



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
PROGRAM PLANNING AND INTEGRATION  
Silver Spring, Maryland 20910

OCT 24 2007

To All Interested Government Agencies, Public Groups:

Pursuant to the National Environmental Policy Act, an environmental review has been performed on the following action:

**TITLE:** Environmental Assessment for the Shell Offshore, Inc. Incidental Harassment Authorization to Take Marine Mammals Incidental to Conducting an Offshore Drilling Project in the U.S. Beaufort Sea Under the Marine Mammal Protection Act

**LOCATION:** Arctic Ocean.

**SUMMARY:** An Environmental Assessment (EA) has been prepared that examines the environmental consequences of issuing an authorization, under section 101(a)(5)(D) of the Marine Mammal Protection Act, for the harassment of several species of marine mammals incidental to conducting an offshore drilling program in the U.S. Beaufort Sea during the summer and fall, 2007. The principal means of taking by this activity is expected to be disturbance by underwater noise due to ocean-bottom drilling and associated vessel activities, such as ice management. The National Marine Fisheries Service (NOAA Fisheries Service) has determined that the drilling program will have a negligible impact on the affected species or stocks of marine mammals and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses provided the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are implemented. The NOAA Fisheries Service has determined that the impact of conducting an ocean-bottom drilling program in this area will result in, at worst, a temporary modification in behavior by certain species of marine mammals (bowhead and gray whales, and ringed, bearded and spotted seals). While behavioral reactions and area avoidance by individuals may be made as a result of the onset and persistence of the sounds resulting from this activity, this behavioral change is expected to have a negligible impact on the affected species or stocks of marine mammals.

**RESPONSIBLE OFFICIAL:** James Lecky, Director  
Office of Protected Resources  
National Marine Fisheries Service  
1315 East-West Highway  
Silver Spring, Maryland 20910

The environmental review process has led NOAA Fisheries Service to conclude that issuance of an Incidental Harassment Authorization for this activity will not have a significant effect on the



human environment. Therefore, an Environmental Impact Statement was not prepared for this action. A copy of the EA and Finding of No Significant Impact is enclosed for your information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Rodney F. Weiher', is written over a rectangular redacted area. The signature is fluid and cursive.

Rodney F. Weiher, Ph.D.  
NEPA Coordinator

Enclosure

**Environmental Assessment for the Shell Offshore, Inc. Incidental Harassment  
Authorization to Take Marine Mammals Incidental to Conducting an Offshore Drilling  
Project in the U.S. Beaufort Sea Under the Marine Mammal Protection Act**

**United States Department of Commerce  
National Oceanic & Atmospheric Administration  
National Marine Fisheries Service**

**October 2007**

## **I. Purpose and Need for Proposed Action**

In January 2007, the National Marine Fisheries Service (NMFS) received an application from Shell Offshore, Inc. (SOI) for an incidental harassment authorization (IHA) pursuant to the Marine Mammal Protection Act (MMPA) to take small numbers of marine mammals incidental to conducting open-water offshore exploratory drilling on Outer Continental Shelf (OCS) oil lease blocks in the Beaufort Sea off Alaska. In their application, SOI proposed to drill priority exploration targets and geotechnical boreholes on their leaseholds known as Sivulliq and Olympia in Camden Bay. SOI planned to utilize up to two drilling vessels that would each drill up to two wells during the open water season of 2007. Each drilling vessel would be accompanied by up to two ice management vessels and additional support vessels. SOI also proposed in their application to implement a series of mitigation and monitoring measures to reduce the potential impact on marine mammals, other wildlife and to ensure no unmitigable adverse impacts to subsistence uses of marine mammals.

On October 1, 2007, however, SOI informed NMFS that they would not conduct any drilling activities during the 2007 open water season due to pending litigation in the Ninth Circuit that stayed MMS' approval of SOI's exploration plan for the 2007 season and inclement weather, among other factors. Shortly thereafter, SOI requested that NMFS proceed with issuance of the IHA as it might have the opportunity to drill in 2007, despite its statement that they were demobilizing. In light of these developments, NMFS proceeded to finalize this NEPA analysis based on SOI's 2007 open water drilling application and associated activities.

This EA discusses NMFS' proposed action of issuing an IHA to SOI for the 2007 open water season; the alternatives to that proposed action, including the no action alternative; the potential impacts of the NMFS proposed action and alternatives; and the identified mitigation and monitoring measures that would reduce impacts on the human environment to the lowest level practicable. Finally, this EA addresses the potential cumulative impacts on the human environment from this proposed action in concert with other activities taking place in the U.S. Beaufort Sea.

Pursuant to the MMPA, NMFS is required to evaluate SOI's application for an IHA, provide notice of SOI's request to the public, make certain findings related to the potential impacts of SOI's drilling activities on marine mammals and prescribe, where appropriate mitigation and monitoring measures to achieve the least practicable adverse impact on marine mammals. After completing this process NMFS is required to either grant or deny SOI's application. On April 10, 2007, NMFS issued a notice of receipt of SOI's proposal to conduct exploratory drilling activities during the 2007 open water season. The *Federal Register* Notice described in detail SOI's proposed activities for the 2007 season.

### A. Statutory and Regulatory Requirements

Pursuant to the MMPA, the taking of marine mammals without a permit or exemption from NMFS is prohibited. Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small

numbers of marine mammals by harassment. The term "take" under the MMPA means "to harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].<sup>1</sup>

An authorization shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses and the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 as ". . . an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

As part of the MMPA authorization process, IHA applicants are required to provide detailed mitigation plans that outline the efforts that will be taken to reduce negative impacts to marine mammals, and their availability for subsistence use, to the lowest level practicable. In addition, MMPA authorizations require that operators conduct monitoring, which should be designed to result in an increased knowledge of the species and an understanding of the level and type of takings that result from the authorized activities. Under the MMPA, NMFS further requires that monitoring be designed to provide information and data verifying (or disputing) that the taking of marine mammals are, in fact, negligible and there are no unmitigable adverse impacts on the availability of marine mammals for subsistence uses.

In making a determination of no unmitigable adverse impacts to subsistence uses of marine mammals, NMFS assumes that the requirements for a Plan of Cooperation (POC) with the affected Alaskan Native communities will be met.<sup>2</sup> NMFS assumes further that an applicant, such as SOI, will be in full compliance with a signed Conflict Avoidance Agreement (CAA) in order to lessen the potential for negative impacts to subsistence-harvest activities.<sup>3</sup> NMFS typically reviews the POC and CAA to determine whether the terms and conditions set forth in these documents ensure that there will not be an unmitigable adverse impact on subsistence uses of affected marine mammal species and stocks.

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<sup>1</sup>Pertinent to the proposed action, NMFS' policy to date has been to use the 180-decibel (dB) root-mean-squared (rms) isopleth for cetaceans and 190-dB rms isopleth for pinnipeds to indicate where Level A harassment from acoustic sources begins. In addition, NMFS uses the 160-dB rms isopleth to indicate where Level B harassment begins for acoustic sources, including impulse sounds, such as used for seismic surveying.

<sup>2</sup>For 2007, SOI submitted a Plan of Cooperation (which was updated periodically by SOI) to NMFS as part of its IHA application (see Section V.A.2.a).

<sup>3</sup>A 2007 CAA was signed by SOI and the Alaska Eskimo Whaling Commission on July 24, 2007, with a subsequent amendment signed on July 26, 2007.

## B. Description of Proposed Action

SOI proposed to conduct open-water offshore exploratory drilling operations during the 2007 open water season in order to drill priority exploration targets on their U.S. Minerals Management Service (MMS) OCS leases in the Beaufort Sea. SOI planned to utilize two drilling units (the semi-submersible drill ship, the *Kulluk* and a floating drill ship, the *Frontier Discoverer (Discoverer)*) to drill up to two wells each during the 2007 season. The highest priority exploratory drilling targets identified for the 2007 season were located offshore of Pt. Thompson and Flaxman Island, on the leaseholds referred to as Sivulliq and Olympia, in Camden Bay. However, given the locations of open water conditions during 2007 and permit/authorization stipulations, SOI had the option to elect to re-prioritize well locations on one, or more of their OCS leases.

SOI had intended, as part of its proposed exploratory drilling operations to obtain geotechnical data for pre-feasibility analyses of shallow sub-sea sediments by drilling as many as eight boreholes, each up to 400 feet (122 m) in depth. These boreholes would have been completed at depths more than one mile (1.6 km) above any of the prospective subsurface hydrocarbon-bearing zones in the Sivulliq prospect (see Figure 1 in SOI's application). Up to three potential development locations were also expected to have been investigated at Sivulliq, in addition to deeper locations along a prospective pipeline access corridor. The borehole operation was proposed to have lasted up to one week per borehole, with a total timeframe of up to eight weeks, depending on such factors as weather, ice conditions, logistics and resupply. The proposed geotechnical locations included the Sivulliq prospect and the Pt. Thompson to Sivulliq prospective pipeline access corridor.

Further, each drilling vessel would have been accompanied by up to two Arctic-class foreign-flagged ice management vessels which also intended to serve duty as anchor tenders, and other drill ship support tasks. These ice management vessels are the *M/V Jim Kilabuk*, the *M/V Vladmir Ignatjuk*, the *M/V Kapitan Dranitsyn*, the *M/V Fennica-Nordica* and the *M/V Tor Viking*. Additional support vessels such as the *M/V Peregrine*, oil spill response vessels, and aircraft were also proposed to have been used during the 2007 drilling season.

As described above, however, SOI informed NMFS that they would not conduct any drilling activities during the 2007 open water season due to pending litigation in the Ninth Circuit that stayed MMS' approval of SOI's exploration plan for the 2007 season and inclement weather, among other factors. Shortly thereafter, SOI requested that NMFS proceed with issuance of the IHA as it might have the opportunity to drill in 2007, despite its statement that they were demobilizing. In light of these developments, NMFS proceeded to finalize this NEPA analysis based on SOI's 2007 open water drilling application and associated activities.

## II. Alternatives

### A. Alternative 1. No Action Alternative

Under this alternative, NMFS would not issue SOI an IHA to take marine mammals incidental to conducting exploratory drilling operations in the Beaufort Sea during the open water season. This alternative is inconsistent with the purpose and need for this action for the following reasons: (1) SOI has already received a permit from MMS to engage in exploratory drilling operations;<sup>4</sup> and (2) this alternative would be inconsistent with the MMPA insofar as the MMPA requires NMFS to evaluate a request for an IHA and make the necessary findings regarding incidental take of marine mammals. Moreover, the no action alternative would effectively preclude SOI from engaging in drilling operations as the MMS permit is contingent upon SOI receiving an IHA from NMFS. The impact on the environment and SOI from not conducting this drilling program in 2007 was addressed in MMS's Exploration Plan EA (2007: SOI EA) as Alternative 3. That document states that: "No impacts to resources would occur from the proposed activities. Disapproval of the EP might result in the delay of activities and potential impacts or in the displacement of activities and potential impacts to other locations. Disapproval of the EP might result in lost opportunities for discovery and production of oil and gas resources and any associated economic benefits." As a result, this is not NMFS' preferred alternative.

### B. Alternative 2. SOI's Proposed Action as Described in their 2007 IHA Drilling Application.

As described in Section I.B., SOI had planned to utilize two drilling units during the 2007 open water season in order to drill priority exploration targets on their MMS OCS leases in the Beaufort Sea. The highest priority exploratory targets for the 2007 season were located offshore of Pt. Thomson and Flaxman Island in Camden Bay. In March 2005, SOI acquired 84 leases during MMS OCS Lease Sale (LS) 195. SOI's leases acquired from MMS contain seven stipulations drawn from the environmental impact statement completed for LS 195, including two directly relevant to SOI's IHA application. These are a site-specific bowhead whale monitoring program and conflict avoidance mechanisms to protect subsistence whaling and other subsistence-harvest activities. SOI's marine mammal monitoring and mitigation plan included with this application is compliant with these MMS stipulations.

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<sup>4</sup>It is worth noting that as of the development of this EA, the SOI Exploration Permit received from MMS is stayed pending resolution of a lawsuit filed in the Ninth Circuit Court of Appeals by a group of environmental organizations and native communities.

The drilling units proposed for the 2007 OCS drilling program include the semi-submersible drill ship, the *Kulluk*, and the *Frontier Discoverer*. Additional support vessels, such as the *M/V Peregrine* and aircraft (marine mammal monitoring aerial overflights) will also be used during the drilling season, helping with crew change support and provision re-supply. Although NMFS believes that the potential for an oil spill affecting marine mammals is unlikely, oil spill response vessels (OSRV) will accompany the drill ships while drilling occurs through prospective hydrocarbon-bearing zones. An ice-class, purpose built OSRV has been constructed for SOI and will be deployed in the Beaufort Sea for this drilling program. The *Arctic Endeavor* barge and associated tug; and an OSR tanker will be staged in proximity to both drilling units to support the OSRV. A list of specifications for the *Kulluk*, *Discoverer* and prospective ice management vessels is found in Attachment A of SOI's 2007 IHA application. The *Kulluk* and *Discoverer*, and all support vessels and aircraft will operate in accordance with terms and conditions to achieve the least practicable adverse impact on marine mammal species or stocks and to ensure there are no unmitigable adverse impacts on the availability of marine mammals for subsistence uses.

SOI proposed in their 2007 IHA application that they would implement a marine mammal mitigation and monitoring program (4MP) to reduce potential adverse impacts to marine mammals, particularly endangered bowhead whales, during the exploratory drilling activities. SOI has indicated that it would conduct vessel-, aerial-, and acoustic-monitoring programs for the drilling program. These measures are intended to characterize the sounds produced by the drilling operations and to document the potential reactions of marine mammals in the area to those sounds and activities. In conjunction with monitoring during SOI's seismic and shallow-hazard surveys, monitoring will provide information on the numbers of marine mammals potentially affected by these activities and permit real time mitigation to prevent injury of marine mammals by industrial sounds or activities.

To mitigate impacts on the subsistence use of marine mammals, SOI proposed the following measures, which it calls its Adaptive Management Plan (AMP) to mitigate potential impacts to the Cross Island hunt.<sup>5</sup> The AMP, which is in 3 phases, is described in detail in Section V.

In addition, the AEWG and the Whaling Captains' Associations prepared and signed a CAA that, they believed would avoid significant impacts to subsistence hunting of marine mammals, particularly bowhead whales during the fall migration period. As it pertains to drilling operations and marine mammals, the CAA contained the following measures that would reduce

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<sup>5</sup> All mitigation and monitoring measures whether proposed by SOI or required by NMFS through the IHA have been evaluated as part of the "specified activity" under section 101(a)(5)(D) of the MMPA.

impacts on marine mammals and the subsistence uses of those animals.

(1) SOI will establish and operate at least five Communication Centers to be staffed by Inupiat operators. The Com-Centers will be operated 24 hours/day during the 2007 fall subsistence bowhead whale hunt.

(2) Plan all vessel and aircraft routes to minimize any potential conflict with bowhead whale subsistence whaling activities. All vessels shall avoid areas of active or anticipated whaling activity.

(3) During the bowhead whaling season, SOI aircraft shall not operate below 1500 ft unless approaching, landing or taking off, or unless engaged in providing assistance to a whaler or in poor weather (low ceilings) or other emergency situations.

(4) Upon notification by a Communication Center operator of an at-sea emergency, SOI would be required to provide such assistance as necessary to prevent the loss of life.

(5) East of Cross Island, no drilling equipment or related vessels will be onsite at any offshore drilling location east of Cross Island from August 25<sup>th</sup> until the close of the bowhead whale hunt in Nuiqsut. However, such equipment may remain within the Beaufort Sea north of 71.25 N or at the edge of the arctic ice pack whichever is closer to shore, and west of 146.4 W. and

(6) no drilling equipment or related vessels shall be moved onsite at any location outside the barrier islands west of Cross Island until the close of the bowhead whale hunt in Barrow.

On July 24, 2007 (as amended on July 26, 2007), SOI agreed to the terms and conditions of the CAA as previously described. In addition, the Parties to the CAA agreed to amend CAA section IV.B.2.a "Drilling Operations - Beaufort Sea East of Cross Island" as follows: "Shell Offshore, Inc. agrees to employ only the *Discoverer* drillship and its associated support and supply vessels for oil and gas exploratory drilling prior to the beginning of the bowhead whale subsistence hunt at Cross Island and to cease drilling operations beginning August 25, 2007, and agrees further to relocate all equipment and related vessels offsite no later than August 27, 2007, until the close of the bowhead whale subsistence hunt in Nuiqsut. However, such equipment and vessels may remain within the Beaufort Sea north of 71.25 N or at the edge of the arctic ice pack whichever is closer to shore, and west of 146.4 W."

### C. Alternative 3. SOI's Proposed Action as Described in their 2007 IHA Drilling Application, Including Additional Mitigation and Monitoring Measures (Preferred Alternative)

This alternative includes SOI's proposed action described in Alternative 2, including all the mitigation measures identified under that Alternative (the 4MP, the AMP, the CAA, and the Amended CAA). In addition, this alternative includes measures determined by NMFS reduce impacts on marine mammals to the lowest level practicable. This alternative also includes measures proposed by SOI in its 2007 Marine Mammal Mitigation and Monitoring Program.

In addition to the mitigation and monitoring measures described previously, NMFS has incorporated additional mitigation and monitoring measures into the IHA to ensure that impacts on marine mammals are at the lowest level practicable. Under this alternative, the SOI IHA would require expanded monitoring-safety zones for bowhead and gray whales and having those

zones monitored as effectively as possible. Monitoring can either be by support vessels or as part of the Beaufort Sea aerial monitoring program described previously, or both.

Specifically, for SOI's drilling program, NMFS has established a monitoring-safety zone to a distance of 160 dB from the noise source (i.e., the drill ship or operating ice-breaker) as verified by the acoustic program from each drilling location to ensure that feeding bowhead and gray whales are not prohibited from accessing food resources in the vicinity of either drill rig. In addition, SOI is required, as they have proposed, to implement the aerial monitoring program described in the 4MP part of its IHA application to ensure that migrating bowhead whales, particularly, cow/calf pairs are not being denied access to their westward migration route past the drilling location(s).

For reasons described in detail in MMS' 2006 Final PEA for Arctic Seismic Surveys, in order to reduce impacts to the lowest level practicable, NMFS continues the same mitigation criteria as it had for the 2006 and 2007 Arctic seismic programs (although the mitigation measures differ slightly). These mitigation measures are limited to balaenopterid whales, are scientifically supportable and are practicable to implement. First, if an aggregation of 12 or more feeding, non-migratory, balaenopterid whales are sighted within an acoustically verified 160-dB rms zone of the vessel (except those whales that are west of or have already passed by) the drilling vessel, SOI must lower its activity and noise level in the drilling area (e.g., by taking appropriate measures up to and possibly including temporarily reducing drilling and/or support vessel activity) to ensure that the sound pressure levels (SPLs) at the shortest distance to the aggregation do not exceed 160 dB rms. Once noise levels are reduced, aerial or vessel observers must monitor the whale aggregation(s). When the whale aggregation has moved outside or past the 160-dB zone, and it is determined that another aggregation is not likely to enter the zone before the next scheduled bowhead whale aerial survey overflight of the drilling site, SOI may resume full activity level. If 12 or more balaenopterid whales remain within the 160-dB area for more than 24 hours, SOI should contact NMFS to review this IHA condition to determine if a temporary waiver of the condition is warranted. NMFS recognizes that preliminary monitoring information from a Canadian seismic survey in 2006 indicates that feeding, non-migratory, bowhead whales did not react to seismic noise of approximately 160 dB and is, therefore, concerned that a long-term occupation of the area may take place and SOI may be restricted from operating at full capacity for a lengthy period of time while the bowheads themselves may not show a significant behavioral response to the drilling/icebreaker sounds. As a result, NMFS has incorporated a waiver provision for this mitigation measure, should it become necessary.

Second, if the aerial monitoring program detects 12 or more bowhead whales or 4 bowhead whale cow/calf pairs within an acoustically-verified 120-dB monitoring zone, SOI must reduce its activity level in the drilling area (e.g., by taking appropriate measures including, but not limited to, suspending drilling or support vessel activity or taking other measures) to ensure that the SPL at the closest aggregation of adult/juvenile bowhead whales or closest bowhead whale cow/calf pair is reduced by at least 50 percent. Once noise levels are reduced, aerial observations by industry or government must monitor the aggregation(s) to ensure that noise levels from the drilling unit(s) and associated activities are not resulting in milling behavior, migration westward and/or a cessation in migration (but not feeding). Because of the critical

nature of the bowhead migration, SOI shall not resume normal activity levels until two consecutive aerial surveys (industry or government) confirm that there are fewer than 12 migrating bowheads or 4 female/calf pairs within the upstream half of the 120-dB zone, and NMFS scientists have reviewed this data. Once the "aggregation" has moved past the activity area (outside the 120-dB zone) and another aggregation is not about to enter the upstream 120-dB zone prior to the next planned bowhead whale aerial survey, SOI will be authorized by NMFS to resume its activity.

NMFS considers the feeding, socializing and migration of bowhead whales during the fall westward migration to be critical for bowhead whale survival. The reason for the 120-dB-related conditions and the requirement for two aerial surveys is that preliminary information from a Canadian seismic survey in 2006 indicates that a tagged bowhead whale migrating westward ceased its migration until the seismic survey ended. This reaction is of concern to NMFS principally because one animal's response to seismic sound is a likely indicator that a larger population of bowheads could exhibit the same response to seismic sound and possibly even drilling noise. Therefore, under this alternative, NMFS intends to implement this mitigation measure to help ensure that bowhead whale migration is not significantly affected.

It should also be understood that the additional mitigation measures are specific to the SOI drilling and seismic projects. They do not necessarily establish NMFS policy applicable to other projects or other locations under NMFS' jurisdiction, as each application for an IHA is context-specific. These measures have been developed based upon available data specific to the project areas, and may or may not be practicable in other areas or other seasons (e.g., fall bowhead migration). These mitigation measures are practicable in part for SOI's drilling program because the aerial monitoring program was proposed by SOI in its 4MP document, and SOI has agreed to voluntarily implement these measures.

In 2008 and beyond, NMFS and MMS intend to collect additional information from all sources, including industry, non-governmental organizations, Alaska Natives and other federal and state agencies regarding measures necessary for effectively monitoring marine mammal populations, assessing impacts from seismic and drilling operations on marine mammals, and determining practicable measures for mitigating those impacts. MMS and NMFS anticipate that mitigation measures applicable to future drilling and other activities may change and evolve based on newly-acquired data.

### **III. Description of the Affected Environment**

The area in which SOI proposes to conduct exploratory drilling operations is located in the OCS of the Beaufort Sea off the coast of Alaska. Specifically, SOI intends to conduct activities in their lease blocks located offshore of Pt. Thompson and Flaxman Island in Camden Bay. This area contains a diverse array of wildlife, including marine mammals, birds, polar bears, and other wildlife susceptible to SOI's proposed activities. For a comprehensive description of the physical, geographical and biological environment and the description and biology of the marine mammal species under NMFS' jurisdiction, refer to the following documents which are incorporated herein by reference: SOI's IHA application dated January 24, 2007; MMS' 2006 Programmatic Environmental Assessment for Seismic Surveys; MMS' 2007 Environmental Assessment for SOI's Exploration Plan; MMS' Beaufort Sea Lease Sale 195 EA, the Beaufort Sea Lease Sale 202 EA, MMS' 2003 Multi-Sale Environmental Impact Statement, and the NMFS 2006 Arctic Region Biological Opinion (ARBO3) (NMFS, 2006).

Additional information on the potentially affected marine mammal species may also be found in the NMFS Stock Assessment Reports located at <http://www.nmfs.noaa.gov/pr/sars/region.htm>.

## **IV. Environmental Consequences**

### **A. Environmental Impacts Under Alternative 1.**

Under this alternative, NMFS would not issue SOI an IHA to take marine mammals incidental to conducting exploratory drilling operations in the Beaufort Sea during the open water season. The no action alternative would effectively preclude SOI from engaging in drilling operations as the MMS permit is contingent upon SOI receiving an IHA from NMFS. The impact on the environment and SOI from not conducting this drilling program in 2007 was addressed in MMS's Exploration Plan EA (2007: SOI EA) as Alternative 3, and incorporated by reference here. Essentially if this Alternative was selected:

(1) Adverse impacts on marine mammals, principally bowhead whales, would not be expected as the associated noise generated by the drilling and support activities that have the potential to result in Level B (behavioral) harassment would not exist;

(2) Adverse impacts on the Inupiat subsistence hunts would not occur as marine mammals would not be affected and would not have cause to deflect further from shore (other than the natural variation due to heavy and low ice years);

(3) Adverse impacts on the marine habitat would not occur as the drilling vessels and associated support vessels would not be conducting drilling activities within the U.S. Beaufort Sea; and

(4) A cessation or delay in offshore drilling activities by SOI will result either in unrecoverable costs with the potential for an increased level of activity in future years in an attempt to recover costs or in the displacement of activities and potential impacts to other offshore locations.

### **B. Environmental Impacts Under Alternative 2.**

The environmental impacts of various offshore oil and gas exploration activities, including the type of drilling activities proposed to be conducted by SOI in 2007, have been addressed in several documents prepared by MMS. These include the 2007 Environmental Assessment for SOI's Exploration Plan; the EA for Beaufort Sea Lease Sale 195, the EA for Beaufort Sea Lease Sale 202, and the 2003 Multi-Sale Environmental Impact Statement. The relevant information contained in each of these documents is incorporated by reference in this section of NMFS' EA. Information on the potential environmental consequences of SOI's proposed Beaufort Sea drilling program for 2007 follows:

#### **1. Potential Effects of Offshore Drilling Activities on Marine Mammals**

The principal means of marine mammal take is expected to be in the form of Level B harassment (i.e., behavioral disturbance) resulting from sound produced by SOI's drilling activities. Drilling vessels, support vessels including ice management vessels, and aircraft are all likely to produce noise, sufficient to cause behavioral harassment. If ice-management activities become prevalent, ice-breaking and vessel prop cavitation noises may become predominant. Also, the physical presence of vessels and aircraft could also lead to non-acoustic effects on marine mammals involving visual or other cues.

The effects of noise on marine mammals are highly variable, but can be categorized as follows (based on Richardson *et al.*, 1995):

(a) The noise may be too weak to be heard at the location of the animal (i.e., lower than the prevailing ambient noise level, the hearing threshold of the animal at relevant frequencies, or both);

(b) The noise may be audible but not strong enough to elicit any overt behavioral response;

(c) The noise may elicit reactions of variable conspicuousness and variable relevance to the well being of the marine mammal; these can range from temporary alert responses to active avoidance reactions such as vacating an area at least until the noise event ceases;

(d) Upon repeated exposure, a marine mammal may exhibit diminishing responsiveness (habituation), or disturbance effects may persist; the latter is most likely with sounds that are highly variable in characteristics, infrequent and unpredictable in occurrence, and associated with situations that a marine mammal perceives as a threat;

(e) Any anthropogenic noise that is strong enough to be heard has the potential to reduce (mask) the ability of a marine mammal to hear natural sounds at similar frequencies, including calls from conspecifics, and underwater environmental sounds such as surf noise;

(f) If mammals remain in an area because it is important for feeding, breeding or some other biologically important purpose even though there is chronic exposure to noise, it is possible that there could be noise-induced physiological stress; this might in turn have negative effects on the well-being or reproduction of the animals involved; and

(g) Very strong sounds have the potential to cause temporary or permanent reduction in hearing sensitivity. In terrestrial mammals, and presumably marine mammals, received sound levels must far exceed the animal's hearing threshold for there to be any temporary threshold shift (TTS) in its hearing ability. For transient sounds, the sound level necessary to cause TTS is inversely related to the duration of the sound. Received sound levels must be even higher for there to be risk of permanent hearing impairment. In addition, intense acoustic or explosive events may cause trauma to tissues associated with organs vital for hearing, sound production, respiration and other functions. This trauma may include minor to severe hemorrhage.

The anticipated impacts to marine mammals associated with drilling activities are from propagation of sounds from the drilling units and associated support vessels and aircraft. SOI and NMFS believe that any impacts resulting from SOI's proposed activities on the whale and seal populations of the Beaufort Sea are likely to be short term and transitory arising from the temporary displacement of individuals or small groups from locations they may occupy at the times they are exposed to intermittent drilling sounds at the 120-190 db received levels. As noted in SOI's IHA application, it is highly unlikely that animals will be exposed to sounds of such intensity and duration as to physically damage their auditory mechanisms. In the case of bowhead whales displacement might well take the form of a deflection of the swim paths of migrating bowheads away from (seaward of) received noise levels greater than 160 db (Richardson *et al.*, 1999). This study and other studies conducted to test the hypothesis of the deflection response of bowheads have determined that bowheads return to the swim paths they were following at relatively short distances after their exposure to the received sounds (SOI, 2006). To date, no evidence has been obtained that bowheads so exposed have incurred injury to

their auditory mechanisms. Additionally, while there is no conclusive evidence that exposure to sounds exceeding 160 db have displaced bowheads from feeding activity (Richardson and Thomson, 2002), there is some information that intermittent sounds (e.g., oil drilling and vessel propulsion sounds) may cause a deflection in the migratory path of whales (Malme *et al.*, 1983, 1984), but possibly not when the acoustic source is not in the direct migratory path (Clark and Tyack, 1999). This indicates to NMFS that the reaction to the sounds is dependent upon the context in which the event occurs (e.g., during migration, but not feeding). For the Beaufort Sea bowhead whale population, this deflection is likely to be biologically insignificant as bowhead whales have a fairly wide migration path that deviates based on prevalence of ice. However, NMFS recognizes that this deflection could have significant impacts on the native subsistence uses of bowhead whales (and to a lesser extent other marine mammals) unless effectively mitigated.

There is no evidence to date that seals are more than temporarily displaced from ensonified zones and no evidence that seals have experienced physical damage to their auditory mechanisms even within ensonified zones.

In addition to potential impacts from noise, impacts are possible due to an unanticipated oil spill. The potential for impacts from an oil spill are discussed in section IV.G. below.

## 2. Distance Effects of Open Water Drilling on Marine Mammals

The only type of incidental taking requested in SOI's IHA application is that of takes by noise harassment. The principal sources of project-created noise will be those resulting from the *Kulluk* and *Discoverer* and their support vessels, especially ice-management vessels. Although the bulk of the activity will be centered in the area of drilling, potential exposures, or impacts to marine mammals also will occur as the drilling vessels, and ice management vessels mobilize through the Beaufort and Chukchi Seas.

Noise propagation studies were performed on the *Kulluk* (Hall *et al.*, 1994) in the Kuvlum prospect drill sites, approximately 6 mi (9.6 km) east of SOI's Sivulliq prospect that SOI is proposing to drill during 2007. Acoustic recording devices were established at 10-m (33-ft) and 20-m (65.6-ft) depths below water surface at varying distances from the *Kulluk* and decibel (dB) levels were recorded during drilling operations. There were large differences between sound propagation between the different water depths. At 10 m (33 ft) water depth, the 120-db threshold had a 0.7-km (0.4-mi) radius around the *Kulluk*, and the 105-db threshold had an 8.5-km (5.3-mi) radius. At a depth of 20 m (66 ft) below water surface, the 120-db threshold had a radius of 8.5 km (5.3 mi) and the 105-db threshold had a radius of 100 km (62.1 mi). While there is no definitive explanation for the large differences in propagation at the different levels, SOI used the 20 m. depth range to calculate take levels since that is the most likely depth contour for the 2007 drilling activity. Possible explanations for this depth-related difference include the presence of an acoustic layer due to melting ice during the sound studies and/or sound being channeled into the lower depths due to the seafloor topography (SOI, 2006). However, new sound propagation studies will be performed on the *Kulluk*, *Discoverer*, ice management, and support vessels once these vessels are at their locations for drilling in the Beaufort Sea and new

mitigation/exclusion/safety zones will be established and monitored based on those measurements (see V. Mitigation, Monitoring and Reporting).

SOI's plan is for all drilling operations to occur within a few miles of the same location, which places them within the same depth zone. Hence the approach taken was to utilize the depth zone as an indicator of the potential area of impact. However, side to side impacts are expected to be less than perpendicular placement of the drilling vessels. As the area ensonified was taken times ten for purposes of impact calculations, the effect is as if the vessels were distributed along a north south axis.

### 3. Numbers of Marine Mammals Expected to Be Taken

#### *Cetaceans*

For whales, Moore *et al.* (2000b and c) offer the most current data to estimate densities of belugas, and gray whales during summer in the Beaufort and Chukchi Seas. However, densities of beluga and gray whales are likely overestimated due to the fact that most beluga and gray whales are found west of the most highly prospective drilling area. Density estimates for bowhead whales were derived from aerial surveys during the bowhead migration (Miller *et al.*, 2002). While these density estimates are likely accurate for the areas proposed for drilling activities within the eastern Beaufort Sea, they may result in an overestimate of the numbers of "takes by harassment" (noise disturbance) because drilling activities will also occur when bowhead whales are not present.

Table 1 gives the average and maximum densities for each cetacean species likely to occur within the project areas. All drilling activities will occur in waters between 20 and 40 m in depth. The estimated numbers of potential exposures presented in Table 1 are based on the 160 dB re 1 microPa (rms) criteria for most cetaceans, because this range is assumed to be the sound source level at which marine mammals may change their behavior sufficiently to be considered "taken by harassment."

#### *Pinnipeds*

Ringed, spotted, and bearded seals are all associated with sea ice, and most census methods used to determine density estimates for pinnipeds are associated with counting the number of seals hauled out on ice.

Ringed seals would be the most prevalent marine mammal species encountered at each of the two proposed drilling areas. Pinnipeds are not likely to react to sounds unless they are >170 dB re 1 microPa (rms), and Moulton and Lawson (2002) indicated that most pinnipeds exposed to 170 dB do not visibly react. Under the IHA, SOI has requested a take authorization for all pinnipeds using the maximum density between 170 and 179 dB instead of the 160 dB threshold. SOI's decision to use the lower estimated number is based on the theory that surveys for pinnipeds within the Beaufort Sea, and elsewhere, are based on on ice counts which will overestimate the number of potential exposures (i.e., only a portion of the animals are in the

water, and therefore, could be exposed). Spotted and bearded seals may be encountered in smaller numbers than ringed seals, but also have the potential to be exposed to drilling and associated vessel operation sounds.

Correction factors have been developed for most pinniped species that address biases associated with detectability and availability of a particular species. Although extensive surveys of ringed and bearded seals have been conducted in the Beaufort Sea, the majority of the surveys have been conducted over the landfast ice and few seal surveys have been in open water. The most comprehensive survey dataset on ringed seals (and bearded seal) from the central and eastern Beaufort Sea was conducted on offshore pack ice in late spring (Kingsley, 1986). It is important to note that all proposed activities will be conducted during the open-water season and density estimates used here were based on counts of seals on ice, which is the only time ringed seals are available for making practical population estimates. As a result, densities and potential take numbers will overestimate the numbers of seals that would likely be encountered and/or exposed because only the animals in the water would be exposed to the drilling sound sources. Although the estimated numbers of potential exposures presented in Table 1 are based on two sound source ranges (greater than 160 dB and greater than 170 dB re 1 microPa [rms]), for most pinnipeds, the 170 dB threshold should be used to determine "take by harassment" because this range is assumed to be the sound source level at which most pinnipeds may change their behavior in reaction to increased sound exposure.

**Table 1 Expected Densities of Marine Mammals**

Expected densities of marine mammals during open-water drilling program proposed for offshore areas of the Beaufort Sea.

Species	Average Density (#/km <sup>2</sup> ) <sup>1</sup>	Maximum Density (#/km <sup>2</sup> ) <sup>1</sup>
<b><i>Cetaceans</i></b>		
bowhead whale	0.0064	0.0256
gray whale	0.0001	.0004
beluga whale	0.0068	.0135
harbor porpoise	0.0000	.0002
<b><i>Pinnipeds</i></b>		
ringed seal	0.3547	.7094
spotted seal	0.0037	.0149
bearded seal	0.0181	.0362

1. These estimates are calculated from various sources including Moore et al. 2000b & c, Stirling et al. 1982, Kingsley 1986, and presented in LGL 2005, Table 4.

## Exposure Calculations for Bowhead Whales

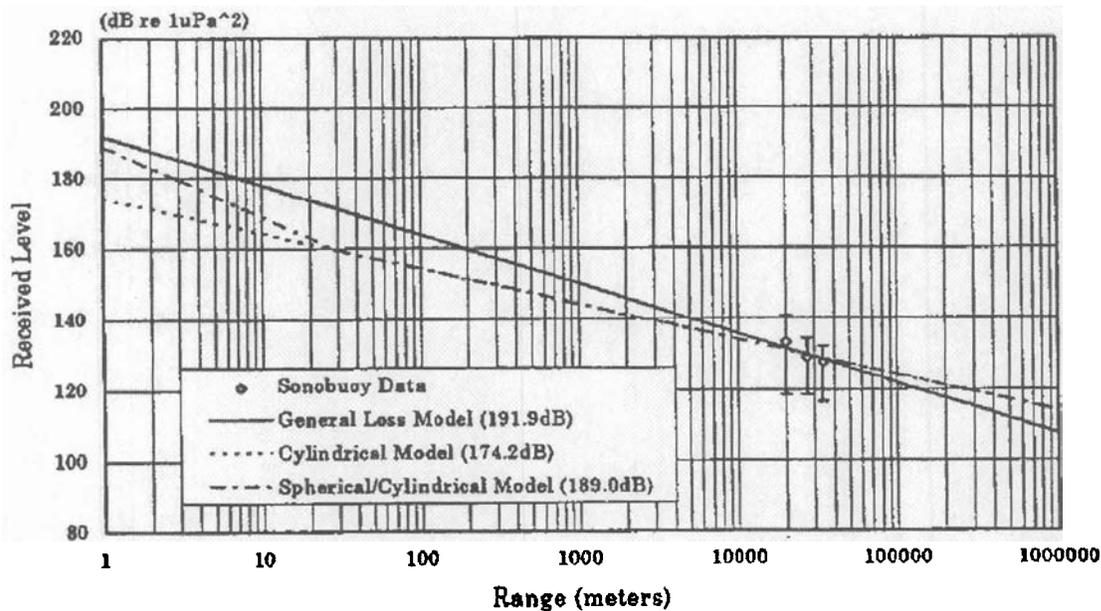
Estimation of exposures of bowhead whales to sound levels that may produce behavioral responses utilized a total population estimate of 12,888 individuals from Zeh and Punt (2005). Sound propagation estimates were derived for the 160 dB level by deriving the most conservative estimate of sound propagation of drilling related activities from LGL and Greenridge (1987) and Hall *et al.* (1994). These latter references also form the basis of similar estimates of sound propagation of drilling operations as reviewed by Richardson *et al.* (1995).

The proportion of bowhead whales that might occur within the area potentially ensonified by the 160 and 120 dB criterion were estimated from Richardson and Thomson (2002) in which average migrating distribution across the 0-20, 20-40, 40-200 and >200 meter isopleths are estimated to be 25, 27, 37, and 10 percent of the population respectively. As the majority of the operations related to the 2007 drilling program will occur within the 20-40 m depth isopleth, it is estimated that the average expected number of bowheads in this area would be  $0.27 \times 12,888$  or 3,480. As a conservative estimate of potential bowheads present the expected number was taken times two for a maximum estimate of 6,960 individuals.

No measured sound levels from either LGL and Greeneridge (1987) or Hall *et al.* (1994) exceeded 160 dB. Hall *et al.*, however, utilized measurements from sonobuoys deployed at distances of 20, 27, and 34 km from active drilling operations to estimate that combined activities including drilling, geotechnical boring, vessel transit, and ice management activities may reach 160 dB at a distance of 200 m from the source (see Figure1). Although no single source produced measured sound in excess of 160 dB, this 200 m distance was selected as a conservative estimate of potential sound propagation from drilling related sources. Although planned operating procedures will limit the number of sound sources that will be operating during any portion of the bowhead migration (e.g., spill response vessels will be on anchor and minimally active) the additional conservative assumption is made that 10 sources could simultaneously operate at a level to cumulatively produce 160 dB at 200 m. The total ensonified (at 160 dB) area under this scenario would be 2 km, or approximately 7 percent of the 29 km wide 20-40 m isopleth.

Seven percent of the bowhead whales present in the 20-40 m isopleth would be 244 as an average estimate and 488 as a maximum estimate for taking by Level B harassment (see Table 2).

## Sonobuoy Received Level, 20Hz-10kHz



**Figure 1. Measured and predicted distances of ensonification by combined drilling and support activities (from Hall *et al.* 1994).**

However, SOI states in its IHA application that there is an inconsistency when using a 120-dB criterion for intermittent noise between field observations of migrating bowhead avoidance behavior associated with sound measurements and sound measurements and modeling that is independent of whale observations. The majority of observations (in the Beaufort Sea) upon which the 120-dB criterion are based are derived from aerial monitoring programs around both drilling and seismic sources. Closest observed proximity of bowhead whales to operating drilling or icebreaking operations vary between 3 km (1.86 mi) (Hall *et al.*, 1994), 11 km (6.8 mi) (LGL & Greeneridge, 1987) and 19 km (11.8 mi) (Ljungblad *et al.*, 1987). SOI notes that there is some consistency, however, in estimating the distance of deflection from drilling/ice management activities being in the range of 10-20 km (6.2-12.4 mi) from the source. Sound measurements acquired in the proximity of observed whales tend to be approximately 120 dB leading to the conclusion that migrating bowheads tend to avoid sound levels in excess of 120 dB (Richardson *et al.*, 1995). Similar conclusions have been drawn from observations around operating seismic vessels (LGL, 2005).

Projection of sound propagation from measurements of sound around drilling operations and seismic operations and modeled sound propagation (Hall *et al.*, 1994) yielded estimations of the 120-dB isopleth well beyond the 20 km (12.4 mi) distance. For example, Hall *et al.* (1994) estimated the 120-dB isopleth for combined drilling/ice management operations to be in excess of 100 km (62 mi) from the source(s). While subsistence hunters report changes in migrating

bowhead whale behavior at distance as far as 35 mi (56 km) from operating seismic vessels, extrapolation of avoidance to greater distances is not generally reported.

For the purpose of estimation of relevant exposures for bowhead whales, a reasonably conservative distance of 30 km (18.6 mi) zone of potential exposure around drilling operations would produce exposures within the 0-20, 20-40, and 40-200 m (65.6 ft, 131 ft, 656 ft respectively) depth zones. As a result, it is possible that exposures to sound levels in excess of 120 dB could be experienced by as much as 65 percent of the population (8,378 individuals).

#### Exposure Calculations for Other Cetaceans and Pinnipeds.

For all other species, average expected abundance was estimated by multiplying the reported densities (Table 1) for each species times a potential operational area of 840 km<sup>2</sup>. Maximum expected abundances for all species were estimated by multiplying average expected abundance times two. Average and expected exposures were then calculated by multiplying the abundance times the expected portion of the operational area expected to be ensonified greater than 160 dB (i.e. 0.069). Average expected abundances for bowhead whales were derived from the Miller *et al.* (2002) feeding study in which total proportion of the population “moving through” was estimated for the depth isopleths in which drilling operations are expected to occur. The results for all species potentially affected are displayed in Table 2. No other cetacean or pinniped species are expected to occur within the eastern portion of the Beaufort Sea and are not included in this analysis because of the unlikely event of an encounter with them by the SOI drilling program.

**Table 2 Exposure Calculations for Cetaceans and Pinnipeds**

Estimates of possible numbers of marine mammals exposures to 160 dB during SOI's proposed drilling program in the Beaufort Sea.

	<b>Average Expected Abundance</b>	<b>Average Expected Exposures in 160 dB range</b>	<b>Maximum Expected Abundance</b>	<b>Maximum Expected Exposures in 160 dB range</b>
<b><i>Cetaceans</i></b>				
bowhead whales	3479.76	244	6959,52	488
gray whale	0.083916	1	0.335662	1
beluga	5.706262	1	11.32861	1
harbor porpoise		0	0.167831	1
<b><i>Pinnipeds</i></b>				
ringed seal	297.6487	21	595.2974	42
spotted seal	3.104878	1	12.50343	1
bearded seal	15.18873	2	30.37745	3

#### 4. Potential Effects of Drilling Sounds and Related Activities on Subsistence Needs

There could be an adverse impact on the Inupiat bowhead subsistence hunt if the whales were deflected seaward (further from shore) in the traditional hunting areas north of Pt. Thomson in Camden Bay. The impact would be that whaling crews may be forced to travel greater distances to intercept westward migrating whales thereby creating a safety hazard for whaling crews and/or limiting chances of successfully striking and landing bowheads. However, this potential impact could be mitigated by the application of mitigation procedures described later in this document and implemented by a Conflict Avoidance Agreement (CAA) between the SOI, the Alaska Eskimo Whaling Commission (AEWC) and the whaling captains' associations of Kaktovik, Nuiqsut and Barrow. NMFS believes that the mitigation measures addressed in a CAA or in the IHA (that are to ensure that there are no unmitigable adverse impacts on subsistence uses of marine mammals) will minimize adverse effects on whales and whalers to the greatest extent practicable and will, to the best of our knowledge, ensure that there is not an unmitigable adverse impact on subsistence uses of marine mammals, particularly bowhead whales for subsistence uses (see Mitigation later in this document).

## 5. Potential Impact On Marine Mammal Habitat

The proposed drilling and related activities will not result in any permanent impact on habitats used by marine mammals, or to their prey sources. Any effects would be temporary and of short duration at any one location. The effects of the planned drilling activities on habitat are not likely to be significant. It is estimated that only a small portion of the animals utilizing the areas of the proposed activities would be temporarily displaced from that habitat. During the period of drilling activities (late-July or early-August through October 2007 or 2008), most marine mammals would be dispersed throughout the Beaufort Sea area. The peak of the bowhead whale migration through the Beaufort Sea typically occurs in October, and efforts to reduce potential impacts during this time will be discussed with the affected whaling communities. Starting in late- August, bowheads may travel in proximity to the drilling activity and some might be displaced seaward by the planned activities. The numbers of cetaceans and pinnipeds subject to displacement are small in relation to abundance estimates for the affected mammal stocks.

In addition, feeding does not appear to be an important activity by bowheads migrating through the eastern and central part of the Alaskan Beaufort Sea in most years. In the absence of important feeding areas, the potential diversion of a small number of bowheads is not expected to have any significant or long-term consequences for individual bowheads or their population. Bowheads, gray, or beluga whales are not predicted to be excluded from any significant habitat.

The proposed activities are not expected to have any habitat-related effects that would produce long-term effects to marine mammals or their habitat due to the limited extent of the acquisition areas and timing of the activities.

## 6. Potential Impacts from an Oil Spill

MMS has evaluated the potential for an oil spill in the Multi-Sale Final EIS which NMFS incorporates by reference into this document at this location. A more detailed analysis for the Sivulliq location has been provided in the MMS Report: "*Oil Spill Risk Analysis: Sivulliq Exploration Project*," (OCS Report MMS 2007-039), which is incorporated by reference herein. Also incorporated by reference are the MMS LS 195, 202 and EP EAs which include robust analyses of the potential for oil spills, which found the chance of a large (>1,000 barrels) oil spill from exploratory activities to be very low. This conclusion was based on review of historic oil spill events, including blowouts. The MMS EAs found that no large oil spills occurred from 1971-2005 during OCS exploratory drilling and, during that period, only 4 exploration blow-out-related oil spills occurred from drilling 13,463 exploration wells. The MMS EAs show that the total volume of oil spilled from 35 exploratory wells drilled in the Beaufort and Chukchi seas OCS was 26.7 barrels and approximately 24 barrels were recovered or cleaned up. An independent study (Bercha Group, 2002, 2006) concludes that exploratory wells (such as SOI plans to drill) contribute a negligible portion to the chance of one or more large oil spills occurring during exploration, development, and production. This is consistent with the conclusion in MMS' EAs. Therefore, while NMFS recognizes that the impact on the Beaufort Sea environment, its marine mammal population and the subsistence uses of marine mammals would be significant especially if the oil reached the bowheads or other marine mammals, the

potential for a large oil spill to occur is highly unlikely. In the event that there was a small oil spill (or a large oil spill), SOI is required to utilize the best available technology to clean up any spilled oil.

In previous IHA/LOA applications, NMFS determined that a negligible impact determination may be appropriate if the probability of occurrence is low, but the potential effects may be significant (see 53 FR 8474, March 15, 1988). This policy is supported by following Congressional direction to balance the potential for a significant impact with the likelihood of that event occurring. The specific Congressional direction that justifies balancing probabilities with impacts states:

If potential effects of a specified activity are conjectural or speculative, a finding of negligible impact may be appropriate. A finding of negligible impact may also be appropriate if the probability of occurrence is low but the potential effects may be significant. In this case, the probability of occurrence of impacts must be balanced with the potential severity of harm to the species or stock when determining negligible impact. In applying this balancing test, the Service will thoroughly evaluate the risks involved and the potential impacts on marine mammal populations. Such determination will be made based on the best available scientific information." (132 Cong. Rec. S 16305 (Oct. 15, 1986)).

Because the analyses provided in the previously-mentioned NEPA documents indicate that the potential for an oil spill to occur during the effectiveness period of the proposed action (preferred alternative and Alternative 2) is low, the issuance of an IHA to SOI for this activity would not result in more than a negligible impact on marine mammal species and stocks or have an unmitigable adverse impact on subsistence uses of these marine mammals.

### 7. Cumulative Impacts in the U.S. Beaufort Sea

In addition to SOI's drilling program, as described in detail in SOI's EP and MMS' EA on SOI's EP and in summary form in this EA, NMFS anticipates several additional activities that might add to the potential impacts by SOI's exploratory drilling program. These include SOI's Beaufort Sea seismic survey program for 2007 and beyond, the Northstar oil production facility, nearby onshore exploratory oil drilling programs and the barge traffic that supplies these sites and local villages. A detailed description of the cumulative effects scenarios and analyses for the oil and gas industry and related activities in the U.S. Beaufort Sea are contained in MMS' Beaufort Sea multiple-sale EIS (USDOL, MMS, 2003). This information was updated in MMS EA's for Lease Sale 195 (USDOL, MMS, 2004) and updated again for Lease Sale 202 (USDOL, MMS, 2006). The information contained in these documents on this subject is incorporated herein by reference.

In addition to the above NEPA analyses, MMS and NMFS analyzed the potential impacts from several offshore activities, most importantly the potential impact of up to 4 seismic survey operations being conducted concurrently in the Beaufort and Chukchi seas during 2006. The seismic survey analysis is contained in the 2006 MMS PEA for Arctic Ocean Seismic Surveys.

In 2007, in response to a request for seismic survey IHAs, NMFS updated the cumulative impacts resulting from the actual seismic survey level of effort in 2007 with the cumulative impacts from all other potential activities. This assessment is contained in NMFS' Supplemental EA for Seismic Surveys (NMFS, 2007). The pertinent information contained in the S-EA follows.

NMFS considers the potential 2007 level of seismic survey and other oil and gas-related activities in the Chukchi Sea (i.e., one 3D deep seismic survey using streamers, 0 exploration activities, and 0 site clearance and shallow hazard surveys) to be substantially less than what was cumulatively analyzed in the 2006 PEA (i.e., 4 simultaneously-operating 2D/3D seismic surveys using streamers). This is further supported by a comprehensive analysis of the total 2006 Arctic activities, including the operation by 3 seismic activities (Shell, ConocoPhillips (CPAI) and GXTechnology). While the results are still being analyzed by NMFS, the AEWG, the North Slope Borough scientists and others, there does not appear to have been any significant adverse impacts by the 3 seismic vessels operating in 2006. For the most part, seismic survey operations were separated in both space (divided between the Canadian and U.S. Beaufort Seas and different areas of the Chukchi Sea) and time (Chukchi Sea: Shell July 29-September 19, CPAI July 29-Oct. 12 and GXT Oct. 16-Nov. 11). Therefore, no adverse cumulative impacts are expected to occur in the Chukchi Sea during the 2007 open water season.

Although seismic activity level in 2007 was significantly less than 2006, the analyzed 2007 cumulative seismic survey scenario in the Beaufort Sea is similar to what was analyzed in the 2006 PEA (see section III.C in the 2006 Final PEA). As mentioned, in the 2006 PEA, 4 simultaneously-operating seismic survey operations (which could be either a combination of 2D/3D seismic surveys using streamers, ocean-bottom cable 2D/3D seismic surveys, or high-resolution surveys) and other associated noise-generating activities were analyzed (see section III.H in the 2006 Final PEA). In 2007, as mentioned in III.A. in the Seismic S-EA (and incorporated by reference herein), 1 3D deep seismic survey and 1 high-resolution survey (i.e., site clearance and shallow hazard survey) will be conducted by SOI. The State of Alaska is also permitting 2 high-resolution surveys to work state waters near Pt. Thompson. The mitigation plan for SOI's exploratory operations took into consideration concurrent seismic survey operations in proximity to their exploratory operations. As each of the 3 hi-res surveys in 2007 will impact only small areas within about 1-2 km radius of the activity, and as only a single deep seismic survey vessel will be operating along with the two drilling ships on SOI's Sivulliq site analyzed in this EA, it is unlikely that a cumulative impact will result in 2007 or 2008. In addition, the mitigation measures identified in the 2006 PEA, in concert with MMS's mitigation measures for SOI's exploration operation, and the terms and conditions found in the signed CAA, are expected to reduce any potentially significant adverse effects to the human environment in general and to marine mammals in particular.

In 2006, the State of Alaska, Division of Oil and Gas conducted two lease sales in state waters of the Beaufort Sea. The Beaufort Sea Area-wide 2006 sale, conducted on March 1, 2006, sold 62 tracts totaling approximately 204 million acres. The Beaufort Sea Area-wide 2006A sale, conducted on October 25, 2006, sold 13 tracts totaling approximately 33 million acres. No State of Alaska lease sales are scheduled to occur in the Chukchi Sea, nor are any State deep seismic

survey permits scheduled to be issued for the Beaufort or Chukchi seas. However, the State has issued two 2007 permits for conducting geophysical technical surveys in State waters near Point Thompson (as mentioned). State mitigation measures and lessee advisories for the Beaufort Sea can be found at:

[http://www.dog.dnr.state.ak.us/oil/products/publications/beaufortsea/bsaw2006/bs\\_2006mits.pdf](http://www.dog.dnr.state.ak.us/oil/products/publications/beaufortsea/bsaw2006/bs_2006mits.pdf).

### C. Environmental Impacts Under Alternative 3

As mentioned under Alternative 2, the environmental impacts of various offshore oil and gas exploration activities, including the type of drilling activities proposed to be conducted by SOI in 2007, have been addressed in several documents prepared by MMS. These include the 2007 Environmental Assessment for SOI's Exploration Plan; the EA for Beaufort Sea Lease Sale 195, the EA for Beaufort Sea Lease Sale 202, and the 2003 Multi-Sale Environmental Impact Statement. The relevant information contained in each of these documents is incorporated by reference in this section of NMFS' EA. Information on the potential environmental consequences of SOI's proposed Beaufort Sea drilling program for 2007 remain as analyzed under Alternative 2, including reducing impacts by requiring mitigation measures described previously and in Section V.A.1. and V.A.2. which would be required under either Alternative 2 or 3. Selecting Alternative 3 would require SOI to also implement the mitigation measures described in Section V.C. As described in Section V.C. implementation of these additional mitigation measures will result in reduced adverse impacts on bowhead whales during a critical feeding and migration period.

## V. Mitigation, Monitoring and Reporting Measures

Under Alternatives 2 and 3, the following measures would be incorporated into the IHA to ensure that the taking of marine mammals will be small, have a negligible impact on marine mammals and not have an unmitigable adverse impact on subsistence uses of marine mammals. It will also result in a reduction of impacts on marine mammals. These measures are described next.

SOI has proposed in their 2007 IHA application that they would implement a marine mammal mitigation and monitoring program (4MP) to reduce potential adverse impacts to marine mammals, particularly endangered bowhead whales, during the exploratory drilling activities. For example, SOI has indicated that it would conduct vessel-, aerial-, and acoustic-monitoring programs for the drilling program. These measures are intended to characterize the sounds produced by the drilling operations and to document the potential reactions of marine mammals in the area to those sounds and activities. In conjunction with monitoring during SOI's seismic and shallow-hazard surveys, monitoring will provide information on the numbers of marine mammals potentially affected by these activities and permit real time mitigation to prevent injury of marine mammals by industrial sounds or activities. As described in more detail in the next sections, these goals will be accomplished by conducting vessel-, aerial-, and acoustic-monitoring programs to characterize the sounds produced by the drilling and to document the potential reactions of marine mammals in the area to those sounds and activities. Acoustic modeling will be used to predict the sound levels produced by the shallow hazards and drilling equipment in the U.S. Beaufort Sea. For the drilling program, acoustic measurements will also be made to establish zones of influence (ZOIs) around the activities that will be monitored by observers. Aerial monitoring and reconnaissance of marine mammals and recordings of ambient sound levels, vocalizations of marine mammals, and received levels should they be detectable using bottom-founded acoustic recorders along the Beaufort Sea coast will be used to interpret the reactions of marine mammals exposed to the activities. The components of SOI's monitoring program is briefly described next.

### A. Mitigation

#### *1. Mitigation Measures During Drilling Activities*

SOI's proposed offshore drilling program incorporates both design features and operational procedures to minimize potential impacts on marine mammals and on subsistence hunts. The design features and operational procedures are described in the IHA application and are summarized below. Survey design features to reduce impacts include: (1) timing and locating some drilling support activities to avoid interference with the annual fall bowhead whale hunts from Kaktovik, Nuiqsut (Cross Island), and Barrow; (2) conducting pre-season modeling and early season field assessments to establish the appropriate 180 dB and 190 dB safety zones (if necessary), and the 160 and 120 dB behavior radii; and (3) vessel-based (and aerial) monitoring to implement appropriate mitigation (and to assess the effects of project activities on marine mammals).

Based upon the findings of two workshops (HESS, 1998; Gentry, 1999), NMFS provides guidance for the establishment of "safety radii" for marine mammals around acoustic sources (which are customarily defined as the distances within which received pulse levels are  $\geq 180$  dB re 1 microPa (rms) for cetaceans and  $\geq 190$  dB re 1 microPa (rms) for pinnipeds. These safety criteria are based on an assumption that lower received levels will not injure these animals or impair their hearing abilities, but that higher received levels might have a potential for such effects. Mitigation measures discussed below would be implemented if marine mammals are observed within or about to enter these safety radii.

However, Greene (1987) reported SPLs ranging from 130-136 dB (rms) at 0.2 km (656 ft) from the *Kulluk* during drilling activities (drilling, tripping, and cleaning) in the Arctic. Higher received levels up to 148 dB (rms) were recorded for supply vessels that were underway and for icebreaking activities. However, apparently no recordings were made of sounds created by ice-management activities. As a result, SOI and NMFS believe that the exploratory drilling and the activities of the support vessels are not likely to produce sound levels sufficient to cause temporary hearing loss or permanent hearing damage to any marine mammals. Consequently, standard mitigation as described later in this document for seismic activities including shut down of any drilling activity should not be necessary (unless sound monitoring tests described elsewhere in this document indicate SPLs at or greater than 180 dB). If testing indicates SPLs will reach or exceed 180 dB or 190 dB, then appropriate mitigation measures would be implemented by SOI to avoid potential Level A harassment of cetaceans (at or above 180 dB) or pinnipeds (at or above 190 dB). Mitigation measures to prevent injury would likely include reducing drilling or ice management noises, whichever is appropriate. In addition, mitigation measures (such as reducing or temporarily ceasing certain activities (drilling or ice management activities)) to protect feeding and migrating balaenopterid species would also be required under Alternatives 2 and 3. SOI plans to use MMOs onboard the drill ships, the various support and supply vessels and aircraft to monitor marine mammals and their responses to industry activities. In addition, an acoustical program and an aerial survey program which are discussed in previous sections will be implemented to determine potential impacts of the drilling program on marine mammals.

## *2. Mitigation for Subsistence*

As part of its 2007 IHA application, SOI's submitted an Adaptive Management Plan to reduce potential impacts on subsistence uses of marine mammals. The AMP notes that normal drilling operations would be conducted pursuant to permits and authorizations from the USFWS, NMFS and MMS (Phase I). At the first sighting of bowhead whales at Kaktovik or north of Sivulliq (approximately 3-4 days prior to the beginning of the Cross Island bowhead hunt), SOI's drilling operation at Sivulliq will enter Phase II, a "high alert quiet mode," meaning that (1) all standard mitigation measures from phase I continues to apply; (2) minimize and/or stop marine re-supply or re-fueling, unless communicated and discussed with the AEWC; (3) maintain close communication with Kaktovik and Nuiqsut Whaling Captains Associations to monitor the hunt and migration; (4) at the request of the Nuiqsut Whaling Captains Association and/or discussion with AEWC during the Kaktovik hunt and the Cross Island hunt, ice management and other support vessels in the drilling area will take steps to reduce vessel noise provided such steps can

be taken safely; or the vessels may be moved out of the whale migration path, provided the vessels can be safely moved without endangering health and safety of operations; (5) oil response vessels will remain in area of the *Discoverer* and the *Kulluk* and take steps to reduce the noise emanating from the vessels provided such steps could be taken safely; and (6) during the Kaktovik hunt and the Cross Island hunt, respectively, the Shallow Hazards Vessel (*M/V Henry Christofferson*) and the Geotechnical Coring Vessels (*M/V Pisurayak Kootook* and the 1500-Series barge) will be safely relocated out of relevant hunting area(s); if there are no options for relocation due to conditions beyond SOI's control (i.e., ice conditions and/or weather), then other steps to reduce noise will be taken.

If the AEWG and Nuiqsut Whaling Captains Associations believe additional mitigation is necessary after implementing Phase II, SOI will continue mitigation from Phases I and II and, in addition, (1) shut-down activities to minimum services for safety and personnel, as follows: If the Nuiqsut Whaling Captains Association and the AEWG believe that SOI's activities are impacting the Cross Island hunt, SOI will shut-down all drilling activities at Sivulluq on September 10 for up to 10 days. Based on historical records, typical year for the Nuiqsut whale hunt runs between September 10-19, for a duration of 8-10 days. SOI, the Nuiqsut Whaling Captains Association, and the AEWG will cooperate to adjust this plan during the 2007 open water season. If heavy ice conditions require SOI to move the drilling rigs off location, the rigs will move to a mutually agreed safe location, in a direction away from the hunt.

*a. Plan of Cooperation (POC)*

As required by NMFS' application instructions (50 CFR 216.104), SOI noted in its 2007 IHA application that negotiations were initiated beginning September 2006 with the AEWG to create a drilling CAA between SOI, and the subsistence hunting communities of Barrow, Nuiqsut, and Kaktovik for the 2007 drilling program activities. The drilling CAA will cover both the Beaufort Sea exploratory and geotechnical drilling programs. SOI and other industry participant operators, with AEWG, will attend public meetings and meet with the whaling captains in the communities of Kaktovik, Nuiqsut, and Barrow between January 29-February 1, 2007. These meetings initiate information exchanges with the communities on the potential, proposed open water seismic and drilling programs for 2007. Additional engagements with AEWG and the whaling captains of Kaktovik, Nuiqsut, and Barrow will occur between these meetings and onset of open water activities planned to begin in June/July of 2007.

POC meetings occurred in Barrow and Nuiqsut on October 16 and 17, 2006, and follow-up meetings will be May or June 2007 in these communities. SOI conducted a meeting with the Kaktovik Inupiat Corporation in Kaktovik on November 28, 2006. SOI noted in the application that it will continue efforts with public and private organizations to hold additional meetings as needed in Kaktovik during 2007. In addition to public meetings with AEWG and the whaling captains during January and February, SOI will conduct additional POC meetings in Barrow, Kaktovik and Nuiqsut subsequent to finalization of the 4MP during May and/or June 2007. Following those meetings, on June 7, 2007 (updated version submitted on July 7, 2007), a POC report was prepared and submitted to NMFS, MMS and the USFWS. This POC describes in detail the meetings held with native communities and the results of suggestions and

recommendations made at the meeting.

*b. Conflict Avoidance Agreement (CAA)*

On July 24, 2007, Shell signed a CAA with the AEWC and the Whaling Captains' Associations of Nuiqsut and Kaktovik. As a result of the CAA, the *Kulluk* and *Discoverer*, and all support vessels and aircraft will operate in accordance with the conditions of this CAA. SOI notes that the CAA for SOI's drilling activity will incorporate all appropriate measures and procedures regarding the timing and areas of the operator's planned activities (i.e., times and places where effects of drilling operations will be monitored and prospectively mitigated to avoid potential conflicts with active subsistence whaling and sealing); communications system between operator's vessels and whaling and hunting crews (i.e., the communications centers will be located in strategic areas); provision for marine mammal observers/Inupiat communicators aboard all project vessels; conflict resolution procedures; and provisions for rendering emergency assistance to subsistence hunting crews. The CAA also provides guidance toward mitigating any potential adverse effects on the bowhead whale subsistence hunts.

B. Monitoring Program

*1. Underwater Acoustics Monitoring Program*

Sounds produced during the drilling operation and by the shallow hazards equipment and other support vessels will be measured in the field during typical operations. These measurements will be used to establish disturbance radii for marine mammal groups within the project area. The objectives of SOI's planned work are: (1) to measure the distances from the various sound sources to broadband received levels of 170, 160, and 120 dB rms re 1 microPa (sounds are not expected to reach 180 dB), and (2) to measure the radiated vessel sounds vs. distance for the source and support vessels. The measurements will be made at the beginning of the specific activity (i.e., shallow hazards survey activity and drilling activity) and all safety and disturbance radii will be reported within 72 hours of completing the measurements. For the drilling operation, a subsequent mid-season assessment will be conducted to measure sound propagation from combined drilling operations during "normal" operations. For drilling activities, the primary radii of concern will be the 160-dB disturbance radii (although measurements will be made to the 180-dB isopleth). In addition to reporting the radii of specific regulatory concern, distances to other sound isopleths down to 120 dB (if measurable) will be reported in increments of 10 dB. The distance at which received sound levels become  $\geq 120$  dB for continuous sound (which occurs during drilling activities as opposed to impulsive sound which occurs during seismic activities) is sometimes considered to be a zone of potential disturbance for some cetacean species by NMFS. SOI plans to use vessel-based marine mammal observers (MMOs) to monitor the 160-dB disturbance radii around the seismic sound sources and, if necessary, to implement mitigation measures for the 190- and 180-dB safety radii. The MMOs will also monitor the 120-dB zone around the drilling ships. An aerial survey program will be implemented to monitor the 120-dB zone around the drilling activities in the Beaufort Sea in 2007. These two monitoring and mitigation programs are discussed next.

SOI plans to use a qualified acoustical contractor to measure the sound propagation of the vessel-based drilling rigs during periods of drilling activity, and the drill ships and support vessels while they are underway at the start of the field season. Noise from ships with ice-breaking capabilities will be measured during periods of ice-breaking activity. These measurements will be used to determine the sound levels produced by various equipment and to establish any safety and disturbance radii if necessary. Bottom-founded hydrophones similar to those used in 2006 for measurements of vessel-based seismic sound propagation will likely be used to determine the levels of sound propagation from the drill rigs and associated vessels. An initial sound source analysis will be supplied to NMFS and the drilling operators within 72 hours of completion of the measurements, if possible. A detailed report on the methodology and results of these tests will be provided to NMFS as part of the 90 day report following completion of the drilling program.

SOI plans to develop an acoustic component of the MMMMP to further understand, define, and document sound characteristics and propagation within the broader Beaufort Sea and potential deflections of bowhead whales from anticipated migratory pathways in response to vessel-based drilling activities. Of particular interest for this investigatory component is the east-west extent of deflection (i.e., how far east of a sound source do bowheads begin to deflect and how far to the west beyond the sound source does deflection persist). Of additional interest is the extent of offshore deflection that occurs. Currently, insufficient information is available on how vessel-based drilling noise similar to that proposed by SOI in the Beaufort Sea in 2007 may impact migrating bowhead whales.

Miles *et al.* (1987) reported higher SPLs from ice-breakers underway in open water than from vessel-based drilling activity. SPLs from dredging activity, a working tug, and an icebreaker pushing ice were also greater than those produced by vessel-based drilling activity. However, sounds produced during drilling activity are relatively continuous while ice management vessel sounds are considered to be intermittent, and there is some concern that continuous and intermittent sounds may result in behavioral reactions (at least in mysticete whales) at a greater distance than impulse sound (i.e., seismic) of the same intensity.

Acoustic localization methods provide a possible alternative to aerial surveys for addressing these questions. As compared with aerial surveys, acoustic methods have the advantage of providing a vastly larger number of whale detections, and can operate day or night, independent of visibility, and to some degree independent of ice conditions and sea state—all of which prevent or impair aerial surveys. However, acoustic methods depend on the animals to call, and to some extent assume that calling rate is unaffected by exposure to industrial noise. Bowheads do call frequently in the fall, but there is some evidence that their calling rate may be reduced upon exposure to industrial sounds, complicating interpretation. Also, acoustic methods require development and deployment of instruments that are stationary (preferably mounted on the bottom) to record and localize the whale calls. According to SOI, acoustic methods would likely be more effective for studying impacts related to a stationary sound source, such as a drilling rig that is operating within a relatively localized area, than for a moving sound source such as that produced by a seismic source vessel.

In addition, SOI plans to conduct a study in 2007 and future years similar to the one conducted for

seismic in 2006 in the Chukchi Sea to determine the effect of drilling noise and noise from support vessels and seismic activities on migrating bowhead whales. An acoustic "net" array was used during the 2006 field season in the Chukchi Sea. It was designed to (1) collect information on the occurrence and distribution of beluga whales that may be available to subsistence hunters near villages located on the Chukchi Sea coast, and (2) measure the ambient noise levels near these villages and record received levels of sounds from seismic survey activities should they be detectable. The basic components of this effort consisted of bottom-founded equipment for long-duration passive acoustic recording. A suite of autonomous seafloor recorders was deployed in a "net" array extending from nearshore to approximately 50 miles offshore. During the 2007 drilling program, SOI proposes to deploy bottom-founded acoustic recorders around SOI's drilling activities that have the ability of recording calling whales. Figure 1 in SOI's IHA application shows potential locations of the bottom-founded recorders and an array layout in relation to the drilling site. The actual locations of the bottom-founded recorders will depend on specifications of recording equipment chosen for the project, and on the acoustical characteristics of the environment, which are yet to be determined. The results of these data will be used to determine the extent of deflection of migrating bowhead whales from the sound sources produced by the vessel-based drill rig.

## *2. Aerial Survey Monitoring Program*

SOI proposes to conduct an aerial survey program in support of its dual seismic exploration and drilling programs in the Beaufort Sea during summer and fall of 2007. The objectives of the aerial survey will be to: (1) advise operating vessels as to the presence of marine mammals in the general area of operations; (2) monitor the area east of the seismic activity to ensure that large numbers of bowhead mothers and calves do not enter the area where they would be ensonified by seismic sounds  $\geq 120$  dB re 1 microPa, which might displace them from feeding areas or their preferred migratory routes, (3) collect and report data on the distribution, numbers, movement and behavior of marine mammals near the seismic and drilling operations with special emphasis on migrating bowhead whales; (4) support regulatory reporting and Inupiat communications related to the estimation of impacts of seismic and drilling operations on marine mammals; (5) monitor the accessibility of bowhead whales to Inupiat hunters; and, (6) document how far west of seismic and drilling activities bowhead whales travel before they return to their normal migration paths, and if possible, to document how far east of seismic and drilling operations the deflection begins. For additional information on SOI's aerial survey design and other information, please refer to SOI's IHA application.

## *3. Vessel-based Marine Mammal Monitoring Program*

The vessel-based operations will be the core of SOI's MMMMP. The MMMMP will be designed to ensure that disturbance to marine mammals and subsistence hunts is minimized, that effects on marine mammals are documented, and to collect baseline data on the occurrence and distribution of marine mammals in the study area. Those objectives will be achieved, in part, through the vessel-based monitoring and mitigation program.

The MMMMP will be implemented by a team of experienced MMOs, including both biologists

and Inupiat personnel, approved in advance by NMFS. The MMOs will be stationed aboard the drilling vessels and associated support vessels throughout the drilling period. The duties of the MMOs will include watching for and identifying marine mammals; recording their numbers, distances, and reactions to the drilling operations; initiating mitigation measures when appropriate; and reporting the results. Reporting of the results of the vessel-based monitoring program will include the estimation of the number of "takes."

Drilling activities are expected to occur as early in the year (after July 15<sup>th</sup>) that ice allows vessel transit, but particularly during the months of August and October. The dates and operating areas will depend upon ice and weather conditions, along with SOI's arrangements with agencies and stakeholders. Vessel-based monitoring for marine mammals will be performed throughout the period of drilling operations. The vessel-based work will provide: (1) the basis for real-time mitigation, (2) information needed to estimate the "take" of marine mammals by harassment, which must be reported to NMFS and USFWS, (3) data on the occurrence, distribution, and activities of marine mammals in the areas where the drilling program is conducted, (4) information to compare the distances, distributions, behavior, and movements of marine mammals relative to the source vessels at times with and without drilling or ice-management activity, (5) a communication channel to Inupiat whalers and the Whaling Coordination Center, and (6) employment and capacity building for local residents, with one objective being to develop a larger pool of experienced Inupiat MMOs.

All MMOs will be provided training through a program approved by NMFS, as described later. At least one observer on each vessel will be an Inupiat who will have the additional responsibility of communicating with the Inupiat community and (during the whaling season) directly with Inupiat whalers. Details of the vessel-based marine mammal monitoring program are described in the IHA application.

### *3. Marine Mammal Observers*

The observer(s) (MMOs and Inupiat) will watch for marine mammals from the best available vantage point on the operating source vessel, which is usually the bridge or flying bridge. The observer(s) will scan systematically with the naked eye and 7×50 reticle binoculars, supplemented with night-vision equipment when needed (see below). Personnel on the bridge will assist the marine mammal observer(s) in watching for pinnipeds and whales. The observer(s) will give particular attention to the areas around the vessel. When a mammal sighting is made, the following information about the sighting will be recorded: (1) Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from seismic vessel, apparent reaction to seismic vessel (e.g., none, avoidance, approach, paralleling, etc.), closest point of approach, and behavioral pace; (2) time, location, heading, speed, and activity of the vessel, sea state, ice cover, visibility, and sun glare; (3) the positions of other vessel(s) in the vicinity of the source vessel. This information will be recorded by the MMOs at times of whale (but not seal) sightings.

The ship's position, heading, and speed, and water temperature, water depth, sea state, ice cover, visibility, and sun glare will also be recorded at the start and end of each observation watch, every

30 minutes during a watch, and whenever there is a change in any of those variables. Distances to nearby marine mammals will be estimated with binoculars containing a reticle to measure the vertical angle of the line of sight to the animal relative to the horizon. Observers may use a laser rangefinder to test and improve their abilities for visually estimating distances to objects in the water. However, previous experience showed that this Class 1 eye-safe device was not able to measure distances to seals more than about 70 m (230 ft) away. However, it was very useful in improving the distance estimation abilities of the observers at distances up to about 600 m (1968 ft)-the maximum range at which the device could measure distances to highly reflective objects such as other vessels. Experience indicates that humans observing objects of more-or-less known size via a standard observation protocol, in this case from a standard height above water, quickly become able to estimate distances within about plus or minus 20 percent when given immediate feedback about actual distances during training.

In addition to routine MMO duties, Inupiat observers will be encouraged to record comments about their observations into the "comment" field in the database. Copies of these records will be available to the Inupiat observers for reference if they wish to prepare a statement about their observations. If prepared, this statement would be included in the 90-day and final reports documenting the monitoring work.

### C. Additional Mitigation and Monitoring Measures

Under Alternative 3, additional mitigation and monitoring measures would be required to be fully implemented in addition to those measures described previously. NMFS proposes to incorporate these additional mitigation and monitoring measures into the IHA to ensure that impacts on marine mammals are at the lowest level practicable. The mitigation measures under Alternative 3 are described next.

Under this Alternative, the SOI IHA would require expanded monitoring-safety zones for bowhead and gray whales and having those zones monitored as effectively as possible. Monitoring can either be by support vessels or as part of the Beaufort Sea aerial monitoring program described previously, or both.

Specifically, for SOI's drilling program, NMFS would establish a monitoring-safety zone to a distance of 160 dB from the noise source (i.e., the drill ship or operating ice-breaker) as verified by the acoustic program from each drilling location to ensure that feeding bowhead and gray whales are not prohibited from accessing food resources in the vicinity of either drill rig. In addition, SOI would be required, as they have proposed, to implement the aerial monitoring program described in the 4MP part of its IHA application to ensure that migrating bowhead whales, particularly, cow/calf pairs are not being denied access to their westward migration route past the drilling location(s). For reasons described in detail in MMS' 2006 Final PEA for Arctic Seismic Surveys (which is incorporated by reference here), in order to reduce impacts to the lowest level practicable, NMFS would continue the same mitigation criteria as it had for the 2006 and 2007 Arctic seismic programs. These mitigation measures are limited to balaenopterid whales, scientifically supportable and practical to implement.

First, if an aggregation of 12 or more feeding, non-migratory, balaenopterid whales are sighted within an acoustically verified 160-dB rms zone of the vessel (except those whales that are west of or have already passed by) the drilling vessel, SOI would be required to lower its activity and noise level in the drilling area (e.g., by taking appropriate measures, including, but not limited to, temporarily reducing drilling or support vessel activity) to ensure that SPLs at the shortest distance to the aggregation do not exceed 160 dB rms. Once noise levels are reduced, aerial or vessel observers would monitor the whale aggregation(s). When the whale aggregation has moved outside or past the 160-dB zone, and it is determined that another aggregation is not likely to enter the zone before the next scheduled bowhead whale aerial survey overflight of the drilling site, SOI would be able to resume full activity level. If 12 or more balaenopterid whales remain within the 160-dB area for more than 24 hours, SOI could contact NMFS to review this IHA condition to determine if a temporary waiver of the condition is warranted. NMFS recognizes that preliminary monitoring information from a Canadian seismic survey in 2006 indicates that feeding, non-migratory, bowhead whales did not react to seismic noise of approximately 160 dB and is, therefore, concerned that a long-term occupation of the area may take place and SOI may be restricted from operating at full capacity for a lengthy period of time while the bowheads themselves may not show a significant behavioral response to the drilling/icebreaker sounds.

Second, if the aerial monitoring program detects 12 or more bowhead whales or 4 bowhead whale cow/calf pairs within an acoustically-verified 120-dB monitoring zone, SOI would be required to reduce its activity level in the drilling area (e.g., by taking appropriate measures, including, but not limited to, suspending drilling or support vessel activity) to ensure that the SPL at the closest aggregation of adult/juvenile bowhead whales or closest bowhead whale cow/calf pair is reduced by at least 50 percent. Once noise levels are reduced, aerial observations would monitor the aggregation(s) to ensure that noise levels from the drilling unit(s) and associated activities are not resulting in milling behavior and a cessation in migration (but not feeding). Because of the critical nature of the bowhead migration, SOI would not be authorized to resume normal activity levels until two consecutive aerial surveys (industry or government) confirmed that there are fewer than 12 migrating bowheads or 4 female/calf pairs within the upstream half of the 120-dB zone, and NMFS scientists have reviewed this data. Once the "aggregation" has moved past the activity area (outside the 120-dB zone) and another aggregation is not about to enter the upstream 120-dB zone prior to the next planned bowhead whale aerial survey, SOI would be authorized by NMFS to resume its activity.

NMFS considers the feeding, socializing and migration of bowhead whales during the fall westward migration to be critical for bowhead whale survival. The reason for the 120-dB-related conditions and the requirement for two aerial surveys is that preliminary information from a Canadian seismic survey in 2006 indicates that a tagged bowhead whale migrating westward ceased its migration until the seismic survey ended. If this reaction by a noise event resulted in this bowhead whale's unwillingness to continue to migrate because of seismic noise, does that relate to the larger population migrating in a group and would it also apply to drilling sounds? This is of concern to NMFS and as a result, believes this mitigation measure should be implemented to ensure that the migration is not significantly affected.

#### D. Reporting Measures

Under both Alternatives 2 and 3, the following reporting requirements would be undertaken.

The results of the 2007 SOI vessel-based monitoring, including estimates of take by harassment, will be presented in the "90 day" and final comprehensive technical report required by NMFS under SOI's IHA. The 90-day report will include: (1) summaries of monitoring effort: total hours, total distances, and distribution through study period, sea state, and other factors affecting visibility and detectability of marine mammals; (2) analyses of the effects of various factors influencing detectability of marine mammals: sea state, number of observers, and fog/glare; (3) species composition, occurrence, and distribution of marine mammal sightings including date, water depth, numbers, age/size/gender categories, group sizes, and ice cover; (4) sighting rates of marine mammals versus operational state (and other variables that could affect detectability); (5) initial sighting distances versus operational state; (6) closest point of approach versus operational state; (7) observed behaviors and types of movements versus operational state; (8) numbers of sightings/individuals seen versus operational state; (9) distribution around the drilling vessel and support vessels versus operational state; and (10) estimates of take based on (a) numbers of marine mammals directly seen within the relevant zones of influence (160 dB, 180 dB, 190 dB (if SPLs of that level are measured)), and (b) numbers of marine mammals estimated to be there based on sighting density during daytime hours with acceptable sightability conditions.

Following the 2007 open water seasons, a comprehensive report describing the proposed acoustic, vessel-based, and aerial monitoring programs will be prepared. The comprehensive report will describe the methods, results, conclusions and limitations of each of the individual data sets in detail. The report will also integrate (to the extent possible) the studies into a broad based assessment of industry activities and their impacts on marine mammals in the Beaufort Sea during 2007. The report will form the basis for future monitoring efforts and will establish long term data sets to help evaluate changes in the Beaufort Sea ecosystem. The report will also incorporate studies being conducted in the Chukchi Sea and will attempt to provide a regional synthesis of available data on industry activity in offshore areas of northern Alaska that may influence marine mammal density, distribution and behavior.

This comprehensive report will consider data from many different sources including two relatively different types of aerial surveys; several types of acoustic systems for data collection (net array, passive acoustic monitoring, vertical array, and other acoustical monitoring systems that might be deployed), and vessel based observations. Collection of comparable data across the wide array of programs will help with the synthesis of information. However, interpretation of broad patterns in data from a single year is inherently limited. Much of the 2007 data will be used to assess the efficacy of the various data collection methods and to establish protocols that will provide a basis for integration of the data sets over a period of years.

## **VI. Other Applicable Law**

Section 7 (16 U.S.C. § 1536) of the Endangered Species Act (ESA) states that all Federal agencies shall, in consultation with and with the assistance of the Secretary of the Interior/Commerce (Secretary), ensure that any actions authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species.

Under section 7 of the ESA, NMFS completed consultation with the MMS on the effects of exploratory oil and gas activities on the outer continental shelves of the Chukchi and Beaufort Seas. In a Biological Opinion issued on June 16, 2006, NMFS concluded that this activity and the issuance of the associated IHAs for oil and gas exploration by NMFS are not likely to jeopardize the continued existence of threatened or endangered species (specifically the bowhead whale) under the jurisdiction of NMFS or destroy or adversely modify any designated critical habitat. The 2006 Arctic Region Biological Opinion (ARBO) takes into consideration those oil and gas related exploratory activities that are reasonably likely to occur, based on scenarios developed by MMS.

NMFS has determined that the findings in the 2006 ARBO are relevant to the 2007 open water seasons. NMFS plans to issue an Incidental Take Statement under this Biological Opinion which contains reasonable and prudent measures (RPM) with implementing terms and conditions to minimize the effects of this take. Through the RPMs, NMFS is able to achieve project-specific measures under the programmatic ARBO. As noted, NMFS has made the necessary determinations under the ESA regarding the incidental harassment of marine mammals by SOI while it is conducting activities permitted under MMS' jurisdiction.

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## **VIII. List of Preparers**

National Oceanic and Atmospheric Administration - NOAA Fisheries Service

Ken Hollingshead

Fishery Biologist

**Finding of No Significant Impact  
for the  
Issuance of an Incidental Harassment Authorization to Shell Offshore, Inc. to Take Marine  
Mammals Incidental to Conducting an Offshore Drilling Program in the Beaufort Sea off  
Alaska**

Background: The National Marine Fisheries Service (NMFS) is in receipt of an application from Shell Offshore Inc. (SOI) for an Incidental Harassment Authorization (IHA) to take marine mammals incidental to conducting an offshore drilling program in the U.S. Beaufort Sea off Alaska. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS shall authorize the taking by harassment of small numbers of marine mammals of a species or population stocks incidental to an otherwise lawful activity (other than commercial fishing), provided that NMFS determines that the specified activity (in this case an offshore drilling project) will (1) have a negligible impact on the affected species or stocks of marine mammals; (2) not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses and (3) that the permissible methods of taking by harassment and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has made such a determination in its authorization for the taking of marine mammals by harassment incidental to oil-and-gas exploratory drilling by SOI in 2007 in the Beaufort Sea off Alaska.

NMFS Determinations: Based on the information contained in its Final EA on this action, an examination of the potential impacts associated with the proposed drilling activity, the alternatives to that activity, and a review of comments received from the public and federal agencies, NMFS has selected Alternative 3 (*SOI's Proposed Action as Described in their 2007 IHA Drilling Application, Including Additional Mitigation and Monitoring Measures*), outlined in the Final EA, as its Preferred Alternative. NMFS developed additional mitigation and monitoring measures and analyzed the measures within the Final EA to further reduce the level of any potential adverse effects. The vessel and aerial monitoring component of the mitigation package was proposed by SOI and contained in their IHA application. These mitigation and monitoring measures have become part of NMFS' Preferred Alternative and were analyzed by NMFS as part of the specified activity. The suite of mitigation measures, described in Section V.A and V.C. of the Final EA, will be implemented as requirements in SOI's 2007 IHA for its offshore open-water drilling program. By incorporating these additional mitigation measures into the Preferred Alternative and designating them as IHA conditions, NMFS has determined that no significant impacts on the human environment would occur from implementing the Preferred Alternative.

In addition, SOI signed a Conflict Avoidance Agreement (CAA) with the Alaska Eskimo Whaling Commission (AEWC) and the affected villages' Whaling Captains Associations on July 24, 2007. The purpose of the CAA is to ensure that no unmitigable adverse impacts on subsistence uses of marine mammals would occur as a result of SOI's activities. NMFS will require SOI to abide by the terms of the CAA as part of its authorization to take marine mammals. These measures include a prohibition on conducting oil drilling activities during the

fall bowhead whale hunting season in the U.S. Beaufort Sea, dispute resolution, and emergency assistance to whalers at sea. Implementation of these measures ensures that there will not be significant social or economic impacts on the coastal inhabitants of the Beaufort Sea or have an unmitigable adverse impact of the subsistence uses of marine mammals.

#### Significance Review:

National Oceanic and Atmospheric Administration Administrative Order 216-6 (NAO 216-6) (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of “context” and “intensity.” Each criterion listed below is relevant in making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ’s context and intensity criteria. These include:

B1. Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson-Stevens Act and identified in FMPs? The NMFS action (*i.e.*, issuing an IHA to SOI) will not have a substantial impact on the Arctic Ocean or its resources. The eastern U.S. Beaufort Sea area has not been identified as containing EFH. While drilling vessels and support vessels will transit the Chukchi Sea, where EFH has been identified and described for 5 species of Pacific salmon (pink (humpback), chum (dog), sockeye (red), chinook (king), and coho (silver)) occurring in Alaska, the issuance of an IHA for SOI’s drilling program in 2007 is not anticipated to have any adverse effects on EFH. In addition, due to the remote chance for an oil spill by SOI’s drilling program in 2007, and the relatively short time period the activity will remain on-site, impacts on benthic resources will be of short-duration and not significant. Also, relatively short-term exposure to drilling vessel, icebreaker noise, and related sounds are unlikely to have an impact on benthic marine life, because most benthic species do not contain internal organs subject to damage by low noise levels. The NMFS Final EA indicates that impacts, if they were to occur, would add only a minor incremental degree of adverse impacts to living marine resources; these impacts would not be significant.

Therefore, issuance of an IHA for SOI’s Beaufort Sea drilling program in 2007 is not anticipated to have any adverse effects on EFH. Consultation with NMFS has been concluded indicating that there will not be an adverse effect on EFH.

B.2. Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc)? As the zone for potential acoustic injury is less than 10 m (33 ft) around the drilling vessel/icebreaker activity area, and the fact that most invertebrate marine life do not contain organs subject to injury by underwater sounds, NMFS believes that there will not be a substantial impact on marine life biodiversity or on the normal functioning of the nearshore or offshore Beaufort Sea ecosystem. Organisms with organs subject to injury by underwater sounds

(e.g., fish) may be affected by (1) injury or mortality if within close proximity to the drilling vessel, (2) dispersal into nearby areas if the sounds are annoying to them, and/or (3) behavior modification resulting in reduced availability to fishermen. Most effects however, are considered to be short-term and unlikely to affect normal ecosystem function or predator/prey relationships.

B.3. Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety? The proposed action of issuing an IHA to SOI for this activity will not have a substantial adverse impact on public health or safety. Oil spills (which is not authorized by the IHA, making it a prohibited action if one should occur) are highly unlikely (See criterion B.6.) and mitigation measures have been established to ensure that one does not occur, and if one did occur, that it can be cleaned up quickly. As described in criterion B.5., mitigation measures imposed by NMFS will prohibit SOI from conducting the activity when North Slope Borough subsistence whalers are hunting bowhead whales, thereby minimizing the risk to them.

B.4. Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species? This action may adversely affect, but will not jeopardize the continued existence of, species listed under the Endangered Species Act (ESA). The ESA-listed species that might be affected by this action is the bowhead whale.

For bowhead whales, adverse effects will be limited to short-term behavioral disturbances that may constitute Level B behavioral harassment under the MMPA. No injury or mortality is expected because bowhead whales are likely to avoid active drilling activities by 20 km (12.4 mi) or more and other marine mammals likely taking similar actions to avoid the proximity of drilling vessels and the resultant noise. NMFS' Arctic Regional Biological Opinion includes this action and supports this determination. Impacts to marine mammals, if any, are expected to be limited to short-term behavioral harassment. This action has been determined to be consistent with determinations made under section 101(a)(5)(D) of the MMPA as the taking of marine mammals by oil drilling activities in the Beaufort Sea will have a negligible impact on affected species and be at the lowest level practicable through implementation of mitigation and monitoring measures.

To minimize the potential for significant impacts during periods of biologically important behavior of the bowhead and gray whales, additional mitigation measures will be required. The monitoring measures were proposed by SOI and include: (1) Implementing a 120-dB monitoring-safety zone for concentrations of migrating bowhead cow/calf pairs in the U.S. Beaufort Sea and a 160-dB monitoring-safety zone for feeding concentrations of bowhead and gray whales in the Beaufort Sea; (2) conducting dedicated aerial and vessel surveys of the 120-dB monitoring-safety zone in the Beaufort Sea, and (3) conducting aerial and vessel surveys in the Beaufort Sea for feeding concentrations of bowhead and gray whales in the 160-dB monitoring-safety zone. Under the IHA, detection of aggregations of migrating bowhead whales, especially cow/calf pairs and concentrated feeding areas for bowheads and gray whales will require SOI to reduce its activity level in the drilling area (e.g., by temporarily ceasing drilling or

support vessel activity) to ensure that the SPL at the closest aggregation of adult/juvenile bowhead whales or closest bowhead whale cow/calf pair are reduced (as stipulated in the IHA) until the identified aggregation is no longer within the designated monitoring-safety zone.

NMFS is requiring SOI to conduct aerial and vessel surveys in the Beaufort Sea during the fall migration period because (1) NMFS has been informed that it is relatively safe to conduct aerial monitoring in the Beaufort (e.g., there is a number of available landing areas along the Beaufort Sea coast; and there is a history of annual bowhead aerial surveys that have been conducted successfully by MMS and industry over the past 20 years), (2) this monitoring activity was proposed by SOI in its 2007 IHA application, (3) it is required in the CAA signed by SOI with the AEWC and affected villages' Whaling Captains' Associations, on July 24, 2007, and (4) from a biological perspective, the aerial monitoring would help ensure that bowhead whale fall feeding and migration activities are not adversely affected by drilling operations. One of the objectives of SOI's aerial monitoring program is to notify SOI and NMFS of the presence of marine mammals in the general area of operations and to implement mitigation measures, such as reducing its activity level in the drilling area (e.g., by temporarily ceasing drilling or support vessel activity) if 12 or more bowhead whales or more than 4 bowhead whale cow/calf pairs are sighted within the 120-dB isopleth of the drilling and support vessels during the aerial survey or if 12 or more bowheads or gray whales are seen feeding within the 160-dB isopleth of the drilling operation. NMFS is requiring this mitigation measure to ensure that bowhead whales are not significantly impacted by the drilling activity such that they either remain east of the activity area (e.g., Sivulluq) (as noticed during a 2006 seismic survey in the Canadian Beaufort Sea), or migrate significantly north of the normal migratory route in order to avoid the drilling noises.

B.5. Are significant social or economic impacts interrelated with natural or physical environmental effects? Other than potential impacts to native subsistence needs and culture, this action will not have a significant social or economic impact as there are no commercial fishing or other activities that might be affected by offshore exploratory drilling for oil and gas deposits. Marine mammals are legally hunted in Alaskan waters by coastal Alaska Natives. The species hunted include bowhead and beluga whales; ringed, spotted, and bearded seals, walruses, and polar bears. The importance of each of the various species varies among the communities and is based largely on availability. Bowhead whales and belugas are the two marine mammal species primarily harvested during the time of the proposed drilling program. Bowhead whale hunting is the key activity in the subsistence economies of Barrow, Nuiqsut and Kaktovik. The whale harvests have a great influence on social relations by strengthening the sense of Inupiat culture and heritage in addition to reinforcing family and community ties. Because seals (ringed, spotted, bearded) are hunted in near-shore waters and the offshore drilling activity will remain offshore of the coastal and near-shore areas of these seals, activities related to oil drilling should not conflict with harvest activities.

To avoid having an unmitigable adverse impact on subsistence uses of marine mammals, NMFS is required to implement mitigation measures to ensure that SOI's drilling activities do not have an unmitigable adverse impact on subsistence uses of marine mammals. However, because SOI signed the 2007 CAA with the AEWC and the affected villages' Whaling Captains Association,

NMFS has determined that there will not be an adverse impact on the species or stocks of marine mammals for subsistence uses. These mitigation measures include a prohibition on conducting offshore drilling operations after August 25 and moving all vessels offshore and away from the migration corridor during the fall bowhead whale hunting season in the Beaufort Sea, dispute resolution and emergency assistance to whalers at sea. Implementation of these measures helps ensure that there will not be significant social or economic impacts on the coastal inhabitants of the Beaufort Sea.

B.6. Are the effects on the quality of the human environment likely to be highly controversial?

There is a lack of agreement and some controversy within the scientific and stakeholder communities about the potential effects of noise on marine mammals, including in this instance, bowhead whales. This was demonstrated recently by the National Research Council (NRC, 20005) report and by the lack of consensus among participants in the Marine Mammal Commission's Sound Advisory Panel (MMS, 2006). NMFS believes that the analyses in the EA are cautious in that NMFS attempted to err on the side of overestimating potential effects, and then built in mitigation measures to reduce such potential effects. While any maritime noise issue can be considered controversial because of several marine mammal stranding incidents allegedly due to military sonar, in reviewing concerns raised regarding potential impacts of noise on marine mammals, particularly bowheads and beluga whales (which are addressed in NMFS' IHA determination) by SOI's Beaufort Sea activities, comments raised during the review of SOI's IHA application focused mainly on: (1) requirements under the MMPA, NEPA and ESA; (2) impacts of noise and potential oil spills on marine mammals and the subsistence lifestyle of impacted villages; and (3) the mitigation and monitoring measures proposed by SOI and NMFS. In reviewing these concerns (which are addressed in NMFS' final IHA determination), NMFS believes that its actions are in full compliance with NEPA, the MMPA, the ESA and other statutes. As noted elsewhere in this Statement, NMFS is requiring, as proposed by SOI, a detailed mitigation and monitoring program designed to reduce impacts on affected marine mammal stocks to the lowest level practicable. In addition, the oil industry will implement for the second year, a research program to address the status of Arctic Ocean marine mammal populations.

In 2006, industry concerns focused on the practicability of implementing some of the mitigation measures that NMFS is requiring this year under SOI's IHA for drilling, and the transfer of these mitigation measures to other areas of the world where oil and gas exploration occurs. These concerns were addressed in the IHA supporting documentation indicating that all IHAs are reviewed independently based upon the marine mammal species affected, the level of impact, and mitigation and monitoring measures required to reduce those impacts to the lowest level practicable and whether the activity would have an unmitigable adverse impact on subsistence uses of marine mammals.

There is also a lack of agreement and some controversy within the scientific and stakeholder communities about the potential for an oil spill to occur in the Beaufort Sea as a result of SOI's 2007 drilling program, the size of that potential oil spill, and the potential for the spilled oil to impact marine mammals and other marine life. MMS evaluated the potential for an oil spill in

the Multi-Sale Final EIS which NMFS incorporates by reference into its Final EA. The MMS EAs for Lease Sale (LS) 195, LS 202 and the SOI EP include robust analyses of the potential for oil spills. These documents found the chance of a large ( $\geq 1,000$  barrels) oil spill from exploratory activities to be very low. This conclusion was based on review of historic oil spill events, including blowouts. The MMS EA found that no large oil spills occurred from 1971-2005 during OCS exploratory drilling and, during that period, only 4 exploration blow-out-related oil spills occurred from drilling 13,463 exploration wells. The MMS EAs show that the total volume of oil spilled from 35 exploratory wells drilled in the Beaufort and Chukchi seas OCS was 26.7 barrels and approximately 24 barrels were recovered or cleaned up. An independent study (Bercha Group, 2002, 2006) concludes that exploratory wells (such as SOI plans to drill) contribute a negligible portion to the chance of one or more large oil spills occurring during exploration, development, and production. This is consistent with the conclusion in MMS' EA. No information was provided to NMFS during its comment period on SOI's IHA or to MMS on SOI's EP, on a different oil spill analysis and simply questioned the MMS oil spill analysis provided in its Multi-Sale EIS. Therefore, while NMFS recognizes that the impact of a large oil spill on the Beaufort Sea environment, its marine mammal population and the subsistence uses of marine mammals could be significant, the potential for a large oil spill to occur is highly unlikely. In the event that there was a small oil spill (or a large oil spill), SOI is utilizing the best available technology to clean up any spilled oil.

Finally, Inupiat concerns on the potential impact on their traditional lifestyle have been addressed through both the mitigation and monitoring measures in the IHA and the signed 2007 CAA. As a result, SOI will avoid significant cultural impacts. Little additional information on the scientific basis for NMFS' determinations has been provided by the public. Also, NMFS continues to make its determinations under the MMPA based on the best available science. As a result, while certain segments of the public continue to believe that offshore oil and gas exploration in U.S. waters is controversial, NMFS does not believe the activity proposed in the Arctic Ocean in 2007 is highly controversial.

B.7. Can the proposed action reasonably be expected to result in substantial impacts to unique area, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas? Detailed information about the affected environment, bowhead whales, other marine mammals, and marine life are provided in the MMS' 2006 Programmatic Environmental Assessment for Seismic Surveys (P-EA), MMS' 2007 EA for SOI's Exploration Plan, MMS' Beaufort Sea Lease Sale 195 EA, MMS' Beaufort Sea Lease Sale 202 EA and MMS' 2003 Final Environmental Impact Statement for Beaufort Sea Planning Area Oil and Gas Lease Sales 186, 195, and 202. NMFS has incorporated relevant information from these documents by reference into its EA on SOI's drilling activity. The original affected environment in which this activity could have occurred included areas within the spring migratory pathway of the bowhead whale in the Chukchi and Beaufort seas (as the icebreakers moved and towed the drill ships); bowhead calving areas; the fall migratory pathway of the bowhead; and spring, summer, and fall bowhead feeding grounds. Mating can occur within the Beaufort Sea, but most mating is thought to occur in the Bering Sea. NMFS has undertaken measures to substantially reduce the potential for significant effects on bowhead

calving by building into the base action a ban on moving drill ships and icebreakers during the spring bowhead migration period. As a result, icebreakers and drill ships are not authorized to transit the spring lead system before July 1<sup>st</sup>. While some calving may occur after this date, available data indicates that most of the calving has occurred before that time. This prohibition on vessel movement also should significantly reduce the possibility of dispersal or disruption of whales that are feeding within the spring lead system in the Chukchi Sea.

Thus, because of the bowhead migration, the spring lead system within the Chukchi Sea until July 1<sup>st</sup> is removed from the affected environment in which this action could now occur. Where data are available and sufficient, NMFS has attempted to identify other areas where aggregations of bowheads are known to occur and where feeding or migratory aggregations repeatedly have been observed (e.g., Smith Bay in the Beaufort Sea for feeding; nearshore habitat in the Beaufort Sea for migration). NMFS has summarized information that is available about the timing of habitat use. Where analyses identified areas where effects to bowheads potentially could be reduced, NMFS has identified monitoring and mitigation measures to reduce the potential for such impacts to the lowest level practicable. Such mitigation includes prohibiting in the Beaufort Sea, the generation of high noise levels from drilling operations when aggregations of 12 or more migrating bowheads or 4 or more cow/calf pairs are detected visually or when feeding aggregations of bowhead or gray whales are sighted.

B.8. Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks? As discussed in the previously cited adopted NEPA documents, and incorporated by reference in this Final EA, there is a degree of uncertainty concerning the following issues: bowhead whale use of the Beaufort Sea for feeding during the summer before September 1; the importance of feeding areas within the Alaska Beaufort Sea, especially the western Alaskan Beaufort Sea, to the bowhead population as a whole and, more specifically, to certain segments of the population; the importance of the areas to segments of the population and to the population as a whole during years when large aggregations are observed feeding; the potential effects of such disturbance to the health of females and young calves and to the next year's reproductive potential of adult females; the effects of sound on the hearing of very young calves; and the factors causing interannual variability in the use of the Beaufort Sea for feeding by bowheads. In the Final PEA analyses (incorporated by reference in this EA), NMFS acknowledged this uncertainty and, where it exists, NMFS has designed appropriate and practicable mitigation measures aimed at reducing this uncertainty and to reduce the potential for adverse effects on bowhead whales, especially cow/calf pairs. In the Final PEA (and by reference this EA), NMFS reviewed this information and stated that imposition of these additional mitigation and monitoring measures should resolve uncertainty and further reduce the level of any potential impacts on marine mammal species, particularly the bowhead whale, and any other marine biological resources. As a result, monitoring of the 120-dB and 160-dB zones in the Beaufort Sea will be implemented as it is a part of SOI's submitted monitoring plan, it is required by the signed CAA, and it is practicable to do so.

B.9. Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts? There are other oil and gas exploratory and production

activities in Alaskan waters and around the world that may result in the harassment, injury or mortality of marine mammals, but most are dispersed both geographically and temporally (Gulf of Mexico, North Sea, West Africa) and may affect different marine mammal stocks, than the ones impacted in the Beaufort Sea. Oil exploration activities are relatively short-term in nature, and all either currently use, or will likely use in the future, standard mitigation and monitoring measures to minimize impacts to marine life from high noise levels. When in U.S. waters, these activities (most of which are subject to NEPA or State review) are temporally dispersed, relatively short-term (except for the Northstar oil production facility) and use appropriate mitigation designed to reduce impacts on the marine environment to the lowest level practicable. In 2007, SOI will have the only offshore oil exploration activity in the U.S. Beaufort Sea. Using up to two drilling vessels and support vessels (including ice management vessels), SOI plans to conduct an oil drilling project at the Sivulliq prospect, located in Camden Bay in the U.S. Beaufort Sea. Although currently under a court-ordered Stay which prohibits any oil exploration by SOI in this area, if this project takes place in 2007, it will have mitigation measures imposed by the CAA and IHA (such as a prohibition of drilling activities during the fall bowhead migration) that will ensure that impacts on marine mammals (particularly the endangered bowhead whale) are negligible and that the oil exploration project is not having an unmitigable adverse impact on subsistence uses of marine mammals. Within the Beaufort and Chukchi seas there are other activities, such as oil-and-gas exploration and production and scientific seismic activities (in 2007, the *USCG Cutter Healy* is conducting bathymetric multi-beam sonar surveys for NOAA approximately 200 miles north of Barrow). In addition to site clearance and shallow hazard surveys of potential exploratory drilling locations within SOI's lease areas in the Beaufort Sea, SOI is also conducting deep seismic surveys. Finally, this area is not known for heavy ship traffic, mostly being barge traffic to supply villages and onshore and offshore oil facilities. Thus, as all activities in the U.S. Beaufort Sea (other than village barging activities) are under IHAs reducing impacts to the lowest level practicable through mitigation measures tailored to the specific activity, NMFS believes that the cumulative effect of SOI's drilling program (assuming the court-ordered Stay is lifted), in combination with SOI's deep and shallow seismic survey program and other nearby projects (e.g., Northstar, barging) will not result in significant cumulative impacts on the human environment.

B.10. Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources? The action proposed by NMFS will have some potential to adversely affect native cultural resources along the Arctic Coast. As described in criterion B.5, implementation of mitigation measures in the IHA issued to SOI and under the signed CAA between industry and the native whaling communities ensures that there will not be a significant social or economic impacts on the coastal inhabitants of the Beaufort and Chukchi seas nor an unmitigable adverse impact of the subsistence uses of marine mammals by these residents.

B.11. Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species. Issuance of an IHA to SOI for the taking of marine mammals incidental to conducting an exploratory drilling program in 2007 does not involve the introduction or

removal of any species. Therefore, it will not result in the introduction or spread of a nonindigenous species.

B.12. Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration? This action will not set a precedent for future actions with significant effects or represent a decision in principle. NMFS' actions under section 101(a)(5)(D) of the MMPA must be based on the best available information, which is continuously evolving. Moreover, each action for which an incidental take authorization is sought must be considered in light of the specific circumstances surrounding the action. Mitigation and monitoring vary depending on those circumstances and have been evolving for Beaufort Sea offshore oil exploration since 1990, when authorizations under section 101(a)(5)(A) of the MMPA were first issued. Regarding bowhead whales, there is extensive history and regulatory and procedural structure to evaluate the effects of noise on bowhead whales and other marine mammal species. For these reasons, NMFS does not believe that issuance of an IHA for offshore drilling activities in the Beaufort Sea in 2007 is precedent setting.

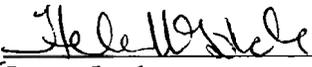
B.13. Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment? If offshore oil drilling were conducted without authorizations under the MMPA, violations of the MMPA and the ESA could result. However, MMS permit stipulations require that operators obtain an MMPA authorization prior to commencement of offshore drilling activity. For this reason, this action does not threaten a violation of any such laws or requirements. Moreover, all other applicable law has been complied with as it relates to issuance of the IHA.

B.14. Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species? This action will not target any marine species, but may affect certain non-target species, such as cetaceans and pinnipeds in the area, particularly bowhead and gray whales. In regard to cumulative effects, with a single seismic vessel operating in the Chukchi and Beaufort seas in 2007, another deep seismic survey vessel operating in the Canadian Beaufort Sea, and a shallow-hazards seismic vessel operating in the U.S. Beaufort Sea in 2007, along with SOI's offshore drilling project, cumulative impacts are possible if seismic or drilling vessels were to adversely impact marine mammals during critical life cycle periods, such as migration and concentrated feeding. In order to avoid, or if not possible, at least minimize cumulative adverse effects, NMFS is requiring offshore operations in the U.S. Beaufort Sea to implement mitigation measures, such as monitoring exclusion zones to prevent injury and safety zones in the U.S. Beaufort Sea to ensure that bowhead and gray whales are not significantly affected during important periods of feeding (bowheads and grays) and migration (bowhead cow/calf pairs). However, due to the relatively large habitat area for marine mammals in the Arctic Ocean and the small areas of the Beaufort Sea that are of interest for conducting offshore oil and gas operations in 2007, the relatively short time that operations will be in the area (mid-July to mid-November), the disbursed nature of marine mammals (particularly pinnipeds), the relatively low density of all marine mammal species in these waters, avoidance behavior by some species (bowheads and belugas) to the

activity area, and the implementation of mitigation measures (e.g., black-out periods), NMFS does not believe that cumulative effects by the subject drilling and seismic activities will occur. To reduce potential impacts to the lowest level practicable, additional mitigation and monitoring measures proposed by SOI and required by NMFS will be implemented during the 2007 offshore season to both the drilling and seismic operations.

#### DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting EA prepared for issuance of an Incidental Harassment Authorization to SOI to take marine mammals incidental to conducting an offshore drilling program in the Beaufort Sea off Alaska, it is hereby determined that the issuance of this IHA will not significantly impact the quality of the human environment as described above and in the supporting EA. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

  
w/ James Lecky  
Director, Office of Protected  
Resources  
National Marine Fisheries Service

  
Date

**Finding of No Significant Impact  
for the  
Issuance of an Incidental Harassment Authorization to Shell Offshore, Inc. to Take Marine  
Mammals Incidental to Conducting an Offshore Drilling Program in the Beaufort Sea off  
Alaska**

Background: The National Marine Fisheries Service (NMFS) is in receipt of an application from Shell Offshore Inc. (SOI) for an Incidental Harassment Authorization (IHA) to take marine mammals incidental to conducting an offshore drilling program in the U.S. Beaufort Sea off Alaska. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS shall authorize the taking by harassment of small numbers of marine mammals of a species or population stocks incidental to an otherwise lawful activity (other than commercial fishing), provided that NMFS determines that the specified activity (in this case an offshore drilling project) will (1) have a negligible impact on the affected species or stocks of marine mammals; (2) not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses and (3) that the permissible methods of taking by harassment and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has made such a determination in its authorization for the taking of marine mammals by harassment incidental to oil-and-gas exploratory drilling by SOI in 2007 in the Beaufort Sea off Alaska.

NMFS Determinations: Based on the information contained in its Final EA on this action, an examination of the potential impacts associated with the proposed drilling activity, the alternatives to that activity, and a review of comments received from the public and federal agencies, NMFS has selected Alternative 3 (*SOI's Proposed Action as Described in their 2007 IHA Drilling Application, Including Additional Mitigation and Monitoring Measures*), outlined in the Final EA, as its Preferred Alternative. NMFS developed additional mitigation and monitoring measures and analyzed the measures within the Final EA to further reduce the level of any potential adverse effects. The vessel and aerial monitoring component of the mitigation package was proposed by SOI and contained in their IHA application. These mitigation and monitoring measures have become part of NMFS' Preferred Alternative and were analyzed by NMFS as part of the specified activity. The suite of mitigation measures, described in Section V.A and V.C. of the Final EA, will be implemented as requirements in SOI's 2007 IHA for its offshore open-water drilling program. By incorporating these additional mitigation measures into the Preferred Alternative and designating them as IHA conditions, NMFS has determined that no significant impacts on the human environment would occur from implementing the Preferred Alternative.

In addition, SOI signed a Conflict Avoidance Agreement (CAA) with the Alaska Eskimo Whaling Commission (AEWC) and the affected villages' Whaling Captains Associations on July 24, 2007. The purpose of the CAA is to ensure that no unmitigable adverse impacts on subsistence uses of marine mammals would occur as a result of SOI's activities. NMFS will require SOI to abide by the terms of the CAA as part of its authorization to take marine mammals. These measures include a prohibition on conducting oil drilling activities during the

fall bowhead whale hunting season in the U.S. Beaufort Sea, dispute resolution, and emergency assistance to whalers at sea. Implementation of these measures ensures that there will not be significant social or economic impacts on the coastal inhabitants of the Beaufort Sea or have an unmitigable adverse impact of the subsistence uses of marine mammals.

#### Significance Review:

National Oceanic and Atmospheric Administration Administrative Order 216-6 (NAO 216-6) (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of “context” and “intensity.” Each criterion listed below is relevant in making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ’s context and intensity criteria. These include:

B1. Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson-Stevens Act and identified in FMPs? The NMFS action (*i.e.*, issuing an IHA to SOI) will not have a substantial impact on the Arctic Ocean or its resources. The eastern U.S. Beaufort Sea area has not been identified as containing EFH. While drilling vessels and support vessels will transit the Chukchi Sea, where EFH has been identified and described for 5 species of Pacific salmon (pink (humpback), chum (dog), sockeye (red), chinook (king), and coho (silver)) occurring in Alaska, the issuance of an IHA for SOI’s drilling program in 2007 is not anticipated to have any adverse effects on EFH. In addition, due to the remote chance for an oil spill by SOI’s drilling program in 2007, and the relatively short time period the activity will remain on-site, impacts on benthic resources will be of short-duration and not significant. Also, relatively short-term exposure to drilling vessel, icebreaker noise, and related sounds are unlikely to have an impact on benthic marine life, because most benthic species do not contain internal organs subject to damage by low noise levels. The NMFS Final EA indicates that impacts, if they were to occur, would add only a minor incremental degree of adverse impacts to living marine resources; these impacts would not be significant.

Therefore, issuance of an IHA for SOI’s Beaufort Sea drilling program in 2007 is not anticipated to have any adverse effects on EFH. Consultation with NMFS has been concluded indicating that there will not be an adverse effect on EFH.

B.2. Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc)? As the zone for potential acoustic injury is less than 10 m (33 ft) around the drilling vessel/icebreaker activity area, and the fact that most invertebrate marine life do not contain organs subject to injury by underwater sounds, NMFS believes that there will not be a substantial impact on marine life biodiversity or on the normal functioning of the nearshore or offshore Beaufort Sea ecosystem. Organisms with organs subject to injury by underwater sounds

(e.g., fish) may be affected by (1) injury or mortality if within close proximity to the drilling vessel, (2) dispersal into nearby areas if the sounds are annoying to them, and/or (3) behavior modification resulting in reduced availability to fishermen. Most effects however, are considered to be short-term and unlikely to affect normal ecosystem function or predator/prey relationships.

B.3. Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety? The proposed action of issuing an IHA to SOI for this activity will not have a substantial adverse impact on public health or safety. Oil spills (which is not authorized by the IHA, making it a prohibited action if one should occur) are highly unlikely (See criterion B.6.) and mitigation measures have been established to ensure that one does not occur, and if one did occur, that it can be cleaned up quickly. As described in criterion B.5., mitigation measures imposed by NMFS will prohibit SOI from conducting the activity when North Slope Borough subsistence whalers are hunting bowhead whales, thereby minimizing the risk to them.

B.4. Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species? This action may adversely affect, but will not jeopardize the continued existence of, species listed under the Endangered Species Act (ESA). The ESA-listed species that might be affected by this action is the bowhead whale.

For bowhead whales, adverse effects will be limited to short-term behavioral disturbances that may constitute Level B behavioral harassment under the MMPA. No injury or mortality is expected because bowhead whales are likely to avoid active drilling activities by 20 km (12.4 mi) or more and other marine mammals likely taking similar actions to avoid the proximity of drilling vessels and the resultant noise. NMFS' Arctic Regional Biological Opinion includes this action and supports this determination. Impacts to marine mammals, if any, are expected to be limited to short-term behavioral harassment. This action has been determined to be consistent with determinations made under section 101(a)(5)(D) of the MMPA as the taking of marine mammals by oil drilling activities in the Beaufort Sea will have a negligible impact on affected species and be at the lowest level practicable through implementation of mitigation and monitoring measures.

To minimize the potential for significant impacts during periods of biologically important behavior of the bowhead and gray whales, additional mitigation measures will be required. The monitoring measures were proposed by SOI and include: (1) Implementing a 120-dB monitoring-safety zone for concentrations of migrating bowhead cow/calf pairs in the U.S. Beaufort Sea and a 160-dB monitoring-safety zone for feeding concentrations of bowhead and gray whales in the Beaufort Sea; (2) conducting dedicated aerial and vessel surveys of the 120-dB monitoring-safety zone in the Beaufort Sea, and (3) conducting aerial and vessel surveys in the Beaufort Sea for feeding concentrations of bowhead and gray whales in the 160-dB monitoring-safety zone. Under the IHA, detection of aggregations of migrating bowhead whales, especially cow/calf pairs and concentrated feeding areas for bowheads and gray whales will require SOI to reduce its activity level in the drilling area (e.g., by temporarily ceasing drilling or

support vessel activity) to ensure that the SPL at the closest aggregation of adult/juvenile bowhead whales or closest bowhead whale cow/calf pair are reduced (as stipulated in the IHA) until the identified aggregation is no longer within the designated monitoring-safety zone.

NMFS is requiring SOI to conduct aerial and vessel surveys in the Beaufort Sea during the fall migration period because (1) NMFS has been informed that it is relatively safe to conduct aerial monitoring in the Beaufort (e.g., there is a number of available landing areas along the Beaufort Sea coast; and there is a history of annual bowhead aerial surveys that have been conducted successfully by MMS and industry over the past 20 years), (2) this monitoring activity was proposed by SOI in its 2007 IHA application, (3) it is required in the CAA signed by SOI with the AEWC and affected villages' Whaling Captains' Associations, on July 24, 2007, and (4) from a biological perspective, the aerial monitoring would help ensure that bowhead whale fall feeding and migration activities are not adversely affected by drilling operations. One of the objectives of SOI's aerial monitoring program is to notify SOI and NMFS of the presence of marine mammals in the general area of operations and to implement mitigation measures, such as reducing its activity level in the drilling area (e.g., by temporarily ceasing drilling or support vessel activity) if 12 or more bowhead whales or more than 4 bowhead whale cow/calf pairs are sighted within the 120-dB isopleth of the drilling and support vessels during the aerial survey or if 12 or more bowheads or gray whales are seen feeding within the 160-dB isopleth of the drilling operation. NMFS is requiring this mitigation measure to ensure that bowhead whales are not significantly impacted by the drilling activity such that they either remain east of the activity area (e.g., Sivulluq) (as noticed during a 2006 seismic survey in the Canadian Beaufort Sea), or migrate significantly north of the normal migratory route in order to avoid the drilling noises.

B.5. Are significant social or economic impacts interrelated with natural or physical environmental effects? Other than potential impacts to native subsistence needs and culture, this action will not have a significant social or economic impact as there are no commercial fishing or other activities that might be affected by offshore exploratory drilling for oil and gas deposits. Marine mammals are legally hunted in Alaskan waters by coastal Alaska Natives. The species hunted include bowhead and beluga whales; ringed, spotted, and bearded seals, walruses, and polar bears. The importance of each of the various species varies among the communities and is based largely on availability. Bowhead whales and belugas are the two marine mammal species primarily harvested during the time of the proposed drilling program. Bowhead whale hunting is the key activity in the subsistence economies of Barrow, Nuiqsut and Kaktovik. The whale harvests have a great influence on social relations by strengthening the sense of Inupiat culture and heritage in addition to reinforcing family and community ties. Because seals (ringed, spotted, bearded) are hunted in near-shore waters and the offshore drilling activity will remain offshore of the coastal and near-shore areas of these seals, activities related to oil drilling should not conflict with harvest activities.

To avoid having an unmitigable adverse impact on subsistence uses of marine mammals, NMFS is required to implement mitigation measures to ensure that SOI's drilling activities do not have an unmitigable adverse impact on subsistence uses of marine mammals. However, because SOI signed the 2007 CAA with the AEWC and the affected villages' Whaling Captains Association,

NMFS has determined that there will not be an adverse impact on the species or stocks of marine mammals for subsistence uses. These mitigation measures include a prohibition on conducting offshore drilling operations after August 25 and moving all vessels offshore and away from the migration corridor during the fall bowhead whale hunting season in the Beaufort Sea, dispute resolution and emergency assistance to whalers at sea. Implementation of these measures helps ensure that there will not be significant social or economic impacts on the coastal inhabitants of the Beaufort Sea.

B.6. Are the effects on the quality of the human environment likely to be highly controversial?

There is a lack of agreement and some controversy within the scientific and stakeholder communities about the potential effects of noise on marine mammals, including in this instance, bowhead whales. This was demonstrated recently by the National Research Council (NRC, 20005) report and by the lack of consensus among participants in the Marine Mammal Commission's Sound Advisory Panel (MMS, 2006). NMFS believes that the analyses in the EA are cautious in that NMFS attempted to err on the side of overestimating potential effects, and then built in mitigation measures to reduce such potential effects. While any maritime noise issue can be considered controversial because of several marine mammal stranding incidents allegedly due to military sonar, in reviewing concerns raised regarding potential impacts of noise on marine mammals, particularly bowheads and beluga whales (which are addressed in NMFS' IHA determination) by SOI's Beaufort Sea activities, comments raised during the review of SOI's IHA application focused mainly on: (1) requirements under the MMPA, NEPA and ESA; (2) impacts of noise and potential oil spills on marine mammals and the subsistence lifestyle of impacted villages; and (3) the mitigation and monitoring measures proposed by SOI and NMFS. In reviewing these concerns (which are addressed in NMFS' final IHA determination), NMFS believes that its actions are in full compliance with NEPA, the MMPA, the ESA and other statutes. As noted elsewhere in this Statement, NMFS is requiring, as proposed by SOI, a detailed mitigation and monitoring program designed to reduce impacts on affected marine mammal stocks to the lowest level practicable. In addition, the oil industry will implement for the second year, a research program to address the status of Arctic Ocean marine mammal populations.

In 2006, industry concerns focused on the practicability of implementing some of the mitigation measures that NMFS is requiring this year under SOI's IHA for drilling, and the transfer of these mitigation measures to other areas of the world where oil and gas exploration occurs. These concerns were addressed in the IHA supporting documentation indicating that all IHAs are reviewed independently based upon the marine mammal species affected, the level of impact, and mitigation and monitoring measures required to reduce those impacts to the lowest level practicable and whether the activity would have an unmitigable adverse impact on subsistence uses of marine mammals.

There is also a lack of agreement and some controversy within the scientific and stakeholder communities about the potential for an oil spill to occur in the Beaufort Sea as a result of SOI's 2007 drilling program, the size of that potential oil spill, and the potential for the spilled oil to impact marine mammals and other marine life. MMS evaluated the potential for an oil spill in

the Multi-Sale Final EIS which NMFS incorporates by reference into its Final EA. The MMS EAs for Lease Sale (LS) 195, LS 202 and the SOI EP include robust analyses of the potential for oil spills. These documents found the chance of a large ( $\geq 1,000$  barrels) oil spill from exploratory activities to be very low. This conclusion was based on review of historic oil spill events, including blowouts. The MMS EA found that no large oil spills occurred from 1971-2005 during OCS exploratory drilling and, during that period, only 4 exploration blow-out-related oil spills occurred from drilling 13,463 exploration wells. The MMS EAs show that the total volume of oil spilled from 35 exploratory wells drilled in the Beaufort and Chukchi seas OCS was 26.7 barrels and approximately 24 barrels were recovered or cleaned up. An independent study (Bercha Group, 2002, 2006) concludes that exploratory wells (such as SOI plans to drill) contribute a negligible portion to the chance of one or more large oil spills occurring during exploration, development, and production. This is consistent with the conclusion in MMS' EA. No information was provided to NMFS during its comment period on SOI's IHA or to MMS on SOI's EP, on a different oil spill analysis and simply questioned the MMS oil spill analysis provided in its Multi-Sale EIS. Therefore, while NMFS recognizes that the impact of a large oil spill on the Beaufort Sea environment, its marine mammal population and the subsistence uses of marine mammals could be significant, the potential for a large oil spill to occur is highly unlikely. In the event that there was a small oil spill (or a large oil spill), SOI is utilizing the best available technology to clean up any spilled oil.

Finally, Inupiat concerns on the potential impact on their traditional lifestyle have been addressed through both the mitigation and monitoring measures in the IHA and the signed 2007 CAA. As a result, SOI will avoid significant cultural impacts. Little additional information on the scientific basis for NMFS' determinations has been provided by the public. Also, NMFS continues to make its determinations under the MMPA based on the best available science. As a result, while certain segments of the public continue to believe that offshore oil and gas exploration in U.S. waters is controversial, NMFS does not believe the activity proposed in the Arctic Ocean in 2007 is highly controversial.

B.7. Can the proposed action reasonably be expected to result in substantial impacts to unique area, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas? Detailed information about the affected environment, bowhead whales, other marine mammals, and marine life are provided in the MMS' 2006 Programmatic Environmental Assessment for Seismic Surveys (P-EA), MMS' 2007 EA for SOI's Exploration Plan, MMS' Beaufort Sea Lease Sale 195 EA, MMS' Beaufort Sea Lease Sale 202 EA and MMS' 2003 Final Environmental Impact Statement for Beaufort Sea Planning Area Oil and Gas Lease Sales 186, 195, and 202. NMFS has incorporated relevant information from these documents by reference into its EA on SOI's drilling activity. The original affected environment in which this activity could have occurred included areas within the spring migratory pathway of the bowhead whale in the Chukchi and Beaufort seas (as the icebreakers moved and towed the drill ships); bowhead calving areas; the fall migratory pathway of the bowhead; and spring, summer, and fall bowhead feeding grounds. Mating can occur within the Beaufort Sea, but most mating is thought to occur in the Bering Sea. NMFS has undertaken measures to substantially reduce the potential for significant effects on bowhead

calving by building into the base action a ban on moving drill ships and icebreakers during the spring bowhead migration period. As a result, icebreakers and drill ships are not authorized to transit the spring lead system before July 1<sup>st</sup>. While some calving may occur after this date, available data indicates that most of the calving has occurred before that time. This prohibition on vessel movement also should significantly reduce the possibility of dispersal or disruption of whales that are feeding within the spring lead system in the Chukchi Sea.

Thus, because of the bowhead migration, the spring lead system within the Chukchi Sea until July 1<sup>st</sup> is removed from the affected environment in which this action could now occur. Where data are available and sufficient, NMFS has attempted to identify other areas where aggregations of bowheads are known to occur and where feeding or migratory aggregations repeatedly have been observed (e.g., Smith Bay in the Beaufort Sea for feeding; nearshore habitat in the Beaufort Sea for migration). NMFS has summarized information that is available about the timing of habitat use. Where analyses identified areas where effects to bowheads potentially could be reduced, NMFS has identified monitoring and mitigation measures to reduce the potential for such impacts to the lowest level practicable. Such mitigation includes prohibiting in the Beaufort Sea, the generation of high noise levels from drilling operations when aggregations of 12 or more migrating bowheads or 4 or more cow/calf pairs are detected visually or when feeding aggregations of bowhead or gray whales are sighted.

B.8. Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks? As discussed in the previously cited adopted NEPA documents, and incorporated by reference in this Final EA, there is a degree of uncertainty concerning the following issues: bowhead whale use of the Beaufort Sea for feeding during the summer before September 1; the importance of feeding areas within the Alaska Beaufort Sea, especially the western Alaskan Beaufort Sea, to the bowhead population as a whole and, more specifically, to certain segments of the population; the importance of the areas to segments of the population and to the population as a whole during years when large aggregations are observed feeding; the potential effects of such disturbance to the health of females and young calves and to the next year's reproductive potential of adult females; the effects of sound on the hearing of very young calves; and the factors causing interannual variability in the use of the Beaufort Sea for feeding by bowheads. In the Final PEA analyses (incorporated by reference in this EA), NMFS acknowledged this uncertainty and, where it exists, NMFS has designed appropriate and practicable mitigation measures aimed at reducing this uncertainty and to reduce the potential for adverse effects on bowhead whales, especially cow/calf pairs. In the Final PEA (and by reference this EA), NMFS reviewed this information and stated that imposition of these additional mitigation and monitoring measures should resolve uncertainty and further reduce the level of any potential impacts on marine mammal species, particularly the bowhead whale, and any other marine biological resources. As a result, monitoring of the 120-dB and 160-dB zones in the Beaufort Sea will be implemented as it is a part of SOI's submitted monitoring plan, it is required by the signed CAA, and it is practicable to do so.

B.9. Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts? There are other oil and gas exploratory and production

activities in Alaskan waters and around the world that may result in the harassment, injury or mortality of marine mammals, but most are dispersed both geographically and temporally (Gulf of Mexico, North Sea, West Africa) and may affect different marine mammal stocks, than the ones impacted in the Beaufort Sea. Oil exploration activities are relatively short-term in nature, and all either currently use, or will likely use in the future, standard mitigation and monitoring measures to minimize impacts to marine life from high noise levels. When in U.S. waters, these activities (most of which are subject to NEPA or State review) are temporally dispersed, relatively short-term (except for the Northstar oil production facility) and use appropriate mitigation designed to reduce impacts on the marine environment to the lowest level practicable. In 2007, SOI will have the only offshore oil exploration activity in the U.S. Beaufort Sea. Using up to two drilling vessels and support vessels (including ice management vessels), SOI plans to conduct an oil drilling project at the Sivulliq prospect, located in Camden Bay in the U.S. Beaufort Sea. Although currently under a court-ordered Stay which prohibits any oil exploration by SOI in this area, if this project takes place in 2007, it will have mitigation measures imposed by the CAA and IHA (such as a prohibition of drilling activities during the fall bowhead migration) that will ensure that impacts on marine mammals (particularly the endangered bowhead whale) are negligible and that the oil exploration project is not having an unmitigable adverse impact on subsistence uses of marine mammals. Within the Beaufort and Chukchi seas there are other activities, such as oil-and-gas exploration and production and scientific seismic activities (in 2007, the *USCG Cutter Healy* is conducting bathymetric multi-beam sonar surveys for NOAA approximately 200 miles north of Barrow). In addition to site clearance and shallow hazard surveys of potential exploratory drilling locations within SOI's lease areas in the Beaufort Sea, SOI is also conducting deep seismic surveys. Finally, this area is not known for heavy ship traffic, mostly being barge traffic to supply villages and onshore and offshore oil facilities. Thus, as all activities in the U.S. Beaufort Sea (other than village barging activities) are under IHAs reducing impacts to the lowest level practicable through mitigation measures tailored to the specific activity, NMFS believes that the cumulative effect of SOI's drilling program (assuming the court-ordered Stay is lifted), in combination with SOI's deep and shallow seismic survey program and other nearby projects (e.g., Northstar, barging) will not result in significant cumulative impacts on the human environment.

B.10. Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources? The action proposed by NMFS will have some potential to adversely affect native cultural resources along the Arctic Coast. As described in criterion B.5, implementation of mitigation measures in the IHA issued to SOI and under the signed CAA between industry and the native whaling communities ensures that there will not be a significant social or economic impacts on the coastal inhabitants of the Beaufort and Chukchi seas nor an unmitigable adverse impact of the subsistence uses of marine mammals by these residents.

B.11. Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species. Issuance of an IHA to SOI for the taking of marine mammals incidental to conducting an exploratory drilling program in 2007 does not involve the introduction or

removal of any species. Therefore, it will not result in the introduction or spread of a nonindigenous species.

B.12. Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration? This action will not set a precedent for future actions with significant effects or represent a decision in principle. NMFS' actions under section 101(a)(5)(D) of the MMPA must be based on the best available information, which is continuously evolving. Moreover, each action for which an incidental take authorization is sought must be considered in light of the specific circumstances surrounding the action. Mitigation and monitoring vary depending on those circumstances and have been evolving for Beaufort Sea offshore oil exploration since 1990, when authorizations under section 101(a)(5)(A) of the MMPA were first issued. Regarding bowhead whales, there is extensive history and regulatory and procedural structure to evaluate the effects of noise on bowhead whales and other marine mammal species. For these reasons, NMFS does not believe that issuance of an IHA for offshore drilling activities in the Beaufort Sea in 2007 is precedent setting.

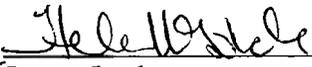
B.13. Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment? If offshore oil drilling were conducted without authorizations under the MMPA, violations of the MMPA and the ESA could result. However, MMS permit stipulations require that operators obtain an MMPA authorization prior to commencement of offshore drilling activity. For this reason, this action does not threaten a violation of any such laws or requirements. Moreover, all other applicable law has been complied with as it relates to issuance of the IHA.

B.14. Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species? This action will not target any marine species, but may affect certain non-target species, such as cetaceans and pinnipeds in the area, particularly bowhead and gray whales. In regard to cumulative effects, with a single seismic vessel operating in the Chukchi and Beaufort seas in 2007, another deep seismic survey vessel operating in the Canadian Beaufort Sea, and a shallow-hazards seismic vessel operating in the U.S. Beaufort Sea in 2007, along with SOI's offshore drilling project, cumulative impacts are possible if seismic or drilling vessels were to adversely impact marine mammals during critical life cycle periods, such as migration and concentrated feeding. In order to avoid, or if not possible, at least minimize cumulative adverse effects, NMFS is requiring offshore operations in the U.S. Beaufort Sea to implement mitigation measures, such as monitoring exclusion zones to prevent injury and safety zones in the U.S. Beaufort Sea to ensure that bowhead and gray whales are not significantly affected during important periods of feeding (bowheads and grays) and migration (bowhead cow/calf pairs). However, due to the relatively large habitat area for marine mammals in the Arctic Ocean and the small areas of the Beaufort Sea that are of interest for conducting offshore oil and gas operations in 2007, the relatively short time that operations will be in the area (mid-July to mid-November), the disbursed nature of marine mammals (particularly pinnipeds), the relatively low density of all marine mammal species in these waters, avoidance behavior by some species (bowheads and belugas) to the

activity area, and the implementation of mitigation measures (e.g., black-out periods), NMFS does not believe that cumulative effects by the subject drilling and seismic activities will occur. To reduce potential impacts to the lowest level practicable, additional mitigation and monitoring measures proposed by SOI and required by NMFS will be implemented during the 2007 offshore season to both the drilling and seismic operations.

#### DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting EA prepared for issuance of an Incidental Harassment Authorization to SOI to take marine mammals incidental to conducting an offshore drilling program in the Beaufort Sea off Alaska, it is hereby determined that the issuance of this IHA will not significantly impact the quality of the human environment as described above and in the supporting EA. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

  
w/ James Lecky  
Director, Office of Protected  
Resources  
National Marine Fisheries Service

  
Date