/18/09	2	10	0	0	0
09/19/09	2	13	---	0	0
09/20/09	1	9	0	---	0
09/21/09	5	25	0	0	5
09/22/09	4	27	0	0	3
09/23/09	0	8	---	0	0
09/24/09	2	15	0.01	---	0
09/25/09	1	6	0	0.01	0
09/26/09	0	10	0.01	0	0
09/27/09	0	7	0	0.01	0
09/28/09	-1	6	0.01	0	0
09/29/09	0	12	0	0.01	0
09/30/09	0	51	0	0	0
10/01/09	-1	13	0	0	0
10/02/09	1	22	0	0	0
10/03/09	3	21	0	0	8
10/04/09	1	7	0	0	5
10/05/09	1	19	0	0	0
10/06/09	3	69	---	0	0
10/07/09	15	44	0	---	10
10/08/09	23	52	0	0	13
10/09/09	0	3	0	0	0
10/10/09	1	6	0.03	0	1
10/11/09	3	12	0.11	0.03	0

Date	24-Hour $PM_{2.5}$ Conc ($\mu g/m^3$)	24-Hour PM_{10} Conc ($\mu g/m^3$)	Precip - Day of (inches)	Precip - Previous Day (inches)	Hours per Day with Winds > 10 m/sec
10/12/09	1	2	0	0.11	0
10/13/09	0	3	0	0	0
10/14/09	1	6	0	0	0
10/15/09	1	12	---	0	0
10/16/09	1	19	0	---	0
10/17/09	1	11	0	0	0
10/18/09	0	6	0	0	0
10/19/09	1	3	0	0	0
10/20/09	1	3	0	0	0
10/21/09	1	7	0	0	4
10/22/09	4	7	0	0	21
10/23/09	3	8	0	0	4
10/24/09	0	3	0	0	0
10/25/09	0	1	0	0	0
10/26/09	0	4	0	0	0
10/27/09	4	21	---	0	0
10/28/09	2	11	0	---	0
10/29/09	0	2	---	0	0
10/30/09	1	2	0	---	0
10/31/09	1	2	0	0	0
11/01/09	-1	1	0	0	1
11/02/09	1	3	0	0	4
11/03/09	0	2	0	0	0
11/04/09	2	5	0	0	20
11/05/09	2	4	0	0	4
11/06/09	2	4	0	0	0
11/07/09	2	4	0	0	0
11/08/09	2	4	0	0	1
11/09/09	0	2	0	0	1
11/10/09	0	2	0	0	0
11/11/09	1	7	0	0	11
11/12/09	3	6	0	0	1
11/13/09	1	4	0	0	0
11/14/09	2	3	0	0	0
11/15/09	1	3	0	0	0
11/16/09	1	3	0	0	0
11/17/09	2	INVALID	0	0	0
11/18/09	4	INVALID	0	0	0
11/19/09	3	5	0	0	0
11/20/09	2	6	0	0	0
11/21/09	1	6	0	0	0
11/22/09	2	5	0	0	0
11/23/09	3	6	0	0	0

Date	24-Hour $PM_{2.5}$ Conc ($\mu g/m^3$)	24-Hour PM_{10} Conc ($\mu g/m^3$)	Precip - Day of (inches)	Precip - Previous Day (inches)	Hours per Day with Winds > 10 m/sec
11/24/09	2	5	0	0	0
11/25/09	2	5	0	0	0
11/26/09	1	5	0	0	0
11/27/09	4	7	0	0	0
11/28/09	2	6	0	0	0
11/29/09	2	7	0	0	0
11/30/09	2	8	0	0	0
12/01/09	3	7	0	0	0
12/02/09	2	7	0	0	0
12/03/09	7	15	0	0	0
12/04/09	7	12	0	0	0
12/05/09	3	8	0	0	16
12/06/09	2	2	0	0	0
12/07/09	-1	1	0	0	0

ATTACHMENT B

E-mail from AECOM to Air Sciences Regarding PM data collected at the Permanent Station

From: Bopray, Doug [mailto:Doug.Bopray@aecom.com]
Sent: Friday, January 08, 2010 1:37 PM
To: tmartin@airsci.com
Cc: Damiana, Thomas
Subject: Wainwright Permanent Station Data

Tim,
The attached zip file contains the data that you requested from Tom Damiana. Included in the zip file are monthly tabular summaries of all data collected from September through November 2009, digital copies of all data collected in *.prd format and a README.pfd file that describes how the data are arranged in the *.prd files .

The final calibration of the near-term monitoring station was performed on December 6, 2009. Following the calibration all monitoring systems were taken offline and the station was decommissioned.

The permanent monitoring station was installed and calibrated September 10-13, 2009. Valid data collection started on September 12 for meteorological parameters and September 13 for air quality parameters. Collection of particulate data that we feel meet PSD quality begins on December 9, following the fourth quarter calibration and audit of the air quality measurement systems.

We have included particulate data prior to December 9 in the data set that we feel is high quality/defensible data. However, prior to December 9, QA procedures deviated from USEPA guidance in the following ways:

PM_{10} data from October 6 through December 9 did not have an initial calibration.
$PM_{2.5}$ data from September 26 through October 9 did not have a final calibration because the analyzer failed. It was replaced on December 9.
The $PM_{2.5}$ analyzer was operating with the incorrect pressure sensor.

Particulate data from the period prior to Dec 9 will not be used to assess compliance with the NAAQS standards.

A data summary report for the period from September through November should be finalized early next week. The report will include a Table of Significant Events that will describe the operation of the particulate analyzers in more detail.

Doug Bopray
Air Quality Scientist
Environment
D 970-530-3463
doug.bopray@aecom.com

AECOM
1601 Prospect Parkway
Fort Collins, CO 80525-9769
T 970- 493-8878 F 970-493-0213
www.aecom.com

ATTACHMENT C

Generator Specifications – Hull 247

LAFAYETTE POWER SYSTEMS
Generator Specifications

Printed: 11/5/2009

Spec. No: 4P8.1-2700 Model: 4P8.1-2700

********** Specifications **********

Poles	4
Excitation:	PMG
Pitch:	0.667
Connection:	Wye
Max Overspeed (60 sec)	125%
Number of Bearings	Two
Number of Leads	Six
Number of Terminals	Four

********** Ratings **********

Power	1700	EkW
K.V.A.	2125	
P.f.	0.8	
Voltage-L.L.	4,160	V
Voltage-L.N.	2402	V
Current-L.L.	295	A
Frequency	60	Hz
Speed	1800	RPM

********** Efficiency and Heat Dissipation **********

(As per NEMA and IEC at 95°C)

Load PU	Kilowatts	Efficiency	Heat Rejection	
0.25	425.0	92.1%	124421	BTU/hr
0.50	850.0	95.2%	146271	BTU/hr
0.75	1275.0	96.0%	181316	BTU/hr
1.00	1700.0	96.2%	229189	BTU/hr

******* Temperature & Insulation Data *******

Ambient Temperature	50	°C
Temperature Rise	90	°C
Insulation Class	F	(155 °C)
Insulation Resistance (as shipped)	100	Megaohms (at 40 °C)

********** Fault Currents **********

Instantaneous 3-Ø symmetrical fault current	2949	Amps
Instantaneous L-N symmetrical fault current	3403	Amps
Instantaneous L-L symmetrical fault current	2221	Amps

********** Exciter Armature Data **********

(at full load, 0.8 p.f.)

Voltage	119.0	V
Current	77.0	A

********** Time Constants **********

OC Transient - Direct Axis	T'DO	5.177	Sec
SC Transient - Direct Axis	T'D	0.414	Sec
OC Subtransient - Direct Axis	T"DO	0.052	Sec
SC Subtransient - Direct Axis	T"D	0.042	Sec
OC Subtransient - Quadrature Axis	T"QO	0.026	Sec
SC Subtransient - Quadrature Axis	T"Q	0.005	Sec
Armature SC	TA	0.036	Sec

********** Resistances **********

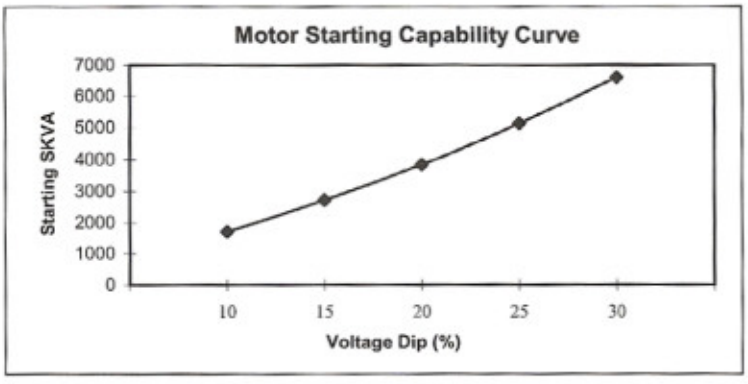
Base Impedence	8.144	ohms
Stator (at 25 °C)	0.036	ohms
Field (at 25 °C)	1.07	ohms
Zero Sequence R0	0.11	ohms
Positive Sequence R1	0.04	ohms
Short Circuit Ratio	0.65	

********** Reactances **********

		Saturated		Unsaturated	
		Per Unit	Ohms	Per Unit	Ohms
Subtransient - Direct Axis	X"D	0.100	0.8	0.120	1.0
Subtransient - Quadrature Axis	X"Q	0.160	1.3	0.190	1.5
Transient - Direct Axis	X'D	0.120	1.0	0.140	1.1
Transient Quadrature Axis	X'Q	0.690	5.6	0.910	7.4
Synchronous - Direct Axis	XD	1.550	12.6	2.110	17.2
Synchronous - Quadrature Axis	XQ	0.690	5.6	0.910	7.4
Negetive Sequence	X2	0.130	1.1	0.150	1.2
Zero Sequence	X0	0.030	0.2	0.030	0.2

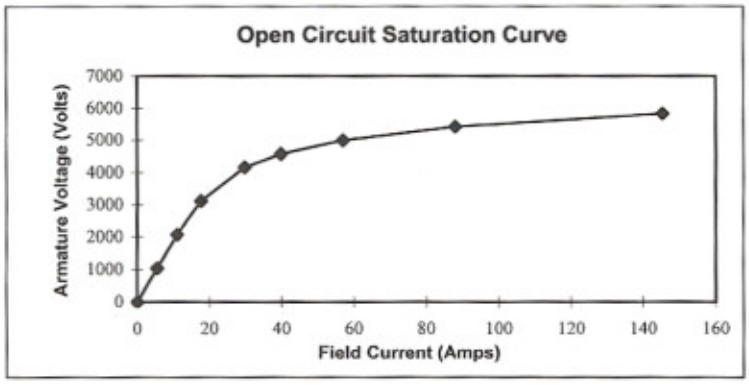
****** Motor Starting Capability Data ******

Voltage Dip (%)	Starting SKVA
10	1714
15	2722
20	3856
25	5141
30	6610



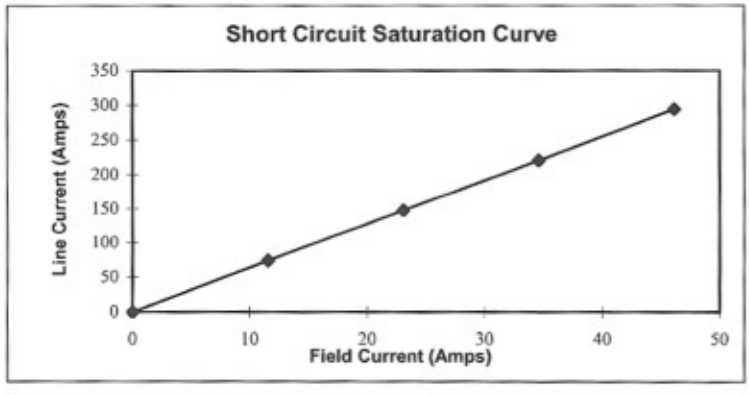
******* Open Circuit Saturation Data *******

Field Current (Amps)	Armature Voltage (Volts)
0.0	0
5.5	1040
11.1	2080
17.7	3120
29.8	4160
39.8	4576
57.0	4992
88.0	5408
145.4	5824



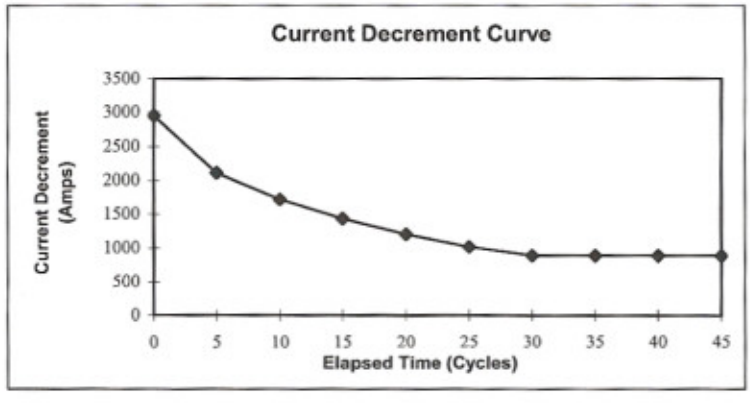
******* Short Circuit Saturation Data *******

Field Current (Amps)	Line Current (Amps)
0.0	0.0
11.5	73.7
23.1	147.5
34.6	221.2
46.1	294.9



******** Current Decrement Data **********

Elapsed Time (Cycles)	Current Decrement (Amps)
0	2949
5	2114
10	1715
15	1431
20	1205
25	1019
30	885
35	885
40	885
45	885



10% higher
S/W 22322
as built Data

Kato Engineering/Leroy-Somer Generator Design Program

PREDICTED GENERATOR PERFORMANCE VALUES

4P8.1-2700 Tewac								
KW	**KVA**	**PF**	**TAMB**	**TRISE**	**POLES**	**RPM**	**SLOTS**	**HZ**
1870.	2337.5	0.8	50	90	4	1800	84	60
VOLTS-PH	**VOLTS-LL**	**AMPS-PH**	**AMPS-LN**	**BASE Z**	**025**	**026**	**PHASE/CONNECTION**	
2402	4160	324.4	324.4	7.403	420882	409977	3 PHASE WYE	

0.6667 PER UNIT PITCH

REACTANCES		SAT	UNSAT		HI POT VALUES	VOLTS	
SYNCHRONOUS					STATOR	9320	
DIRECT AXIS	Xd	170.3	232.3		ROTOR	1500	
QUADRATURE AXIS	Xq	76.4	99.6		EXCITER FIELD	1500	
TRANSIENT					EXCITER ARM	1500	
DIRECT AXIS	X'd	13.3	15.2				
QUADRATURE AXIS	X'q	76.4	99.6		MOTOR STARTING	0 P.F.	
SUBTRANSIENT						INRUSH	%VOLT
DIRECT AXIS	X"d	10.7	12.6		SKVA AT GENERATOR	SKVA	DIP
QUADRATURE AXIS	X"q	17.6	20.8		TERMINALS	1713.6	10
NEGATIVE SEQUENCE	X2	14.2	16.7			2721.7	15
ZERO SEQUENCE	X0	3.1	3.7			3855.7	20
LEAKAGE REACTANCE	XL	5.843	6.64			5140.9	25
						6609.8	30
RESISTANCES @ 25C -	RDCa	0.03575					
	RDCf	1.0669					

NL-FL VOLTAGE DIP AT RATED P.F. = 9.6%
USED XID= 15.2% FOR DIP CALCULATION.

TIME CONSTANTS (SECONDS)		
D-AXIS 3-PH S.C. TRANSIENT	T'd3	0.414
D-AXIS O.C. TRANSIENT	T'd0	5.177
D-AXIS 3-PH S.C. SUB-TRANS	T"d3	0.042
D-AXIS O.C. SUB-TRANS	T"d0	0.052
ARM CKT (ASYMMETRICAL S.C.)	TA	0.036

TRANSIENT TORQUES				KW		HEAT REJ
	TORQUE	MAX TORQUE		@0.8P.F.	%EFF	BTU/HR
CONDITION	P.U.	FT-LBS				
3-PH S.C.	9.3	85169	FL	1870.0	96.2	250307
L-L S.C.	10.4	95273	3/4L	1402.5	96.1	193215
			1/2L	935.0	95.5	151659
			1/4L	467.5	92.7	125507

EFFICIENCY CALCULATED AT 105.0C

SHORT CIRCUIT CURRENT	INSTANTANEOUS SYMMETRICAL FAULT CURRENT		INSTANTANEOUS ASYMMETRICAL FAULT CURRENT	
TYPE	P.U.	AMPS	P.U.	AMPS
3-PH	9.32	3024	16.15	5239
L-L	6.95	2255	12.04	3907
L-N	10.70	3470	18.53	6010

OVERSPEED: 2250.0 RPM FOR 1 MINUTE. MINIMUM 3 PHASE MOTORING POWER: 187.00 KW

	FULL LOAD	NO LOAD
SYNCH COEFF	3962KW/RAD	1960KW/RAD

DISPLACEMENT ANGLE: 29.1 DEGREES

BY _____

Shell Gulf of Mexico Inc.
3601 C Street, Suite 1000
Anchorage, AK 99503

Shell Chukchi Air Permit
EPA Region 10
1200 6th Ave. Ste. 900, AWT-107
Seattle, WA 98101

February 17, 2010

Re: Shell Gulf of Mexico Inc. Additional Comments on the January 2010 Proposed Discoverer / Chukchi OCS/PSD Permit to Construct

Dear EPA,

Shell Gulf of Mexico Inc. provides the attached comments on the above-referenced permit. These comments generally consist of support for EPA conclusions provided in the January 2010 Statement of Basis, while also requesting two changes in the compliance conditions of the proposed January 2010 permit to align more accurately the permit allowances with the sources and impact modeling provided in the permit application.

We remain available to EPA to discuss or expand on any of these comments.

Sincerely,

Susan Childs

Enclosure

cc: *Lance Tolson*
Duane Siler
Kirk Lilley
Keith Craik
Neal Hennegan
Nicole St Amand
Mark Schindler – Octane LLC.
Rodger Steen – Air Sciences Inc.
Eric Hansen – ENVIRON International
Jeffrey Walker - Minerals Management Service

1.0 IMPACT MODELING ASSUMPTIONS ARE CONSERVATIVE

The impact modeling was performed using multiple conservative assumptions, none of which are necessary to estimate maximum impacts by EPA procedures. Among several of these assumptions, one is that there is no EPA recognition of a safety exclusion zone around the Discoverer drill ship. Another is that wind speeds used in determining maximum impacts are inconsistent and biased to high-side impacts. A third is that the model only evaluates a maximum impact rather than a 98th percentile impact and the maximum is used to be a conservative representation of the 98th percentile value. All three tend to overestimate the impacts, in different ways. Because the Coast Guard (USCG) has not yet finalized a proposed safety zone around the Discoverer for operations in 2010, which would exclude the public from that zone, impacts are calculated on the sea surface at the hull and it is at the hull that the modeling shows impacts to be highest. If a safety zone of at least 500 meters around the hull is, as expected, ultimately finalized as the limit of public access, the maximum impacts to which the public would be exposed would be considerably lower. In addition to USCG's anticipated finalization of the proposed safety zone, we note that drill ship anchor lines go well beyond 500 meters, the ship rotates around the drill hole, and at times there is an ice management vessel within this radius. Furthermore, there is no legitimate reason for a vessel that is not a part of the project to risk coming closer. Five hundred meters is the normal exclusion distance for safety and protection of oil platforms in the Gulf of Mexico and off the Southern California coast. Thus, the assumption of exposure of the public to ambient air immediately adjacent to the drillship is highly conservative.

EPA has required the calculation of associated vessel plume heights to be based on an extreme wind speed of 20 m/s, which forces the plume to be close to the sea surface. Moreover, the closer the plume is to the ocean surface, the higher the impact from that plume will be. This low plume height is used to estimate the impacts regardless of the dispersion speed that actually causes the estimates of highest impacts. In the modeling provided in the application materials, wind speeds that cause highest impacts are less than 8 m/s. If the speed used to calculate plume height of the associated vessels were consistent with the speed causing highest impacts, the associated vessel plumes would be much higher and surface-level impacts would be lower.

From the modeling of the Discoverer, Shell notes that the first two conservative assumptions, including no recognized exclusion zone and wind speed inconsistency result in impact estimates about 50 percent and 33 percent above maximum realistic estimates of 24-hour PM and annual NO_x respectively.

The recently promulgated $PM_{2.5}$ 24-hour standard regulates the 98th percentile impact, which in effect allows for two percent of the impacts to be above the standard. Using Badami Site actual meteorology and analyzing the impact of 24-hour $PM_{2.5}$, the 98 percentile value is at least 30

percent below the maximum value. So in this example, assuming that the maximum value is equal to the 98 percentile value (the third conservative assumption), the 98 percentile over-estimates the $PM_{2.5}$ impact by at least 30 percent.

2.0 BOW WASHING RESTRICTION SHOULD BE ALIGNED WITH IMPACT MODELING ANALYSIS

In reference to the August 20, 2009 additional modeling results, addressed on page 182, Shell notes that the bow washing impact was evaluated at a distance of 100 meters between the propulsion stacks of the Discoverer and propulsion stack of the anchor handler, not from hull to hull. Shell requests that the compliance condition be consistent with this and that the 100 meter limitation be between these two stack locations, rather than between the hulls.

Shell requests that Condition O.9.1 be modified from: "…such that the closest point of the icebreaker to the closest point on the Discoverer shall not be…"

to: "…such that the propulsion engine stack location of the icebreaker #2 to the primary generator engines stack location on the Discoverer shall not be…"

3.0 HULL 247 PROPULSION ENGINES ARE ALSO USED FOR OTHER VESSEL LOADS

Condition O.1.2 limits the generator engines on Hull 247 to 0 hp. In fact, the Hull 247 propulsion engines will consist of both direct drive engines and generators. Furthermore, some of the propulsion generator engine power will be used to power the ship utilities. Thus, Shell requests that the wording be modified to recognize this combined duty of the propulsion generator engines. One possible modification of Condition O.1 2 is as follows:

> "The total capacity of all ***utility*** generator engines on Icebreaker #2 shall not exceed 2,336 hp for the Tor Viking. ***There will be no utility generation, separate from the propulsion engines, for Hull 247;*** "