9 December 2011

Mr. P. Michael Payne, Chief
Permits, Conservation, and Education Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, Maryland 20910-3226

Dear Mr. Payne:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the application from Shell Offshore, Inc., seeking an incidental take authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act. The applicant is seeking authorization to take small numbers of marine mammals by harassment incidental to offshore exploratory drilling at the Burger prospects in the Chukchi Sea, Alaska, during the 2012 Arctic open-water season. The Commission also has reviewed the National Marine Fisheries Service's 9 November 2011 Federal Register notice (76 Fed. Reg. 69958) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

RECOMMENDATIONS

The Marine Mammal Commission recommends that the National Marine Fisheries Service—

- issue the requested incidental harassment authorization but also facilitate development of conflict avoidance agreements that involve all potentially affected communities and co-management organizations and take into account potential adverse impacts on all marine mammal species taken for subsistence purposes including, but not limited to, bowhead whales;
- require Shell to collect all new and used drilling muds and cuttings and either reinject them or transport them to an Environmental Protection Agency licensed treatment/disposal site outside the Arctic;
- require Shell to evaluate the source levels of the *Discoverer* at the proposed drilling location and recalculate the 120-dB re 1µPa harassment zone and estimated takes as appropriate;
- require Shell to develop and employ a more effective means for monitoring the entire corrected 120-dB re 1µPa harassment zone for the presence and movements of all marine mammals and for estimating the actual number of takes, including, but not limited to, aerial and acoustic surveys of the proposed drilling site before, during, and after drilling operations: Shell also should make the data associated with the monitoring program publicly available for evaluation by independent researchers;
- track and enforce Shell's implementation of mitigation and monitoring measures to ensure that they are executed as expected;
- require Shell to cease drilling operations in mid- to late-September to reduce the possibility of having to respond to a large oil spill in ice conditions; and

- require Shell to develop and implement a detailed, comprehensive, and coordinated Wildlife Protection Plan that includes strategies and sufficient resources for minimizing contamination of sensitive marine mammal habitats and that provides a realistic description of the actions that Shell can take, if any, to respond to oiled or otherwise affected marine mammals; the plan should be developed in consultation with Alaska Native communities (including marine mammal co-management organizations), state and federal resource agencies, and experienced non-governmental organizations.

RATIONALE

Shell has proposed to drill up to four exploratory wells at Shell's Burger prospect (Lease Blocks 6764, 6714, 6912, 6812, 6762, and 6916) in the Chukchi Sea, Alaska, during the 2012 Arctic open-water season (July through October). Drilling would occur 105 to 125.5 km from shore, in waters 43.7 to 45.8 m in depth. Shell would use the drillship *Discoverer*, with estimated broadband sound source levels of 177–185 dB re 1μPa at 1 m. Shell also would deploy vessels and aircraft for ice management and other support. Sound pressure levels for the icebreaking supply ship *Robert Lemeur* were estimated to be 193 dB re 1μPa at 1 m. Shell would conduct geophysical surveys at the end of each drill hole using a zero-offset vertical seismic profile airgun array. A typical eight-airgun array consists of four 150 in^3 (2,458 cm^3) airguns and four 40 in^3 (655 cm^3) airguns, with source levels of 238 and 241 dB re 1μPa at 1 m, depending on source depth.

Drilling and associated activities could affect marine mammals in several ways. Sound emitted from drilling, ice management, and seismic profile surveys could cause marine mammals to change their behavior, modify habitat use patterns, or mask their calls. If received at sufficiently high levels, such sound also could affect marine mammals physically, including temporary or permanent hearing impairment. In addition, oil spills—albeit unlikely—have the potential to affect marine mammals through exposure to toxic contaminants either externally through contact with the oil or internally through ingestion of the oil or inhalation of oil fumes.

The Service preliminarily has determined that the proposed activities could result in a temporary modification in the behavior of small numbers of up to twelve species of marine mammals, but that the total taking would have a negligible impact on the affected species or stocks. The Service does not anticipate any take of marine mammals by death or serious injury. The Service believes that the likelihood of an oil spill is extremely remote and therefore does not propose to authorize take from an oil spill. The Service also believes that the potential for temporary or permanent hearing impairment from drilling and other acoustic impacts would be at the least practicable level because of Shell's proposed mitigation and monitoring measures, as well as additional mitigation and monitoring measures proposed by the Service. Together, those include—

(1) using Service-approved vessel-based observers to monitor for marine mammals on the drillship and all support vessels, including the ice management vessels, throughout the exploration drilling period;

(2) using two observers to monitor the 190- and 180-dB re 1 μPa exclusion zones (for pinnipeds and cetaceans, respectively) and beyond during active drilling or airgun operations and before and during start-ups of airguns day or night;
(3) using ramp-up and shut-down procedures;
(4) prohibiting initiation of airgun operations during nighttime or low visibility conditions after an extended shutdown;
(5) reducing vessel speed to 9 knots or less and avoiding multiple changes in vessel direction and speed within 274 m of whales;
(6) avoiding injury to whales by reducing vessel speed and changing direction as necessary, especially when weather conditions diminish visibility;
(7) limiting aircraft overflights to an altitude of 457 m or higher and a horizontal distance of 305 m or greater when marine mammals are present (except during takeoff, landing, or an emergency situation);
(8) conducting aerial surveys in the coastal areas of the eastern Chukchi Sea and to collect and report on beluga whales near traditional hunting areas;
(9) conducting in-situ measurements of sound propagation from the drilling vessel, support vessels, and the airgun array;
(10) deploying acoustic recorders to record vocalizations of bowhead whales as they migrate through the drilling area;
(11) deploying acoustic recorders widely across the U.S. Chukchi Sea to gain information on the distribution of marine mammals in the region;
(12) reporting injured and dead marine mammals to the Service and local stranding network using the Service's phased approach and suspending activities, if appropriate; and
(13) submitting field and technical reports and a final comprehensive report to the Service.

Availability of marine mammals for subsistence

Shell has met, and plans to continue meeting, with various stakeholders to develop and implement a plan of cooperation. The plan specifies measures to minimize impacts to Alaska Natives who use marine mammals for subsistence purposes. As part of the plan, Shell would not bring its drillship and support vessels into the Chukchi Sea before July 1. Vessels that can travel safely outside the polynya zone would do so, and would notify the communication and call centers in local communities if it is necessary to move into the polynya zone to avoid ice breaking. Shell also would implement a proposed communication plan with local subsistence users and village whaling associations before initiating exploratory drilling operations and maintain communication throughout the open-water season. Shell would employ local subsistence hunters from the Beaufort and Chukchi Sea villages to advise the company regarding the whale migration and subsistence hunt. Finally, Shell would recycle all drilling mud to the extent practicable. Based on the timing and location of the proposed activities and these additional mitigation measures, the Service preliminarily has determined that the expected taking would not have an unmitigable adverse impact on the availability of marine mammals for subsistence use by Alaska Natives. Shell should be acknowledged for its efforts to avoid such impacts.

However, it is not yet clear that those steps are sufficient. A determination of "no unmitigable adverse impact" on the availability of marine mammals for subsistence uses should be based, in part, on concurrence of those people who are the experts regarding the availability of marine mammals for subsistence hunts—the Alaska Native hunters themselves. Shell signed a conflict avoidance agreement in 2011 with the Alaska Eskimo Whaling Commission and intends to enter into negotiations again in 2012. Negotiating and completing a conflict avoidance agreement related to bowhead whales is useful but also prompts the question as to why such agreements are not being developed with subsistence hunters taking other species that might be affected by oil and gas operations. For example, the Point Lay hunt for beluga whales occurs in late June or the first two weeks in July. If the hunt were delayed into mid-July, would Shell agree to delay its entry into the Chukchi Sea until after the hunt was completed to avoid deterring beluga whale movements? These and other potential issues should be addressed as part of a conflict avoidance agreement with, for example, the Alaska Beluga Whale Committee.

With these concerns in mind, the Marine Mammal Commission recommends that the National Marine Fisheries Service issue the requested incidental harassment authorization but also facilitate development of conflict avoidance agreements that involve all potentially affected communities and co-management organizations and take into account potential adverse impacts on all marine mammal species taken for subsistence purposes including, but not limited to, bowhead whales.

Mitigating impacts from drilling muds and cuttings

Unlike Shell's proposed Beaufort Sea exploratory drilling program, Shell is not proposing to collect drilling muds or cuttings for transport and disposal outside the Arctic. Shell states that "[B]oth modeling and field studies have shown that discharged drilling fluids are diluted rapidly in receiving waters" and that "[T]he impact of the limited amount of drilling mud and cuttings discharges would be localized to the drill sites and temporary." This might be acceptable if Shell were only planning on drilling a few exploratory wells. Clearly, however, the intent is to locate oil and gas reserves that can be exploited, which would involve much more drilling and, over time, the cumulative effects of repeated discharges could be significant. Shell also has stated that a considerable amount has been invested in research on exposures of marine mammals to organochlorines or other toxins. The Commission disagrees, as information regarding sub-lethal, long-term, and cumulative impacts from discharge of drilling muds and cuttings on marine mammals and the marine environment is quite limited. Studies done to date regarding the impacts on marine mammals from exposure to polycyclic aromatic hydrocarbons are informative, yet do not provide a sufficient basis for predicting, with full confidence, the severity of either short- or long-term effects of exposure (Marine Mammal Commission 2011). Therefore, as a prudent and precautionary measure, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Shell to collect all new and used drilling muds and cuttings and either reinject them or transport them to an Environmental Protection Agency licensed treatment/disposal site outside the Arctic.

Monitoring impacts from drilling and ice management activities

Drilling and icebreaking are considered continuous sound sources and a 120-dB re 1µPa threshold was used to estimate the area in which marine mammals may be taken by Level B harassment. The "corrected" 120-dB re 1µPa harassment zone (the Level B harassment zone multiplied by 1.5) has a radius of 1.97 km for the *Discoverer*, and 9.50 km for icebreaking (Table 4 in the *Federal Register* notice). However, as noted in the Commission's comments regarding Shell's proposed drilling program for the Beaufort Sea, it is not clear which specific source level was used to model the size of the corrected 120-dB re 1µPa harassment zone for the *Discoverer*, as the reported source levels for the *Discoverer* ranged from 177–185 dB re 1µPa at 1 m. It also is not clear how the source level measurements taken in the South China Sea were incorporated in the model to estimate the 120-dB re 1µPa harassment zone in the Chukchi Sea.

In addition, the corrected 120-dB re 1µPa harassment zone for ice management activities is too large to be monitored effectively using visual methods, especially when visibility is poor. Acoustic recorders deployed widely across the U.S. Chukchi Sea and on the prospect would help provide information on the distribution of marine mammals, but the shortcomings of acoustic methods are well known. They do not provide a basis for tracking movements of animals in response to noise, they can be used to detect only those animals that vocalize, and they can be used as an index of abundance, but only if some substantial assumptions are made. In addition, marine mammals in the area may decrease their vocalization rate because of the noise from drilling operations (Richardson et al. 1985, Blackwell et al. 2011). In the Commission's view, the "net" array proposed by Shell would not be sufficient to characterize the distribution of marine mammals in the area or their responses to drilling operations.

In addition to expanding its acoustic monitoring capabilities, Shell also could use aerial surveys to detect marine mammals and characterize their responses to drilling operations. Shell has indicated that it does not consider aerial surveys to be sufficiently safe. However, it also plans to use airplanes for monitoring ice and helicopters for support activities at this site. That being the case, Shell is essentially indicating that it is willing to use aircraft to support its operations, but does not consider potential effects on marine mammals to be sufficient to warrant monitoring. The Marine Mammal Commission recognizes that aircraft must be used with caution in this region. However, it does not agree that the circumstances are such that aircraft cannot be used safely. Indeed, aerial surveys are flown throughout U.S. waters, including Alaskan and Arctic waters, to survey marine mammals. So while the Commission concurs with Shell's desire to ensure safety, it also believes that aerial surveys can be flown safely in this region.

To address these concerns, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Shell to evaluate the source levels of the *Discoverer* at the proposed drilling location and recalculate the 120-dB re 1µPa harassment zone and estimated takes, as appropriate. The Marine Mammal Commission further recommends that the National Marine Fisheries Service require Shell to develop and employ a more effective means for monitoring the entire corrected 120-dB re 1µPa harassment zone for the presence and movements of all marine mammals and for estimating the actual number of takes, including, but not limited to, aerial and

acoustic surveys of the proposed drilling site before, during, and after drilling operations. Shell also should make the data collected by the monitoring program publicly available for evaluation by independent researchers.

Requiring certain mitigation and monitoring measures will mean little if the parties involved fail to implement them. In this case, Shell is working under a tight schedule to drill its proposed wells, and its ability to meet that schedule would be determined in part by seasonal changes in weather and, particularly, ice conditions. Although Shell may recognize that the specified mitigation and monitoring measures are important, it may not deem these measures to be its highest priority if they conflict with operations considered essential to drilling progress. Under such conditions, mitigation and monitoring measures may not be fully implemented as the Service intended and their value may be compromised. To avoid such situations, the Marine Mammal Commission recommends that the National Marine Fisheries Service track and enforce Shell's implementation of mitigation and monitoring measures to ensure that they are executed as expected.

Mitigation measures for potential oil spills

The *Federal Register* notice and Shell's application provided a summary of potential risks to marine mammals from oil spills, including contact with oil, ingestion of oil or contaminated prey, and inhalation of oil. Shell also noted that oil spill cleanup activities may have more of an impact than the oil itself. The Commission believes that Shell's summary of potential impacts under-represents the risks to marine mammals, and that information regarding the long-term effects of exposure to oil and oil spill cleanup activities is inadequate (Marine Mammal Commission 2011). Shell also states that "[T]he likelihood of a large or very large … oil spill occurring during Shell's proposed program has been estimated to be low" and that Shell "will deploy an oil spill response (OSR) fleet that is capable of collecting oil on the water up to the worst case discharge (WCD) planning scenario." Here, too, the Commission believes these statements both downplay the potential risks of an oil spill to marine mammals and overstate Shell's oil spill response capabilities. The Commission also believes that the Service is being too dismissive of the potential for a large oil spill based on the conclusion that such a spill is not likely.

However, the risk of a spill is not simply a function of its probability of occurrence—it also must take into account the consequences if such a spill occurs. Those consequences are, in part, a function of the spill's characteristics and the ability of the industry and government to mount an effective response. In all areas, but particularly in the Arctic, the longstanding but still unresolved question is whether the responsible parties can mount an effective response. Having just witnessed the requirements for and difficulties of responding to a major spill in the much less harsh environment of the Gulf of Mexico, the Commission sees no basis for concluding that the necessary response capability exists in Arctic ice conditions. The assertion that Shell would be able to respond adequately to any kind of major spill is simply unsupported by all the available evidence. The Commission does not mean to dismiss Shell's efforts to develop response capabilities, but the reality is that the harsh conditions and lack of infrastructure, trained personnel, supplies, etc., could make it virtually impossible to respond effectively to a significant Arctic spill.

With regard to marine mammals that might be affected, impacts from a spill would be determined by the time of year, the species in or migrating through the area down-current from the facility (i.e, in the spill's path), and the amount of disruption to their natural behavior (e.g., reproduction, feeding). Given that marine mammals move through this area in large pulses, it may or may not be the case that few animals would be affected; actual effects would depend on the timing and circumstances, such as the size of the spill. And although Shell has emphasized oil spill response strategies that would prevent oil from reaching shorelines, impacts to marine mammals would incur both from oil that remains in the offshore environment as well as oil that reaches the shore. It also is important to consider that some of the animals may already be in a compromised state as a result of climate disruption, stochastic variation in food resources, or variation in physiological state due to normal life history events (e.g., molting or reproduction in pinnipeds).

Shell's Oil Discharge Prevention and Contingency Plan for the Chukchi Sea outlines several measures for preventing and responding to a spill, as summarized in the incidental harassment authorization application. Although Shell revised the contingency plan in May 2011 in response to new Bureau of Ocean Energy Management safety and environmental requirements, the contingency plan is still inadequate for addressing a large oil spill in the Arctic, and especially a worst case discharge. For example, the plan states that in the event of a worst-case incident (estimated at 25,000 barrels of oil per day for 30 days, for a total of 750,000 barrels), the "OSR [oil spill response] fleet will be available within 72 hours if needed and will be capable of collecting oil on the water up to the calculated Worst Case Discharge." However, the worst case discharge scenario and assertions regarding Shell's response capabilities are based on a summer (August) spill rather than a late October spill, which would be a more appropriate worst-case discharge. The plan also includes a response strategy for a spill of unspecified size occurring nine days before freezeup, noting that as the response enters Day 21, "it is no longer possible to conduct containment and recovery operations safely and effectively downstream of the blowout." These statements all indicate that Shell has little chance of recovering oil that spills once ice formation begins, which can vary from as early as the beginning of October to as late as the end of November.

Even if a spill were to occur during summer, Shell's ability to contain the well and recover spilled oil is limited by the lack of adequate infrastructure. The contingency plan states that the preference is to use the original drilling rig to drill a relief well. However, if there is damage to the rig as a result of a blowout or other accident, Shell would need to move a second rig onsite, which may take several weeks considering that the second rig would likely be fully engaged in drilling activities in the Beaufort Sea. The plan proposes to use skimming and in-situ burning for recovery of oil—technologies that were effective in recovering only 8 percent of the oil spilled from the Gulf of Mexico Macondo well (NOAA 2010) and which have not been proven (and cannot reasonably be assumed) to be effective in Arctic conditions.

In the event of a spill, Shell also has included provisions for wildlife protection in its contingency plan. However, the provisions of the "Wildlife Protection Plans" are limited to monitoring and deterrents at the spill site, hazing, placement of containment booms to prevent contamination of sensitive shoreline, and the designation of a facility to treat oiled animals. Based on experience gained from the Exxon Valdez, the Deepwater Horizon, and other small and large oil

spills, a more detailed, comprehensive, and coordinated strategy would be needed to respond to, recover, and rehabilitate oiled wildlife. The Commission must question whether such response activities are realistic, given that the expertise and infrastructure needed to conduct them are simply not available in the Arctic.

For these and other reasons, the Commission must question whether Shell can respond effectively to a large spill under harsh Arctic conditions. At the same time, the impact of a spill on Arctic marine mammals could be significant and long-lasting. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Shell to cease drilling operations in mid- to late-September to reduce the possibility of having to respond to a large oil spill in ice conditions. The Marine Mammal Commission also recommends that the National Marine Fisheries Service require Shell to develop and implement a detailed, comprehensive, and coordinated Wildlife Protection Plan that includes strategies and sufficient resources for minimizing contamination of sensitive marine mammal habitats and that provides a realistic description of the actions that Shell can take, if any, to respond to oiled or otherwise affected marine mammals; the plan should be developed in consultation with Alaska Native communities (including marine mammal co-management organizations), state and federal resource agencies, and experienced non-governmental organizations.

Please contact me if you have questions regarding these recommendations.

Sincerely,

Timothy J. Ragen, Ph.D.
Executive Director

Cc: Kaja Brix, National Marine Fisheries Service Alaska Regional Office
Jim Kendall, Bureau of Ocean Energy Management Alaska Region

References

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