Summary: When the U.S Fish & Wildlife Service (Service) Marine Mammals Management Office (MMM) was informed that Shell Gulf of Mexico, Inc. (Shell) was proposing activities for its 2015 exploration program in the Chukchi Sea that are inconsistent with the 2013 incidental take regulations (ITR) (i.e. simultaneous drilling at locations less than 15-miles from one another), we were asked to work with Shell to analyze their proposal. We sought to understand why Shell could not comply with the 15-mile separation distance requirement, what alternative separation distance they proposed, and how Pacific walruses would be affected by their proposal. On the last point, we specifically asked Shell to explain why their proposal provided equivalent conservation benefit compared to that otherwise achieved by the 15-mile separation distance.

In response to our inquiries, Shell's position is that spacing of rigs needs to be determined by the need to effectively, efficiently, and economically explore the geological positioning of the oil and gas reserves rather than an attempt to further minimize potential behavioral disturbance of walruses. They have proposed a 9-mile separation distance for 2015 and it has become clear in our discussions that they are seeking maximum flexibility in establishing separation distances in future years. Regarding their characterization of the potential impacts of their proposed 9-mile separation distance compared to the 15-mile separation distance contained in our regulations, they largely limit their analysis to underwater sound impacts and their proposed separation distance. Shell's analysis indicate that the most common drilling scenario results in a 20% increase in the ensonified area. They argue that this difference is insignificant given their characterization that there are few walruses in the vicinity of their project and their determination that any effects are anticipated to be short-term, highly-localized, and biologically insignificant.

Introduction: The Service MMM requested additional information from Shell to supplement their September 16, 2014, request for a LOA for the incidental take of polar bears and Pacific walruses during their proposed 2015 exploration drilling program in the Chukchi Sea, Alaska. On April 20, 2015, the Service MMM received Shell's *Supplement to Request for Letter of Authorization (LOA) for the Incidental Take of Polar Bears and Pacific Walrus; Exploration Drilling Program, Chukchi Sea, Alaska* (dated April 20, 2015) and the *Drilling Rig Separation Distance Impact Analysis Exploration Drilling Program Chukchi Sea, Alaska* (April 2015).

Shell's current proposed 2015 exploration drilling program in the Chukchi Sea, Alaska, fails to comply with a Pacific walrus disturbance mitigation measure for exploration drilling set forth in the Marine Mammal Protection Act (MMPA) ITR for the Chukchi Sea (78 FR 35364, June 12, 2013). To date, as part of this process, Shell has not been willing to alter its proposal to adhere to all required mitigation measures as part of the aforementioned ITRs. Specifically, Shell disagrees with the part of the ITR that established additional mitigation measures for offshore exploration activities. The mitigation measure in question (50 C.F.R. § 18.114(a) (4) (ii)) requires that:

> To avoid significant synergistic or cumulative effects from multiple oil and gas exploration activities on foraging or migrating walruses, operators must maintain a minimum spacing of 24 km (15 mi) between all active seismic source vessels and/or drill rigs during exploration activities. This does not include support vessels for these operations. No more than two simultaneous seismic operations

> and three offshore exploratory drilling operations will be authorized in the Chukchi Sea region at any time.

As noted in Shell's supplemental materials, in our ITRs and the supporting documentation, we identified a number of benefits of the 15-mile separation distance requirement including a reduction in the potential for hearing damage; a reduction in potential noise density in a single area while allowing routes for walruses to exit an area; allowing for uninterrupted communication between walruses; reduction in the potential number of animals exposed to multiple activities simultaneously, or in sequence within a short period of time, thus reducing the potential for taking of marine mammals by disturbance; reducing cumulative effects of operations that are in close proximity to each other and to walrus; and reducing the potential for interference with subsistence hunters.

Shell believes the 15-mile separation requirement for drill rigs is impracticable and not biologically relevant. Shell suggests that there is no specific prescription for drill rig spacing that is optimal for avoiding cumulative or synergistic effects from operations occurring simultaneously unless they are very widely spaced. Shell states that:

> Various distances may be required between rigs to effectively, efficiently, and economically explore the geological positioning of the oil and gas resources in the subsurface of the prospect. Spacing of the rigs needs to be determined by these characteristics rather than an attempt to further minimize potential behavioral disturbance of walruses. Any rig spacing chosen will likely have potential benefits and potential costs in terms of behavioral disturbance when compared to other rig spacing arrangements but in all cases the numbers will be small and the impacts negligible.

According to Shell, the purpose of the supplemental information is to:

a. Describe in more detail their proposed exploration drilling program;
b. Provide the Service with additional data and analysis concerning Pacific walrus ecology in the Chukchi Sea;
c. Describe the potential environmental effects of the drilling program on Pacific walruses;
d. Identify their proposed mitigation and monitoring measures; and
e. Substantiate that the use of two active drilling rigs operating approximately nine miles from one another in 2015 will not result in significant synergistic or cumulative effects on Pacific walruses.

The analysis conducted by the Service MMM during the development of the Chukchi Sea ITR was based on the anticipated levels of proposed activities within the regulatory area over the course of five years. The anticipated levels of proposed activities were provided by the Alaska Oil and Gas Association (AOGA) when they petitioned the Service to create the ITR in January, 2012. The AOGA is a private, nonprofit trade association whose 16-member companies represent the majority of oil and gas exploration, development, production, transportation, refining, and marketing activities in Alaska. Shell is a member of AOGA and was involved in creating the petition for the ITR.

The Service MMM conducted an analysis of the potential impacts of the proposed activities that supported our statutory incidental take determinations required by the MMPA. We determined that the proposed activities would take only small numbers of Pacific walruses, the takes would have no more than a negligible impact upon the Pacific walrus population, and would not have unmitigable adverse impacts upon the availability of Pacific walruses for subsistence uses by Alaska Natives. The regulatory process and its associated mitigation measures enabled the Service to make these determinations and to ensure that the activities would have the least practicable adverse impact. The 15-mile separation requirement for simultaneously operating drill rigs was part of the analysis, and an integral component of the mitigation measures. The omission of any one of the mitigation measures alters the integrity of the analysis, the associated determinations, and brings into question the validity of the ITR.

According to the ITR, the Service would be able to issue LOAs for no more than two simultaneous seismic operations and three offshore exploratory drilling operations. If there were two seismic operations and three offshore exploratory drilling operations occurring simultaneously, the Service would require that each of them occur no closer than 15-miles from the others. This means that no drill rigs would be closer than 15-miles from each other, no active seismic source vessels would be closer than 15-miles from each other, and no active seismic source vessel would be closer than 15-miles from any drill rig. This required mitigation measure applies to all operators conducting these activities in the Chukchi Sea ITR area.

The Service MMM comments on Shell's proposal and associated supplemental information are provided in two categories:

General Comments: These are overarching comments regarding the ITR and how they relate to Shell's proposed drilling program. They reflect thoughts on the proposed drilling program in general terms and describe the situation as a whole.

Specific Comments: These are comments on specific elements contained within the supplement and on Shell's proposed drilling program.

General Comments:

The original exploration plan (EP) created by Shell, *Revised Outer Continental Shelf Lease Exploration Plan, Chukchi Sea, Alaska, Burger Prospect: Posey Area Blocks 6714, 6762, 6764, 6812, 6912, 6915, Chukchi Sea Lease Sale 193* (May 2011), included only one drilling rig for operations in the Chukchi Sea. The proposal to operate two drill rigs simultaneously in the Chukchi Sea was added in Shell's EP Revision 2 (August 2014). That revision was 14 months after the Chukchi Sea final ITR that included the 15-mile separation of drill rigs mitigation measure was published (June 2013). Despite the existing 15-mile drill rig separation mitigation measure, Shell revised their EP to include two drill rigs operating simultaneously within 15-miles of each other. Shell has also made revisions to their EP (November 2013) after the ITR was published to increase the levels of support vessel and helicopter activities.

There is minimal new information contained in Shell's supplement and what is provided does little to support Shell's position that their proposed 9-mile separation distance is conservationally

equivalent to the15-mile drill rig separation mitigation measure. Shell primarily uses the same sources of information found in the ITR. However, Shell interprets the information and data differently, in a manner that supports their proposal and does not adequately identify the uncertainties present in a number of its assumptions. For example, when Shell provides numbers of Pacific walruses that may be potentially exposed to disturbance, they rely heavily upon vessel-based and aircraft-based observations with no correction factor for unobserved animals underwater. Since Pacific walruses spend most of their time submerged, the Service utilizes a correction factor when analyzing surface observation data. The result is that Shell under-reports Pacific walrus numbers. In other words, if 10 Pacific walruses are reported by Shell, the Service multiplies that number by four to account for unobserved animals underwater, resulting in 40 Pacific walruses.

Specific Comments:

There is an emphasis in Shell's supplemental information upon three fundamental arguments.

1. The Burger Prospect generally, and the six locations where Shell proposes to drill specifically, are not optimal forging habitat for Pacific walruses.
2. Due to the claimed sub-optimal nature of the habitat, there will be relatively few Pacific walruses in the vicinity of Shell's operations.
3. Any disturbance to Pacific walruses due to Shell's activities, particularly due to sound in the water, will be consistent with Service analysis and determinations in the ITR, even without the 15-mile drill rig separation mitigation measure.

The preponderance of Shell's supplemental analysis deals with modeling sound in the marine environment during their proposed activities. Shell relies upon vessel and aircraft based observations of Pacific walruses to assess their presence and reactions to disturbance. However, the Service is concerned with more than just disturbance from sound in the water. We are concerned with all forms of disturbance that may affect Pacific walruses. We explained this to Shell on multiple occasions so we are confident they understand our request, however they disagreed and suggested that our concerns should be largely limited to sound. It is not surprising, therefore, that despite the broader language in our regulations in terms of benefits achieved by the 15-mile separation distance, Shell has provided no additional information or analysis to address other sources of potential disturbance and how these manifest themselves differently depending on separation distance.

The Service agrees that there are some areas of the Chukchi Sea that Pacific walruses, and marine mammals in general, may prefer over others, at a variety of times, and for a variety of reasons. However, it is important to note that seasonally the entire Chukchi Sea is Pacific walrus habitat. The Service discusses in our ITR analysis that during the open water period, approximately July through November, and when oil and gas exploration activities will occur, Pacific walruses may be widely distributed throughout the Chukchi Sea region. Further, walruses are not distributed evenly or randomly. Pacific walruses display a patchy and clumped distribution that is strongly associated with certain sea ice conditions and the abundance of their benthic prey. While there may be general patterns to the seasonal and geographic presence and distribution of sea ice, Pacific walruses, and their prey; it is not possible to predict these things

with any specificity. The extreme variability and complexity of the Arctic ecology further complicates the determination of any general patterns. Despite this inherent uncertainty, Shell argues that they are able to make such predictions and wants us to assume the risk of relying on those predictions for our determination.

During Shell's 2012 attempt to drill on the Burger prospect, they made the same claims regarding their ability to forecast sea ice conditions relative to their operations. That season Shell was forced to secure the well they were drilling and move their drill rig and support fleet off the drill site for ten days due to an incursion of dangerous sea ice conditions. Also during 2012, Shell marine mammal observers recorded the presence of many thousands of Pacific walruses within the observation range of Shell's operations. Many of these observations occurred at the Burger prospect. There are also oil and gas industry marine mammal observation reports dating back to the early 1990's up to the present day indicating the presence of Pacific walruses at the Burger prospect. All of these examples are in direct contradiction to Shell's predictions.

While Pacific walruses may not utilize the Burger prospect as heavily as other areas, they are present, it is their habitat, and they do utilize the area. Further, recent research[1] published by U.S Geologic Survey scientists provides information on the general seasonal distribution of Pacific walruses based on satellite radio telemetry tracking data gathered from 2008 to 2011. In the Jay *et al* 2012 paper, they estimated the seasonal habitat utilization distributions (UDs) of Pacific walruses in the Chukchi Sea. The UDs describe walruses' probability of habitat use (activity or occupancy) at a point in space during a specified time period. For example, the monthly 95% UD contour defines the smallest area that contains 95% probability of Pacific walrus use during that month. The Burger prospect, including the six locations identified by Shell where they intend to conduct exploration drilling, are entirely within the 95% UD for Pacific walruses from June through September, except for August which includes a portion of the Burger prospect and some of the drilling locations. We cannot reconcile this information with the following statement by Shell in the supplemental materials: "The location of the Burger prospect to the south and west of Hanna Shoal means that there will be some interaction of animals with operations, but that in most years it is likely to be minimal."

As noted above, Shell reports the number of walruses observed by their Protected Species Observers but does not adequately explain the caveats associated with these observations including how weather limits the opportunities for observations and the effectiveness of observations; the fact that only a portion of the walruses present would be observable at the surface; and that only a portion of the project area is able to be observed at any one given time. Similarly, when describing the response of walruses to their operations, Shell does not caveat its conclusions to acknowledge that behaviors can only be described for those animals we see, which again is only a percentage of the animals likely in the project area, and our ability to understand how walruses are affected by disturbance is greatly limited by our lack of knowledge. How one weighs the uncertainties and caveats greatly influences the conclusion one draws from the statement that approximately 4% of the walruses observed exhibited an escape reaction, for example.

[1] Jay, C.V., A.S. Fischbach, and A.A. Kochnev. 2012. Walrus areas of use in the Chukchi Sea during sparse sea ice cover. Marine Ecology Progress Series Vol. 468: 1–13, 2012.

The best available scientific information, including Shell's own reports and experiences, indicate that Pacific walruses may be found in the Burger prospect area during the period from July through September, and may be exposed to disturbance due to Shell's proposed activities. The specific timing, location, numbers, and activities of those walruses are difficult to predict. The seasonal timing and location of Pacific walruses, however, generally coincide with Shell's proposed activities, the numbers could include none to hundreds or thousands of Pacific walruses, and those animals may be migrating, breathing, feeding, nursing, and resting, among other activities. These are all activities specifically mentioned as significant in the MMPA, and the Service is required to consider any potential disturbance of those activities. Further, based on our understanding of Pacific walrus ecology, the demographics of animals in the Chukchi Sea during the proposed drilling will be dominated by adult females with dependent nursing calves or dependent young, adult females with no dependent young, and sub-adult juveniles of both sexes. This demographic profile represents not only the most sensitive component of the population but also those most likely to respond in a biologically significant manner to disturbance from Shell's activities. More detail on this analysis can be found within the ITR.

Referring back to number 3, found above, if the Service thought that Shell's activities would not be consistent with our analysis and determinations in the ITR, we could not issue Shell a LOA. When the Service issues a LOA under the ITR, it must be consistent with the scope of activities and determinations made in the ITR. In fact, the ITR clearly describes (50 CFR§ 18.115) what criteria the Service must use to evaluate LOA requests.

In the ITR analysis, the Service examined Pacific walrus ecology and biology. Despite uncertainties regarding how Pacific walruses react to disturbance, the acute and chronic effects of disturbance to walruses, and the cumulative impacts of disturbance to walruses, the Service used the best available information combined with our collective expertise and professional judgment to create the ITR, the mitigation measures, and make our statutory determinations.

Section 6.5 of Shell's supplement supports the use of the 15-mile drill rig separation mitigation measure. On pages 56-57 of the supplement, Shell provided an evaluation of a 9-mile separation between proposed 2015 drilling locations versus a 15-mile separation (see Figure 6.5-1 and Table 6.5-1 in the supplement). Shell used sound modeling to estimate the ensonified area under three selected operational scenarios. Shell stated that:

> For two drilling units unaccompanied by support vessels, there is no difference in the total ensonified area between distances of nine and 15 miles separation. In the event that mud line cellars are drilled simultaneously, the ensonified area actually increases between nine miles and 15-miles separation by a total of 19 km2 (3%). The difference between the *Discoverer* and *Polar Pioneer* drilling while accompanied by a vessel on dynamic positioning (DP) at a nine mile separation is an increase of 56 km2 (20%) over the area ensonified at 15 miles of separation. While this difference in area of ensonification during the most common drilling scenario may seem to be significant, the relatively low densities of walruses that occur on the Burger prospect during open water drilling operations (e.g. 0.0731

> individuals/km2; Brueggeman *et al.* 1990[2]) results in a very small increase in the number of individuals potentially exposed to sounds above 120 dB (~4 individuals) in relation to the total population.

Shell admits with its own analysis that, for these scenarios, a 15-mile separation of drill rigs provides for a smaller area of ensonification and a reduction of potential disturbance to Pacific walruses. Shell then dismisses this increase in ensonification given their characterization of Pacific walrus occurrence and utilization of the Burger prospect, which is not supported by the best available information.

Throughout the supplement, Shell refers to portions the Service analysis for the ITR and our subsequent determinations. It is the Service's opinion that this further supports the 15-mile separation of drill rigs mitigation measure. For one such example, referring to the ITR, Shell states on page 60 of the supplement:

> These regulations as promulgated by USFWS apply to the entire Chukchi Sea region and allow properly mitigated exploration to occur in areas throughout the region including areas with much greater walrus concentrations than occur on Shell's Burger prospect. The ITRs were based on exploration scenarios that included up to three drilling operations occurring in the Chukchi Sea simultaneously. Such operations could be conducted by multiple operators each using full suites of equipment and without the benefit of coordination of activities on the rigs, helicopter flights for crew changes, and multi-tasking of some vessels between rigs achievable by a single operator that could lessen potential impacts of the operations on Pacific walrus.

In the example above, Shell highlights an important concept regarding the mitigation of oil and gas industry exploration activity. When the Service created the ITR, we included mitigation measures that we determined were necessary, adequate, and reasonable that would ensure that the incidental takes of Pacific walruses authorized under the ITR would not exceed our statutory determinations, not exceed our estimated level of takes, and would ensure that the activities would have the least practicable adverse impact. When the Service considered three simultaneous drilling operations, we understood that the lack of coordination between operators might be an issue. This was another reason we included the 15-mile separation of drill rigs mitigation measure in the ITR. That Shell is able to coordinate its own activities while simultaneously operating two drill rigs is irrelevant. The 15-mile separation of drill rigs applies to all operators. The limit on three simultaneous drilling operations also applies to all operators. If Shell were to propose using three rigs simultaneously, the regulations would still require each of those rigs be separated by at least 15-miles from the others. If Shell, or any other operator, were to propose using a fourth rig simultaneously, the Service would not be able to issue a LOA under the current ITR. More than three simultaneously operating drill rigs would exceed the level of activity that we analyzed.

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[2] Brueggeman, J.J., C.I. Malme, R.A. Grotefendt, D.P. Volsen, J.J. Burns, D.G. Chapman, D.K. Ljungblad and G.A. Green. 1990. Shell Western E & P Inc. 1989 Walrus Monitoring Program: The Klondike, Burger, and Popcorn Prospects in the Chukchi Sea. Report prepared by EBASCO Environmental for Shell Western E & P Inc. 157 p.

Several times within the supplement, Shell compares the level of activity analyzed in the ITR to its proposed activities. For example, in a footnote on page two of the supplement Shell states that "it is also worth noting that the level of activity considered by the USFWS in the 2013 Chukchi Sea ITRs was far in excess of what Shell proposes in 2015 and we are unaware of any other oil and gas activities proposed to be conducted in the LS 193 area." Again, on page 61, Shell states that, "in sum, Shell believes that its 2015 exploration drilling program falls within the scope of activities considered by the USFWS in its 2013 Chukchi Sea ITR."

Shell's confidence that its proposed operations are within the level of activities the Service analyzed for the ITR is at least overstated, and perhaps misplaced. As noted above, the Service analyzed anticipated levels of proposed activities provided by AOGA through their member companies. When the Service conducted its analysis, the primary source of information regarding Shell's proposed activities in the Chukchi Sea was their original EP. Based on information provided by AOGA and Shell, our analysis for the ITR assumed that "drilling operations will include multiple support vessels in addition to the drillship or platform, including ice management vessels, survey vessels, and on and offshore support facilities. For example, each drillship is likely to be supported by one to two ice management vessels, a barge and tug, one to two helicopter flights per day, and one to two supply ships per week." As noted above, Shell has revised their EP twice since the ITR published. In Shell's EP Revision 2 (November 2013), they increase the proposed number of support vessels for a drill rig, and they increase the proposed number of helicopter flights from 12 per week to 40 per week. We analyzed one to two helicopter flights per day per drill rig, or 7-14 helicopter flights per week per rig. For three simultaneously operating drill rigs that is 21-42 helicopter flights per week total. Shell proposes to conduct 40 helicopter flights per week for two simultaneously operating drill rigs. Our analysis accounted for 14-28 helicopter flights per week for two simultaneously operating drill rigs. We also assumed a 15-mile separation of each drill rig for our analysis. Further, as noted above, the proposal to operate two drill rigs simultaneously in the Chukchi Sea was added in Shell's EP Revision 2 (August 2014). Also in that revision, Shell proposed to nearly double the number of support vessels from the previous revision.

While Shell asserts that its proposed activities are within the level of activity analyzed in the ITR, the Service MMM is not confident in such a clear conclusion. The level of activity proposed in Shell's revised EP per drill site is higher than projected by AOGA when it petitioned for the ITR. The Service must consider that, in fact, Shell's revised EP proposes levels of activities that exceed what the Service analyzed for the ITR. It is important to recall that the analysis considered the level of activity with full implementation of all mitigation measures in order to arrive at the ultimate determination. This is particularly concerning considering that Shell, as part of their 2015 proposed drilling operations, indicates it is not willing to comply with all required mitigation measures.

Future Possible Areas for Cooperative Research

In our recent discussions with Shell, we have acknowledged our limited knowledge on how walruses are affected by disturbance, including but not limited to noise. The supplemental information submitted by Shell acknowledges our lack of data in many areas (e.g. "There are no definitive studies to identify the size of the potential area of masking around a drilling unit"; "Few data are available on walrus disturbance reactions to continuous sound.."; "The response of walruses to disturbance, like most animals, is highly variable and there is little data on behavioral

response to multiple stimuli together or in succession."). We have indicated that we are willing and interested in working with Shell to design and implement studies to collect information that could be used to shape the next set of regulations for the Chukchi Sea. We emphasized that such efforts would need to be initiated in the very near future as we would have, at most, two seasons to collect data prior to the next set of regulations being generated.