

credible evidence that a principal, employee, agent, contractor, sub-grantee, subcontractor, or other person has submitted a false claim under the False Claims Act or has committed a criminal or civil violation of laws pertaining to fraud, conflict of interest, bribery, gratuity, or similar misconduct involving those funds.

*Ensuring Responsible Spending of Recovery Act Funds.* The agency intends to implement this program in compliance with Office of Management and Budget guidance on the President's Memorandum for the Heads of Executive Departments and Agencies of March 20, 2009. Ensuring Responsible Spending of Recovery Act Funds, 74 FR 12531 (Mar. 25, 2009), when such guidance becomes available.

*Best Practices to Promote Equality of Opportunity.* Pursuant to OMB Guidance (see, e.g., "Updated Implementing Guidance for the American Recovery and Reinvestment Act of 2009," April 3, 2009) and consistent with the Recovery Act and other applicable laws, DoC encourages recipients to implement best practices to promote equality of opportunity, to provide opportunities for small and disadvantaged businesses, including veteran-owned small businesses and service disabled veteran-owned small businesses, and to follow sound labor practices.

*Reporting.* Award Recipients shall provide access to information that is required to assess the project's progress throughout the project life cycle. The following reports are required:

a. *Technical Performance Reports.* Award Recipients shall submit a technical performance report in triplicate (an original and two copies) on a calendar quarter basis for the periods ending March 31, June 30, September 30, and December 31, or any portion thereof. Reports are due no later than 30 days following the end of each reporting period. A final technical performance report shall be submitted within 90 days after the expiration date of the award. Two copies of the technical performance reports shall be submitted to the Project Manager and the original report to the NIST Grants Officer. Technical performance reports shall contain information as prescribed in 15 CFR 14.51.

b. *Financial Reports.* For recipients under this program, Article A.01 of the DoC Financial Assistance Standard Terms and Conditions dated March 2008 is revised as follows:

Award Recipients shall submit a Federal Financial Report (SF-425) in triplicate (an original and two copies) on a calendar quarter basis for the

periods ending March 31, June 30, September 30, and December 31, or any portion thereof. Reports are due no later than 30 days following the end of each reporting period. A final SF-425 shall be submitted within 90 days after the expiration date of the award. All SF-425s shall be submitted to the NIST Grants Officer.

c. *Recovery Act Reports—Job Creation and Retention.* As set out in Sec. 1512(c) of the Recovery Act, no later than ten (10) days after the end of each calendar quarter, any recipient that received funds under the Recovery Act from NIST must submit a report to NIST that contains the following four items:

(1) The total amount of Recovery Act funds received from NIST.

(2) The amount of Recovery Act funds received that were obligated and expended to projects or activities. This reporting will also include unobligated allotment balances to facilitate reconciliations.

(3) A detailed list of all projects or activities for which recovery funds were obligated and expended, including:

(a) The name of the project or activity;

(b) A description of the project or activity;

(c) An evaluation of the completion status of the project or activity;

(d) An estimate of the number of jobs created and the number of jobs retained by the project or activity; and

(e) For infrastructure investments made by State and local governments, the purpose, total cost, and rationale of the agency for funding the infrastructure investment with funds made available under this Act, and name of the person to contact at the agency if there are concerns with the infrastructure investment.

(4) Detailed information on any subcontracts or subgrants awarded by the recipient to include the data elements required to comply with the Federal Funding Accountability and Transparency Act of 2006 (Pub. L. 109-282), allowing aggregate reporting on awards below \$25,000 or to individuals, as prescribed by the Director of the Office of Management and Budget (OMB).

Recipients that must report information in accordance with paragraph (4) above must register with the Central Contractor Registration database (<http://www.ccr.gov/>) or complete other registration requirements as determined by the Director of OMB. Section 1512(d) further requires that no later than thirty (30) days after the end of each calendar quarter, NIST must make the information in reports submitted under section 1512(c) of the Recovery Act as

outlined above publicly available by posting the information on a Web site. OMB Memo M-09-10, "Initial Implementing Guidance for the American Recovery and Reinvestment Act of 2009," which can be accessed at <http://www.recovery.gov/>, provides information on requirements for Federal agencies under the Recovery Act.

Additional guidance may be forthcoming related to responsibilities of recipients of grants and cooperative agreements under the Recovery Act.

Reporting requirements are described in the Department of Commerce Financial Assistance Standard Terms and Conditions dated March, 2008, found on the Internet at: <http://oamweb.osec.doc.gov/docs/GRANTS/DOC%20STCsMAR08Rev.pdf>.

The references to Financial Reporting Form SF-269 in the DoC Standard Terms & Conditions, A.01 and B.01, are hereby replaced with the SF-425, "Federal Financial Report," as required by the Office of Management and Budget (OMB) (73 FR 61175, October 15, 2008). As authorized under 15 CFR 14.52 and 24.41, the OMB approved SF-425 shall be used in the place of the SF-269 and SF-272 under the uniform administrative requirements and elsewhere under awards in this program where such forms are referenced.

Dated: May 26, 2009.

**Patrick Gallagher,**

*Deputy Director.*

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## DEPARTMENT OF COMMERCE

### National Oceanic and Atmospheric Administration

RIN 0648-XP00

#### Small Takes of Marine Mammals Incidental to Specified Activities; Open-water Marine Survey Program in the Chukchi Sea, Alaska, During 2009-2010

**AGENCY:** National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

**ACTION:** Notice; proposed incidental take authorization; request for comments.

**SUMMARY:** NMFS has received an application from Shell Offshore Inc. and Shell Gulf of Mexico Inc., collectively known as Shell, for an Incidental Harassment Authorization (IHA) to take marine mammals incidental to an open-water marine survey program, which includes shallow hazards and site

clearance work and strudel scour surveys, in the Chukchi Sea, Alaska. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an IHA to Shell to incidentally take, by harassment, small numbers of several species of marine mammals during the Arctic open-water seasons between August 2009, and July, 2010, during the aforementioned activity.

**DATES:** Comments and information must be received no later than July 1, 2009.

**ADDRESSES:** Comments on the application should be addressed to P. Michael Payne, Chief, Permits, Conservation and Education Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910-3225. The mailbox address for providing email comments is *PR1.0648-XP00@noaa.gov*. Comments sent via e-mail, including all attachments, must not exceed a 10-megabyte file size.

Instructions: All comments received are a part of the public record and will generally be posted to <http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications> without change. All Personal Identifying Information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information.

A copy of the application containing a list of the references used in this document may be obtained by writing to the address specified above, telephoning the contact listed below (see **FOR FURTHER INFORMATION CONTACT**), or visiting the Internet at: <http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications>.

Documents cited in this notice may be viewed, by appointment, during regular business hours, at the aforementioned address.

**FOR FURTHER INFORMATION CONTACT:** Candace Nachman, Office of Protected Resources, NMFS, (301) 713-2289 or Brad Smith, NMFS, Alaska Region, (907) 271-3023.

**SUPPLEMENTARY INFORMATION:**

**Background**

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are

issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if 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."

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. 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].

Section 101(a)(5)(D) establishes a 45-day time limit for NMFS review of an application followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of marine mammals. Within 45 days of the close of the comment period, NMFS must either issue or deny the authorization.

**Summary of Request**

On December 15, 2008, NMFS received an application from Shell for the taking, by Level B harassment only, of small numbers of several species of marine mammals incidental to conducting an open-water marine survey program during the 2009/2010 Arctic open-water season in the Chukchi Sea. Shell plans to conduct site clearance and shallow hazards surveys and a strudel scour survey in the Chukchi Sea. These surveys are a continuation of those conducted by Shell in the Chukchi Sea in 2008. Shell's December 2008, application also requested MMPA coverage for site clearance and shallow hazards surveys, an ice gouge survey, and a strudel scour

survey in the Beaufort Sea and an ice gouge survey in the Chukchi Sea for the 2009/2010 season. However, in an addendum to the IHA application submitted to NMFS on March 10, 2009, Shell indicated that it has cancelled all of the planned survey programs for the Beaufort Sea and the ice gouge survey for the Chukchi Sea in 2009. Therefore, this **Federal Register** Notice only describes the potential effects of conducting site clearance and shallow hazards surveys and a strudel scour survey in the Chukchi Sea for the 2009/2010 open-water season. Shell submitted a second addendum to its application on May 19, 2009, indicating that Shell now plans to use a 40 in<sup>3</sup> airgun array instead of the 20 in<sup>3</sup> array (see the "Description of the Specified Activity" section later in this document for more detail on the specifics of the project).

Site clearance and shallow hazards surveys will evaluate the seafloor and shallow sub-seafloor at prospective exploration drilling locations, focusing on the depth to seafloor, topography, the potential for shallow faults or gas zones, and the presence of archaeological features. The types of equipment used to conduct these surveys use low level energy sources focused on limited areas in order to characterize the footprint of the seafloor and shallow sub-seafloor at prospective drilling locations.

NMFS issued an IHA to Shell on August 20, 2008, to conduct its marine seismic survey program in the Beaufort and Chukchi Seas for the 2008/2009 Arctic open-water season. This IHA is valid through August 19, 2009, or until a new IHA is issued to Shell, whichever is earlier.

**Description of the Specified Activity**

*Chukchi Site Clearance and Shallow Hazards Surveys*

Site clearance and shallow hazards surveys of potential proposed locations for exploration drilling will be executed as required by the Minerals Management Service's (MMS) regulations. These surveys gather data on: (1) bathymetry; (2) seabed topography and other seabed characteristics (e.g., boulder patches); (3) potential geohazards (e.g., shallow faults and shallow gas zones); and (4) the presence of any archeological features (e.g., shipwrecks). Site clearance and shallow hazards surveys can be accomplished by one vessel with acoustic sources. No other vessels are necessary to accomplish the proposed work.

The Chukchi Sea site clearance and shallow hazards surveys will be

conducted on leases that were acquired in Outer Continental Shelf (OCS) Lease Sale 193. Site clearance surveys are confined to small specific areas within OCS blocks. Actual locations of site clearance and shallow hazards surveys have not been definitively set as of this date, although the surveys will occur within the Chukchi Sea marine survey area of OCS lease blocks shown in Figure 1 of Shell's application. These surveys will occur more than 113 km (70 mi) or more offshore of the Alaska coast. Before the commencement of operations, survey location information will be supplied to MMS as ancillary activities authorizations and provided to other interested agencies as it becomes available.

Shell anticipates shooting approximately 480 km (298 mi) of survey lines (plus approximately 120 km (74.6 mi) of mitigation gun activity between survey lines) from August through October, 2009, exposing approximately 900 km<sup>2</sup> (347.5 mi<sup>2</sup>) of water to sounds of 160 dB (rms) or greater. The operation will be active 24 hr/day and use a single vessel to collect the geophysical data.

The vessel that will be conducting the site clearance and shallow hazards surveys may also be used in the deployment and retrieval of underwater Ocean Bottom Hydrophones (OBHs) as described in the Marine Mammal Monitoring and Mitigation Plan (4MP) in Attachment A of Shell's application and also later in this document. These OBHs are anchored underwater buoys that record marine mammal vocalizations and other underwater sounds.

These surveys are confined to small specific areas within OCS blocks. At this time, Shell has indicated that the *R/V Norseman II* will be used to conduct the activity. The *R/V Norseman II* is a diesel powered vessel, 35.05 m (115 ft) long, 8.66 m (28.4 ft) wide, with a 4.08 m (13.4 ft) draft. In the event the *R/V Norseman II* is unavailable, Shell would utilize a similar vessel to conduct the activities.

It is proposed that the following acoustic instrumentation, or something similar, will be used: (1) dual-frequency side scan sonar (2–7 kHz or 8–23 kHz), or similar; (2) single beam Echo Sounder (33–210 kHz), or similar; (3) multibeam Echo Sounder (200 kHz), or similar; (4) high resolution multi-channel two-dimensional (2D) system, 40 in<sup>3</sup> (4 x 10) airgun array (0–150 Hz), or similar; (5) shallow sub-bottom profiler (SBP; 1–12 kHz), or similar; and (6) medium penetration SBP (400–800 Hz), or similar.

This activity is proposed to occur during August–October 2009, and, as proposed, the total program will last a maximum of 50 days of active data acquisition, excluding downtime due to weather and other unforeseen delays. This vessel may also be used to perform other activities, such as deploying and retrieving the OBHs. The time for deploying and retrieving the OBHs is not included in the 50-day estimate.

#### *Chukchi Strudel Scour Survey*

During the early melt, the rivers begin to flow and discharge water over the coastal sea ice near the river deltas. That water rushes down holes in the ice ("strudels") and scours the seafloor. These erosional areas are called "strudel scours". Information on these features is required for prospective pipeline planning. Two proposed activities are required to gather this information: aerial survey via helicopter overflights during the melt to locate the strudels and strudel scour marine surveys to gather bathymetric data. The overflights investigate possible sources of overflow water and will survey local streams that discharge in the vicinity of potential pipeline shore crossings. These helicopter overflights will occur during mid-May/early June 2010 and, weather permitting, should take no more than four days. There are no planned landings during these overflights other than at local airports. Areas that have strudel scour identified during the aerial survey will be verified and surveyed with a marine vessel after the breakup of nearshore ice. This proposed activity, i.e., marine surveys to gather bathymetric data, is not anticipated to take more than 10 days to conduct, excluding downtime due to weather and other unforeseen delays. It is anticipated to occur in July through mid-August 2010. This is a daylight only operation. The specific locations for pipeline shore crossings have not yet been identified. This vessel will use the following equipment: multi-beam bathymetric sonar, or similar; side-scan sonar system, or similar; and single beam bathymetric sonar, or similar.

The vessel has not been contracted; however, it is anticipated that it will be the diesel-powered *R/V Annika Marie* which has been utilized from 2006–2008 and measures 13.1 m (43 ft) long, or similar vessel. Only one vessel is needed to complete the survey, and the acoustic sources will be deployed from that vessel.

#### **Marine Mammals Affected by the Activity**

Marine mammals that occur in the proposed survey areas belong to three

taxonomic groups: (1) odontocetes (toothed cetaceans), (2) mysticetes (baleen whales), and (3) carnivora (pinnipeds and polar bears). Cetaceans and pinnipeds (except walrus) are the subject of this IHA request to NMFS. In the U.S., the walrus and polar bear are managed by the U.S. Fish and Wildlife Service (USFWS). A separate permit application for this survey has been submitted to USFWS for incidental "takes" specific to walrus and polar bears, and these species are not discussed further in Shell's application or this **Federal Register** Notice.

Marine mammal species under the jurisdiction of NMFS which are known to or may occur in the open-water marine survey area of the Chukchi Sea include eight cetacean species and four species of pinnipeds (see Table 4–1 in Shell's application). Three of these species, the bowhead, humpback and fin whales, are listed as "endangered" under the Endangered Species Act (ESA). The bowhead whale is more common in the survey area than other endangered species. Based on a small number of sightings, the fin whale is unlikely to be encountered along the planned trackline in the Chukchi Sea. Humpback whales normally are not found in the Chukchi Sea; however, several humpback sightings were recorded during vessel-based surveys in the Chukchi Sea in 2007 (Reiser *et al.*, 2008).

The marine mammal species under NMFS jurisdiction that are most likely to occur in the survey area include four cetacean species (beluga, bowhead, and gray whales and harbor porpoise), and three pinniped species (ringed, bearded, and spotted seals). Most encounters are likely to occur in nearshore shelf habitats or along the ice edge. Animal densities are generally expected to be lower in deep water and at locations far-offshore. The marine mammal species that is likely to be encountered most widely (in space and time) throughout the survey period is the ringed seal. Encounters with bowhead and gray whales are expected to be limited to particular regions and seasons, as discussed in Shell's application.

Four additional cetacean species and one pinniped species—the killer, minke, humpback, and fin whales and ribbon seals—could occur in the project area, but each of these species is uncommon or rare in the survey area and relatively few encounters with these species are expected during the open-water marine survey program. Descriptions of the biology, distribution, and population status of the marine mammal species under NMFS' jurisdiction can be found in Shell's application and the NMFS

Stock Assessment Reports (SARS). The Alaska SAR is available at: <http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2008.pdf>. Please refer to those documents for information on these species.

#### Potential Effects of Survey Activities on Marine Mammals

The only anticipated impacts to marine mammals associated with Shell's proposed activities (primarily resulting from noise propagation) are from vessel movements and airgun operations. Aircraft may provide a potential secondary source of sound. The physical presence of vessels and aircraft could also potentially lead to non-acoustic effects on marine mammals involving visual or other cues.

The effects of sounds from airguns might include one or more of the following: tolerance, masking of natural sounds, behavioral disturbance, and temporary or permanent hearing impairment or non-auditory effects (Richardson *et al.*, 1995). As outlined in previous NMFS documents, the effects of noise on marine mammals are highly variable, and can be categorized as follows (based on Richardson *et al.*, 1995):

(1) 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);

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

(3) 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;

(4) 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;

(5) 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;

(6) 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

(7) 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.

#### Tolerance

Numerous studies have shown that pulsed sounds from airguns are often readily detectable in the water at distances of many kilometers. Numerous studies have shown that marine mammals at distances more than a few kilometers from operating seismic vessels often show no apparent response. That is often true even in cases when the pulsed sounds must be readily audible to the animals based on measured received levels and the hearing sensitivity of that mammal group. Although various baleen whales, toothed whales, and (less frequently) pinnipeds have been shown to react behaviorally to airgun pulses under some conditions, at other times, mammals of all three types have shown no overt reactions. In general, pinnipeds and small odontocetes seem to be more tolerant of exposure to airgun pulses than baleen whales.

#### Masking

Masking effects of pulsed sounds will be limited relative to continuous sound sources. Bowhead whales are known to continue calling in the presence of marine survey sounds, and their calls can be heard between sound pulses, although at reduced rates (Greene *et al.*, 1999; Richardson *et al.*, 1986). Masking effects are expected to be minimal to nonexistent in the case of belugas given that sounds important to that species are predominantly at much higher frequencies than are airgun sounds.

#### Behavioral Effects

Any impacts to marine mammals associated with sound propagation from vessel movements and survey operations would be non-lethal, temporary, and, at most, may result in short-term displacement of whales and seals from within the ensonified zones produced by such sound sources. The following discussion of potential behavioral deflection of whales or seals pertains to observations of behavior during relatively large scale seismic programs, such as deep 3D seismic sound sources. As Shell's planned 2009/2010 open-water marine survey program in the Chukchi Sea only includes small-scale sound sources used to perform site clearance and shallow hazards and strudel scour surveys, NMFS anticipates any effects to marine mammals to be similar to or less than those described next.

Any impacts on the whale and seal populations in the vicinity of Shell's Chukchi Sea operations are expected to be non-lethal, short-term, and transitory in nature arising from the temporary displacement of individuals or small groups from locations they may occupy at the time they are exposed to sounds between 160 dB to 190 dB (rms) received levels. In the case of migrating bowhead whales, displacement may take the form of deflection from their swim path away from (seaward of) received sound levels lower than 160 dB (rms; Richardson *et al.*, 1999). While it is not presently known at what distance after passing the sound source bowhead whales return to their previous migration route, any deflection is expected to be only temporary and does not appear to adversely impact the whales or materially affect their successful completion of the migration to the winter calving grounds.

Results from the 1996–1998 BP and Western Geophysical seismic monitoring programs in the Beaufort Sea indicate that most fall migrating bowhead whales deflected seaward to avoid an area within about 20 km (12.4 mi) of an active nearshore seismic operation, with the exception of a few close sightings when there was an island or very shallow water between the seismic operations and the whales (Miller *et al.*, 1998, 1999). The available data do not provide an unequivocal estimate of the distance (and received sound levels) at which approaching bowheads begin to deflect, but this may be on the order of 35 km (21.7 mi). Any deflection as a result of being exposed to seismic operations would be temporary and would not adversely impact the whales or materially affect

the whales' successful completion of the migration to winter calving grounds.

When the received levels of sound exceed some threshold, cetaceans are expected to exhibit behavioral disturbance reactions. The levels, frequencies, and types of sound that will elicit a response vary between and within species, individuals, locations, and seasons. Behavioral changes may be subtle alterations in surface, respiration, and dive cycles. More conspicuous responses include changes in activity or aerial displays, movement away from the sound source, or complete avoidance of the area. The reaction threshold and degree of response also are related to the activity of the animal at the time of the disturbance. Whales engaged in active behaviors, such as feeding, socializing, or mating, appear less likely than resting animals to exhibit overt behavioral reactions, unless the disturbance is perceived as directly threatening.

#### *Hearing Impairment and Other Physical Effects*

Temporary or permanent hearing impairment is a possibility when marine mammals are exposed to very strong sounds, but there has been no specific documentation of this for marine mammals exposed to sequences of airgun pulses. Currently, NMFS' practice regarding exposure of marine mammals to high-level sounds is that cetaceans and pinnipeds should not be exposed to impulsive sound pressure levels (SPLs) greater than 180 and 190 dB re 1  $\mu$ Pa (rms), respectively (NMFS, 2000). Those criteria have been used in defining the safety (shutdown) radii planned for the proposed survey activities. However, those criteria were established before there were any data on the minimum received levels of sounds necessary to cause temporary auditory impairment in marine mammals. The precautionary nature of these criteria are summarized here:

- The 180 dB criterion for cetaceans is precautionary (i.e., lower than necessary to avoid TTS, let alone permanent auditory injury, at least for belugas and delphinids) as it was established prior to empirical research on marine mammals that now indicate that permanent auditory injury would not occur until significantly higher SPLs were encountered.
- The minimum sound level necessary to cause permanent hearing impairment is higher, by a variable and generally unknown amount, than the level that induces TTS.
- The level associated with the onset of TTS is often considered to be a level

below which there is no danger of permanent damage.

Several aspects of the planned monitoring and mitigation measures for this project are designed to detect marine mammals occurring near the airguns to avoid exposing them to sound pulses that might cause hearing impairment. In addition, many cetaceans are likely to show some avoidance of the area with high received levels of airgun sound (see above). In those cases, the avoidance responses of the animals themselves will reduce or (most likely) prevent any possibility of hearing impairment.

Non-auditory physical effects might also occur in marine mammals exposed to strong underwater pulsed sound. Possible types of non-auditory physiological effects or injuries that theoretically might occur in mammals close to a strong sound source include stress, neurological effects, bubble formation, and other types of organ or tissue damage. Some marine mammal species (i.e., beaked whales) may be especially susceptible to injury and/or stranding when exposed to strong pulsed sounds. However, as discussed below, there is no definitive evidence that any of these effects occur even for marine mammals in close proximity to large arrays of airguns, and beaked whales do not occur in the proposed project area. It is unlikely that such effects would occur during Shell's proposed surveys given the brief duration of exposure and the planned monitoring and mitigation measures described later in this document. The following sections discuss the possibilities of TTS, permanent threshold shift (PTS), and non-auditory physical effects in more detail.

(TTS) – TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises and a sound must be stronger in order to be heard. At least in terrestrial mammals, TTS can last from minutes or hours to (in cases of strong TTS) days. For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the noise ends. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals, and none of the published data concern TTS elicited by exposure to multiple pulses of sound.

For toothed whales exposed to single short pulses, the TTS threshold appears to be, to a first approximation, a function of the energy content of the pulse (Finneran *et al.*, 2002, 2005).

Given the available data, the received level of a single seismic pulse (with no frequency weighting) might need to be approximately 186 dB re 1  $\mu$ Pa<sup>2</sup>•s (i.e., 186 dB sound exposure level [SEL]) in order to produce brief, mild TTS. Exposure to several strong seismic pulses that each have received levels near 175–180 dB SEL might result in slight TTS in a small odontocete, assuming the TTS threshold is (to a first approximation) a function of the total received pulse energy. For Shell's proposed survey activities, the distance at which the received energy level (per pulse) would be expected to be  $\geq 175$ –180 dB SEL is the distance to the 190 dB re 1  $\mu$ Pa (rms) isopleth (given that the rms level is approximately 10–15 dB higher than the SEL value for the same pulse). Seismic pulses with received energy levels  $\geq 175$ –180 dB SEL (190 dB re 1  $\mu$ Pa (rms)) are expected to be restricted to radius of approximately 50 m (164 ft) around the airgun array. For an odontocete closer to the surface, the maximum radius with  $\geq 175$ –180 dB SEL or  $\geq 190$  dB re 1  $\mu$ Pa (rms) would be smaller.

For baleen whales, there are no data, direct or indirect, on levels or properties of sound that are required to induce TTS. The frequencies to which baleen whales are most sensitive are lower than those to which odontocetes are most sensitive, and natural background noise levels at those low frequencies tend to be higher. As a result, auditory thresholds of baleen whales within their frequency band of best hearing are believed to be higher (less sensitive) than are those of odontocetes at their best frequencies (Clark and Ellison, 2004). From this, it is suspected that received levels causing TTS onset may also be higher in baleen whales. However, no cases of TTS are expected given the small size of the airguns proposed to be used and the strong likelihood that baleen whales (especially migrating bowheads) would avoid the approaching airguns (or vessel) before being exposed to levels high enough for there to be any possibility of TTS.

In pinnipeds, TTS thresholds associated with exposure to brief pulses (single or multiple) of underwater sound have not been measured. Initial evidence from prolonged exposures suggested that some pinnipeds may incur TTS at somewhat lower received levels than do small odontocetes exposed for similar durations (Kastak *et al.*, 1999, 2005; Ketten *et al.*, 2001; cf. Au *et al.*, 2000). However, more recent indications are that TTS onset in the most sensitive pinniped species studied (harbor seal, which is closely related to

the ringed seal) may occur at a similar SEL as in odontocetes (Kastak *et al.*, 2004).

NMFS (1995, 2000) concluded that cetaceans and pinnipeds should not be exposed to pulsed underwater noise at received levels exceeding, respectively, 180 and 190 dB re 1  $\mu$ Pa (rms). The established 180- and 190-dB re 1  $\mu$ Pa (rms) criteria are not considered to be the levels above which TTS might occur. Rather, they are the received levels above which, in the view of a panel of bioacoustics specialists convened by NMFS before TTS measurements for marine mammals started to become available, one could not be certain that there would be no injurious effects, auditory or otherwise, to marine mammals. As summarized above, data that are now available imply that TTS is unlikely to occur unless bow-riding odontocetes are exposed to airgun pulses much stronger than 180 dB re 1  $\mu$ Pa rms (Southall *et al.*, 2007).

No cases of TTS are expected as a result of Shell's proposed activities given the small size of the source, the strong likelihood that baleen whales (especially migrating bowheads) would avoid the approaching airguns (or vessel) before being exposed to levels high enough for there to be any possibility of TTS, and the mitigation measures proposed to be implemented during the survey described later in this document.

*(PTS)* – When PTS occurs, there is physical damage to the sound receptors in the ear. In some cases, there can be total or partial deafness, whereas in other cases, the animal has an impaired ability to hear sounds in specific frequency ranges.

There is no empirical evidence that exposure to pulses of airgun sound can cause PTS in any marine mammal, even with large arrays of airguns (see Southall *et al.*, 2007). However, given the possibility that mammals close to an airgun array might incur TTS, there has been further speculation about the possibility that some individuals occurring very close to airguns might incur PTS. Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage in terrestrial mammals. Relationships between TTS and PTS thresholds have not been studied in marine mammals, but are assumed to be similar to those in humans and other terrestrial mammals. PTS might occur at a received sound level at least several decibels above that inducing mild TTS if the animal is exposed to the strong sound pulses with very rapid rise time.

It is highly unlikely that marine mammals could receive sounds strong

enough (and over a sufficient duration) to cause permanent hearing impairment during a project employing the airgun sources planned here (i.e., an airgun array with a total discharge volume of 40 in<sup>3</sup>). In the proposed project, marine mammals are unlikely to be exposed to received levels of seismic pulses strong enough to cause more than slight TTS. Given the higher level of sound necessary to cause PTS, it is even less likely that PTS could occur. In fact, even the levels immediately adjacent to the airgun may not be sufficient to induce PTS, especially because a mammal would not be exposed to more than one strong pulse unless it swam immediately alongside the airgun for a period longer than the inter-pulse interval. Baleen whales, and belugas as well, generally avoid the immediate area around operating seismic vessels. The planned monitoring and mitigation measures, including visual monitoring, power-downs, and shutdowns of the airguns when mammals are seen within the safety radii, will minimize the already-minimal probability of exposure of marine mammals to sounds strong enough to induce PTS.

*Non-auditory Physiological Effects* – Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress, neurological effects, bubble formation, and other types of organ or tissue damage. However, studies examining such effects are very limited. If any such effects do occur, they probably would be limited to unusual situations when animals might be exposed at close range for unusually long periods. It is doubtful that any single marine mammal would be exposed to strong seismic sounds for an extended period such that significant physiological stress would develop. Only individuals swimming close to, parallel to, and at the same speed as the vessel would incur a number of high intensity sounds. The small airgun array proposed to be used by Shell would only have 190 and 180 dB distances of 50 and 160 m (164 and 525 ft), respectively.

In general, little is known about the potential for seismic survey sounds to cause auditory impairment or other physical effects in marine mammals. Available data suggest that such effects, if they occur at all, would be limited to short distances or more likely to projects involving large airgun arrays. However, the available data do not allow for meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways. Marine mammals that show behavioral avoidance of seismic vessels, including

most baleen whales, some odontocetes (including belugas), and some pinnipeds, are especially unlikely to incur auditory impairment or other physical effects. Also, the planned monitoring and mitigation measures (described later in this document) include shutdowns of the airguns, which will reduce any such effects that might otherwise occur.

#### *Stranding and Mortality*

In numerous past IHA notices for seismic surveys, commenters have referenced two stranding events allegedly associated with seismic activities, one off Baja California and a second off Brazil. NMFS has addressed this concern several times, and, without new information, does not believe that this issue warrants further discussion. For information relevant to strandings of marine mammals, readers are encouraged to review NMFS' response to comments on this matter found in 69 FR 74905 (December 14, 2004), 71 FR 43112 (July 31, 2006), 71 FR 50027 (August 24, 2006), and 71 FR 49418 (August 23, 2006). In addition, a June, 2008, stranding of 30–40 melon-headed whales off Madagascar that appears to be associated with seismic surveys is currently under investigation. One report indicates that the stranding began prior to seismic surveys starting.

It should be noted that strandings have not been recorded for marine mammal species in the Beaufort and Chukchi seas. NMFS notes that in the Beaufort Sea, aerial surveys have been conducted by MMS and industry during periods of industrial activity (and by MMS during times with no activity). No strandings or marine mammals in distress have been observed during these surveys and none have been reported by North Slope Borough inhabitants. Additionally, if bowhead and gray whales react to sounds at very low levels and therefore move away from the source and outside of the safety radii, then strandings would be unlikely to occur in the Arctic Ocean since a reaction or physical impact that could potentially lead to serious injury or mortality would not likely occur. As a result, NMFS does not expect any marine mammals will incur serious injury or mortality in the Arctic Ocean or strand as a result of the proposed survey.

#### *Possible Effects from Sonar Equipment*

While the sonar equipment proposed to be used for this project generates high sound energy, the equipment operates at frequencies ( $\leq 100$  kHz) beyond the effective hearing range of most marine mammals likely to be encountered

during the proposed activities (Richardson *et al.*, 1995). The equipment proposed for the seismic profiling operate at a frequency range and sound level that could affect marine mammal behavior if they occur within a relatively close distance to the sound source (Richardson *et al.*, 1995). However, given the direct downward beam pattern of these sonar systems coupled with the high-frequency characteristics of the signals, the horizontal received levels of 180 and 190 dB re 1  $\mu$ Pa (rms) would be much smaller when compared to those from the low-frequency airguns with similar source levels. Therefore, NMFS believes that effects of signals from sonar equipment to marine mammals will be negligible.

#### Estimated Take of Marine Mammals

The anticipated harassments from the activities described above may involve temporary changes in behavior. There is no evidence that the planned activities could result in serious injury or mortality, for example due to collisions with vessels or strandings. Disturbance reactions, such as avoidance, are very likely to occur amongst marine mammals in the vicinity of the source vessel. The mitigation and monitoring measures proposed to be implemented (described later in this document) during this survey are based on Level B harassment criteria and will minimize any potential risk of injury.

The sections below describe methods to estimate "take by harassment" and present estimates of the numbers of marine mammals that might be affected during the proposed site clearance and shallow hazards program in the Chukchi Sea. The estimates are based on data obtained during marine mammal surveys in and near the proposed survey area and on estimates of the sizes of the areas where effects could potentially occur. In some cases, these estimates were made from data collected in regions, habitats, or seasons that differ from those in the proposed survey areas. Adjustments to reported population or density estimates were made to account for these differences insofar as possible.

Although several systematic surveys of marine mammals have been conducted in the southern Beaufort Sea, few data (systematic or otherwise) are available on the distribution and numbers of marine mammals in the Chukchi Sea beyond the 200 m (656 ft) bathymetry contour. The main sources of distributional and numerical data used in deriving the estimates are described below and in Shell's application. While there is some uncertainty related to the use of regional

population densities for applications that are local in focus, these estimates are based on the best available scientific data and represents standard practice.

#### Marine Mammal Density Estimates

This section provides estimates of the number of individuals potentially exposed to sound levels at or above 160 dB re 1  $\mu$ Pa (rms). The estimates are based on a consideration of the number of marine mammals that might be disturbed appreciably by operations in the Chukchi Sea.

For the Chukchi Sea, cetacean densities during the summer (July-August) were estimated from effort and sightings data in Moore *et al.* (2000b) while pinniped densities were estimated from Bengtson *et al.* (2005). Because few data are available on the densities of marine mammals other than large cetaceans in the Chukchi Sea in the fall (September-October), density estimates from the summer period have been adjusted to reflect the expected ratio of summer-to-fall densities based on the natural history characteristic of each species. Alternatively, some densities from data collected aboard industry vessels in 2006 and 2007 in the Chukchi Sea have been used.

As noted above, there is some uncertainty about the representativeness of the data and assumptions used in the calculations. To provide some allowance for the uncertainties, "maximum estimates" as well as "average estimates" of the numbers of marine mammals potentially affected have been derived and provided by Shell in their application. For a few marine mammal species, several density estimates were available, and in those cases, the average and maximum estimates were calculated from the survey data. In other cases, only one, or no applicable estimate was available so correction factors were used to arrive at "average" and "maximum" estimates. These are described in detail in Shell's application and the following subsections. Except where noted, the "maximum" estimates have been calculated as twice the "average" estimates. The densities presented are believed to be similar to, or in most cases higher than, the densities that will actually be encountered during the survey.

Detectability bias, quantified in part by  $[f(0)]$ , is associated with diminishing sightability with increasing lateral distance from the survey trackline. Availability bias  $[g(0)]$  refers to the fact that there is less than 100 percent probability of sighting an animal that is present along the survey trackline. These correction factors were applied to

the data from Moore *et al.* (2000b) and were already included in data provided by Richardson and Thompson (2002) on beluga and bowhead whales, and where possible were applied to the available data for other species.

Estimated densities of marine mammals in the Chukchi Sea during the "summer" (July and August) site clearance and shallow hazards survey are presented in Table 6-1 of Shell's application. Densities of marine mammals estimated for the "fall" period of Shell's proposed activities in the Chukchi Sea (September and possibly October) are presented in Table 6-2 of the application. Both "average" and "maximum" densities are provided in the tables. Unless otherwise noted by Shell in the application, maximum densities are twice the average densities. However, since Shell did not provide a rationale regarding the maximum estimate, NMFS has decided that the average density data of marine mammal populations will be used to calculate estimated take numbers because these numbers are based on surveys and monitoring of marine mammals in the vicinity of the proposed project area. NMFS only used the "maximum" estimates for marine mammal species that are considered rare in the project area and for which little to no density information exists (i.e., killer, fin, humpback, and minke whales and ringed seals).

#### (1) Cetaceans

Nine species of cetaceans are known to occur in the Chukchi Sea project area. Only four of these (bowhead, beluga, and gray whales and harbor porpoise) are expected to be encountered in meaningful numbers during the proposed survey. Three of the nine species (bowhead, fin, and humpback whales) are listed as endangered under the ESA.

*Beluga Whales* – Summer densities of beluga whales in offshore waters are expected to be very low. Aerial surveys have recorded very few belugas in the offshore Chukchi Sea during the summer months (Moore *et al.*, 2000b). Additionally, no belugas were observed during more than 42,000 km (26,100 mi) of useable visual effort from industry vessels operating in the Chukchi Sea in 2006 and 2007 (Ireland *et al.*, 2007a,b; Patterson *et al.*, 2007; Reiser *et al.*, 2008). Shallow hazards and site clearance survey activities in 2009 will largely be restricted to open-water areas as were the 2006 and 2007 surveys. Expected densities have been calculated from data in Moore *et al.* (2000b; see Table 6-1 in Shell's application).

In the fall, beluga whale densities in the Chukchi Sea are expected to be higher than in the summer because individuals of the Beaufort Sea stock will be migrating south to their wintering grounds in the Bering Sea (Angliss and Outlaw, 2008). Densities are assumed to be similar in open-water and ice-margin areas although they are probably somewhat higher along the edge of the pack ice than in open-water areas where shallow hazards and site clearance surveys will be conducted. Densities derived from survey results in the northern Chukchi Sea in Moore *et al.* (2000b) were used as the average density for open-water and ice-margin fall estimates (see Table 6–2 in Shell’s application).

**Bowhead Whales** – By July, most bowhead whales are northeast of the Chukchi Sea, within or migrating toward their summer feeding grounds in the eastern Beaufort Sea resulting in low density estimates for the Chukchi Sea (Moore *et al.*, 2000b). The summer estimate in the Chukchi Sea was calculated by assuming there was one bowhead sighting during the 10,684 km (6,639 mi) of survey effort in the Chukchi Sea during the summer months reported in Moore *et al.* (2000b), although, no bowheads were actually observed during those surveys. During the autumn, bowhead whales that summered in the Beaufort Sea and Amundsen Gulf are migrating west and south to their wintering grounds in the Bering Sea making it more likely that bowheads will be encountered in the Chukchi Sea. However, a tagging study of two bowhead whales from 2006 showed that both whales occurred together along the northern Chukotka coast in November of that year, indicating that perhaps they traveled through the northern Chukchi Sea to reach Russian waters (Quakenbush, 2007). A correction factor of  $\times 0.05$  has been used to adjust the observed autumn densities from the Beaufort Sea (Richardson and Thomson, 2002) to estimated densities in the Chukchi Sea, for the following reasons: (1) the migration corridor is narrower in the Beaufort Sea where available data have been obtained; (2) bowheads sometimes linger to feed for extended periods in the Beaufort Sea but extended feeding has not been documented in the central and eastern Chukchi Sea in autumn; and (3) most bowheads will travel through the Chukchi Sea north of the shallow hazards and site clearance survey area after activities are expected to be completed in 2009.

**Gray Whales** – Gray whale densities were estimated from summer aerial surveys by Moore *et al.* (2000b). Moore

*et al.* (2000b) found large summer concentrations of gray whales off the Seward Peninsula, far to the south of Shell’s planned open-water marine surveys. The distribution of gray whales in the proposed survey area was scattered and limited to nearshore areas where most whales were observed in water less than 35 m (115 ft) deep (Moore *et al.*, 2000b). A density calculated from effort and sightings in Moore *et al.* (2000b) in water greater than 35 m (115 ft) in depth was used as the average estimate for the Chukchi Sea during the summer period. In the autumn, gray whales may be dispersed more widely through the northern Chukchi Sea (in the area of the survey), and densities are expected to be slightly higher. A density calculated from effort and sightings in water greater than 35 m (115 ft) deep during autumn in Moore *et al.* (2000b) was used as the average estimate for the Chukchi Sea during the fall period.

**Harbor Porpoise** – Harbor porpoise densities were estimated from industry data collected during 2006 activities in the Chukchi Sea. Prior to 2006, no reliable estimates were available for the Chukchi Sea, and harbor porpoise presence was expected to be very low and limited to nearshore regions. Observers on industry vessels in 2006, however, commonly recorded sightings throughout the Chukchi Sea during the summer and early autumn months. A density estimate from these data has been used for the summer period. No sightings were recorded during the majority of the fall period, so minimal values have been used for that time period.

The remaining four cetacean species that could be encountered in the Chukchi Sea during Shell’s proposed open-water marine survey include the humpback, killer, minke, and fin whales. Although there is evidence of the occasional occurrence of these species in the Chukchi Sea, it is unlikely that individuals will be encountered during the proposed survey. George and Suydam (1998) reported killer whales, Brueggeman *et al.* (1990) reported one minke whale, Suydam and George (1992) and Ireland *et al.* (2008) reported harbor porpoise, and Gambell (1985) recorded the northern extent of fin whales to be in the Chukchi Sea. Small numbers of minke and humpback whales were observed during industry activities in 2006 and 2007 (Ireland *et al.*, 2008).

#### (2) Pinnipeds

Four species of pinnipeds may be encountered in the Chukchi Sea area of Shell’s proposed shallow hazards and

site clearance program: ringed, bearded, spotted, and ribbon seals. Each of these species, except the spotted seal, is associated with both the ice margin and the nearshore area. The ice margin is considered preferred habitat (as compared to the nearshore areas) during most seasons. Spotted seals are often considered to be predominantly a coastal species except in the spring when they may be found in the southern margin of the retreating sea ice, before they move to shore. However, satellite tagging has shown that they sometimes undertake long excursions into offshore waters, as far as 120 km (74.6 mi) off the Alaskan coast in the eastern Chukchi Sea, during summer (Lowry *et al.*, 1994, 1998). Ribbon seals have been reported in very small numbers within the Chukchi Sea by observers on industry vessels (Ireland *et al.*, 2007a; Patterson *et al.*, 2007) so minimal values have been used for expected densities.

**Ringed and Bearded Seals** – For ringed and bearded seals both “average” and “maximum” summer densities are available in Bengtson *et al.* (2005) from spring surveys in the offshore pack ice zone of the northern Chukchi Sea (see Tables 6–1 and 6–2 in Shell’s application). The ringed seal density estimates calculated from data collected during 2006 and 2007 industry operations were 0.262 and 0.041 seals/km<sup>2</sup>, respectively (Jankowski *et al.*, 2007; Reiser *et al.*, 2008), and are lower than those estimated by Bengtson *et al.* (2005). The fall density of ringed seals in the Chukchi Sea has been estimated as two-thirds the summer densities because at that time of year, ringed seals reoccupy nearshore fast ice areas as the fast ice forms.

**Spotted Seals** – Very little information on spotted seal densities in offshore areas of the Chukchi Sea is available because of the difficulty in estimating their density when at sea. Spotted seal densities were estimated by multiplying the bearded seal density from Bengtson *et al.* (2005) by 0.2 based on the ratio of abundance estimates of spotted seal to bearded seal.

#### Exposure Calculations of Marine Mammals

Numbers of marine mammals that might be present and potentially disturbed as a result of the site clearance and shallow hazards survey are estimated below based on available data about mammal distribution and densities at different locations and times of the year, as described in the previous subsections. The proposed survey would take place in the Chukchi Sea over two different seasons (i.e., half in the summer, August, and half in the fall,

September). The estimates of marine mammal densities have therefore been separated both spatially and temporally in an attempt to represent the distribution of animals expected to be encountered over the duration of the survey.

The number of individuals of each species potentially exposed to received sound levels at or above 160 dB re 1  $\mu$ Pa (rms) within the survey region, time period, and habitat zone was estimated by multiplying:

- The expected species density (as provided in Tables 6–1 and 6–2 of Shell’s application); by

- The anticipated area to be ensonified to the specified level in the survey region (900 km<sup>2</sup>), time period, and habitat zone to which that density applies.

The numbers of potential individuals exposed were then summed for each species across the survey regions, seasons, and habitat zones. Some of the animals estimated to be exposed, particularly migrating bowhead whales, might show avoidance reactions before being exposed to 160 dB re 1  $\mu$ Pa (rms). Thus, these calculations actually estimate the number of individuals potentially exposed to sound at or above 160 dB (rms) that would occur if there were no avoidance of the area ensonified to that level.

The area of water potentially exposed to received levels at or above 160 dB (rms) by the proposed operations was calculated by multiplying the planned trackline distance by the cross-track distance of the sound propagation measured during previous field seasons. For site clearance and shallow hazards surveys in 2008 in the Chukchi Sea, the 160 dB radius from the *Cape Flattery’s* four 10 in<sup>3</sup> airguns measured in 2008 was 1,400 m (0.87 mi), and the single 10 in<sup>3</sup> airgun was 440 m (0.27 mi).

Closely spaced survey lines and large cross-track distances of the 160 dB radii can result in repeated exposure of the same area of water. Excessive amounts of repeated exposure can lead to overestimation of the number of animals potentially exposed through double counting. However, the relatively short cross-track distances of the 160 dB radii associated with the site clearance and shallow hazards surveys result in little overlap of exposed waters during the survey, so multiple exposures due to overlap of ensonified areas have not been removed from the area calculations.

Shallow hazards and site clearance surveys in the Chukchi Sea are planned to occur along approximately 480 km (298 mi) of survey lines (plus approximately 120 km (74.6 mi) of

mitigation gun activity between survey lines) from August–September exposing approximately 900 km<sup>2</sup> (347.5 mi<sup>2</sup>) of water to sounds at or above 160 dB (rms).

Density estimates in the Chukchi Sea have been derived for two time periods, the summer period (August) and the fall period (September). Animal densities encountered in the Chukchi Sea during both of these time periods will further depend on the habitat zone within which the source vessel is operating: (1) open-water; or (2) ice margin. The survey vessel is not an icebreaker and cannot tow survey equipment through pack ice. Under this assumption, densities of marine mammals expected to be observed in or near ice margin areas have been applied to 10 percent of the proposed survey trackline. Densities of marine mammals expected to occur in open-water areas have been applied to the remaining 90 percent of the survey trackline.

Approximately half of the proposed Chukchi Sea site clearance and shallow hazards survey is planned to be completed in August, so the summer density estimates have been applied to 50 percent of the trackline falling within each habitat zone. The other half of the trackline is planned to be surveyed in September, so the fall marine mammal densities have also been applied to 50 percent of the trackline in each habitat zone.

Based on the operational plans and marine mammal densities described above, the estimates of marine mammals potentially exposed to sounds at or above 160 dB (rms) in the Chukchi Sea are presented in Table 6–7 of Addendum 2 to Shell’s application. A discussion of the number of potential exposures is summarized by species in the following subsections.

#### (1) Cetaceans

Based on density estimates, one ESA-listed cetacean species (the bowhead whale) is expected to be exposed to received sound levels at or above 160 dB (rms) unless bowheads avoid the survey vessel before the received levels reach 160 dB. Migrating bowheads are likely to avoid the survey vessel, though many of the bowheads engaged in other activities, particularly feeding and socializing may not. Using average density estimates, Shell estimates that one bowhead whale may potentially be exposed to sounds at or above 160 dB (rms) in the Chukchi Sea project area during the site clearance and shallow hazards survey (see Table 6–7 of Addendum 2 to Shell’s application). Two other cetacean species listed as endangered under the ESA that may be

encountered in the project area (fin and humpback whales) are unlikely to be exposed given their low “average” density estimates in the area. However, Shell has estimated that a “maximum” of five humpback whales and five fin whales may be exposed to sound levels at or above 160 dB (rms) during the proposed survey (see Table 6–7 in Addendum 2). NMFS’ reasoning for using the “maximum” estimate for these species was explained earlier in this document.

Most of the cetaceans exposed to survey sounds with received levels greater than or equal to 160 dB (rms) would involve mysticetes (bowhead and gray whales), monodontids (beluga whales), and porpoise (harbor porpoise). Average and maximum estimates of the number of exposures of cetaceans other than bowheads are beluga whale (10 and 19, respectively), gray whale (19 and 37, respectively), and harbor porpoise (6 and 11, respectively). Average estimates for the other cetacean species are zero (see Table 6–7 in Addendum 2 to Shell’s application) since accurate density estimates are not possible given the paucity of sightings. However, maximum estimates are provided for these species (see Table 6–7).

For the common species, the requested numbers are calculated as described previously in this document and based on the average densities from the data reported in the different studies mentioned previously.

#### (2) Pinnipeds

The ringed seal is the most widespread and abundant pinniped in ice-covered Arctic waters, and there is a great deal of annual variation in population size and distribution of these marine mammals. Ringed seals account for the vast majority of marine mammals expected to be encountered and hence exposed to airgun sounds with received levels greater than or equal to 160 dB re 1  $\mu$ Pa (rms) during the proposed site clearance and shallow hazards survey. The average (and maximum) exposure estimate is that 692 (1,078) ringed seals might be exposed to marine survey sounds with received levels at or above 160 dB (rms).

Two additional pinniped species (other than Pacific walrus) are expected to be encountered. They are the bearded seal (31 and 43, average and maximum estimates, respectively) and the spotted seal (6 and 11, average and maximum estimates, respectively; Table 6–7 in Addendum 2 to Shell’s application). Survey activities near spotted seal haulouts at Icy Cape in the Chukchi Sea will remain more than 8 km (5 mi) from shore and be timed to minimize the

chance of disturbance to hauled out seals. The ribbon seal is unlikely to be encountered. Therefore, only a maximum estimate (5) has been provided for this species based on the minimal density data and extremely low density estimates for this species in the Chukchi Sea. NMFS' reasoning for using the "maximum" estimate for this species was explained earlier in this document.

### Conclusions

#### (1) Cetaceans

Most of the bowhead whales encountered during the summer will likely show overt disturbance (avoidance) if they receive airgun sounds with levels at or above 160 dB re 1  $\mu$ Pa (rms). The small airgun array proposed for use in this survey greatly limits the size of the 160 dB zone around the ship (1,400 m (0.87 mi)). The use of this smaller airgun array will result in fewer bowhead whales being disturbed by the survey when compared to the use of larger airgun arrays.

Seismic operators sometimes see dolphins and other small toothed whales near operating airgun arrays, but in general, there seems to be a tendency for most delphinds to show some limited avoidance of operating seismic vessels (Stone, 2003; Moulton and Miller, 2005; Holst *et al.*, 2006; Stone and Tasker, 2006). Studies that have reported cases of small toothed whales close to the operating airguns include Duncan (1985), Arnold (1996), Stone (2003), and Holst *et al.* (2006). However, at least when in the Canadian Beaufort Sea in summer, belugas appear to be fairly responsive to seismic energy, with few being sighted within 10–20 km (6.2–12.4 mi) of seismic vessels during aerial surveys. These results were consistent with the low number of beluga sightings reported by observers aboard the seismic vessel, suggesting that some belugas might be avoiding the seismic operations at distances of 10–20 km (6.2–12.4 mi; Miller *et al.*, 2005). The study conducted by Miller *et al.* (2005) was aboard a vessel conducting a 3D seismic survey, utilizing two identical 2,250 in<sup>3</sup> airgun arrays with each array containing 24 guns. Since the acoustic sources proposed to be used during Shell's survey are significantly smaller (40 in<sup>3</sup> array) than the ones described in the Miller *et al.* (2005) study, deflections of that magnitude are not expected. Belugas will likely occur in small numbers in the Chukchi Sea during the survey period and few will likely be affected by the survey activity.

Taking into account the mitigation measures that are planned, effects on

cetaceans are generally expected to be restricted to avoidance of a limited area around the survey operation and short-term changes in behavior, falling within the MMPA definition of "Level B harassment". Furthermore, the estimated numbers of animals potentially exposed to sound levels sufficient to cause appreciable disturbance are relatively low percentages of the population sizes in the Bearing-Chukchi-Beaufort seas, as described next.

Based on the 160 dB (rms) disturbance criterion, the best (average) estimates of the numbers of cetacean exposures to sounds at or above 160 dB re 1  $\mu$ Pa (rms) represent varying proportions of the populations of each species in the Chukchi Sea and adjacent waters (cf. Table 6–1 in Shell's application). For species listed as endangered under the ESA, Shell's estimates suggest it is unlikely that fin whales or humpback whales will be exposed to received levels greater than or equal to 160 dB rms, but that approximately one bowhead may be exposed at this level. The latter is less than 0.01 percent of the Bering-Chukchi-Beaufort population of greater than 13,779 individuals assuming 3.4 percent annual population growth from the 2001 estimate of 10,545 animals (Zeh and Punt, 2005).

Beluga whales may be exposed to sounds produced by the airgun arrays during the proposed survey, and the numbers potentially affected are small relative to the population size (Table 6–7 in Addendum 2 to Shell's application). The best estimate of the number of belugas that might be exposed to sounds at or above 160 dB (10) represents 0.27 percent of the eastern Chukchi Sea population of approximately 3,710 individuals (Angliss and Allen, 2009).

Gray whales and harbor porpoise may also be exposed to sounds produced by the airguns. The best (average) estimate of the number of gray whales and harbor porpoise that might be exposed to sounds at or above 160 dB (rms) represents 0.11 percent of the Eastern North Pacific stock of gray whales and less than 0.01 percent of the Bering Sea stock of harbor porpoise.

In addition, killer, fin, humpback, and minke whales could also be taken by Level B harassment as a result of the proposed survey. However, the possibility is low. The numbers of "average" estimated take of these species are not available because they are rare in the project area and little density data exist for these species in the proposed project area. Since the Chukchi Sea represents only a small

fraction of the North Pacific and Arctic basins where these animals occur, and these animals do not regularly congregate in the vicinity of the project area, NMFS believes that only relatively small numbers, if any, of these marine mammal species would be potentially affected by the proposed open-water marine survey program.

Varying estimates of the numbers of marine mammals that might be exposed to sounds from the airgun array during the 2009 Shell shallow hazards and site clearance surveys have been presented (average vs. maximum). The relatively short-term exposures that will occur are not expected to result in any long-term negative consequences for the individuals or their populations.

The many reported cases of apparent tolerance by cetaceans of seismic exploration, vessel traffic, and some other human activities show that co-existence is possible. Mitigation measures such as controlled vessel speed, dedicated marine mammal observers (MMOs), non-pursuit, shutdowns or power-downs when marine mammals are seen within defined ranges, and avoiding migration pathways when animals are likely most sensitive to noise will further reduce short-term reactions and minimize any effects on hearing sensitivity. In all cases, the effects are expected to be short-term, with no lasting biological consequence. Subsistence issues are addressed later in this document.

*Potential Bowhead Disturbance at Lower Received Levels* – Aerial surveys during fall seismic surveys in the Beaufort Sea showed that migrating bowhead whales appeared to avoid seismic activities at distances of 20–30 km (12.4–18.6 mi) and received sound levels of 120–130 dB rms (Miller *et al.*, 1999; Richardson *et al.*, 1999). Therefore, it is possible that a larger number of bowhead whales than estimated above may be disturbed to some extent if reactions occur at or near approximately 130 dB (rms). Using the same method of calculation as described earlier in this document for estimating take, the number of migrating bowhead whales exposed to sounds greater than or equal to 120 dB by the proposed survey would be approximately 8.5 the number estimated at 160 dB. (It should be noted though that this calculation is more accurate for the Beaufort Sea where the bowhead whale migration pathway is narrower and more clearly defined than in the Chukchi Sea.) However, acoustic data collected in the vicinity of seismic surveys in the Beaufort Sea in 2007 indicated that bowhead whales did not avoid the sound source at distances equivalent to

120 dB (rms) and instead tolerated sounds at higher levels while likely changing their calling behavior (Blackwell *et al.*, 2008).

Reducing operations during the bowhead whale subsistence harvest is meant to accomplish two mitigation objectives. It greatly reduces the potential for conflicts with subsistence hunting activities, and it allows a large proportion of the bowhead population to migrate past the survey area without being exposed to survey sounds at or above 160 dB (rms) or 120 dB (rms).

The western Arctic stock of bowhead whales usually begins its westward migration through the Beaufort Sea in late August. Westbound bowheads typically reach the Barrow area in mid-September and remain in that area until late October (Brower, 1996). Therefore, migrating bowhead whales are not expected in the proposed Chukchi Sea survey area until the second half of the survey, as the project is expected to occur for approximately 50 days between August and September.

## (2) Pinnipeds

A few pinniped species are likely to be encountered in the study area, but the ringed seal is by far the most abundant marine mammal species in the survey area. The best (average) estimates of the numbers of individual seals likely to be exposed to airgun sounds at received levels at or above 160 dB re 1  $\mu$ Pa (rms) during the open-water marine survey in the Chukchi Sea are as follows: ringed seals (692), bearded seals (31), and spotted seals (6), (representing 0.3 percent, 0.6 percent, and 0.01 percent, respectively, of the Bering-Chukchi-Beaufort populations for each species). It is probable that only a small percentage of the animals exposed to sound levels at 160 dB would actually be disturbed. For example, Moulton and Lawson (2002) indicate that most pinnipeds exposed to seismic sounds lower than 170 dB do not visibly react to that sound, and, therefore, pinnipeds are not likely to react to seismic sounds unless they are greater than 170 dB re 1  $\mu$ Pa (rms). Consequently, the take estimates presented in this document may be an overestimation. The short-term exposures of pinnipeds to airgun sounds are not expected to result in any long-term negative consequences for the individuals or their populations, as observations have shown pinnipeds to be rather tolerant of (or habituated to) underwater seismic sounds.

## Potential Impacts on Habitat

The proposed activities will not result in any permanent impact on habitats

used by marine mammals or to their prey sources. Site clearance and shallow hazards activities will occur during the time of year when bowhead whales are present (i.e., August and September). Any effects would be temporary and of short duration at any one place. The primary potential impacts to marine mammals are associated with acoustic sound levels from the proposed site clearance and shallow hazards survey work discussed earlier in this document.

Mortality to fish, fish eggs, and larvae from energy sources would be expected within a few meters (0.5 to 3 m (1.6 to 10 ft)) from the sound source. Direct mortality has been observed in cod and plaice within 48 hours that were subjected to pulses 2 m (6.6 ft) from the source (Matishov, 1992); however, other studies did not report any fish kills from sound source exposure (La Bella *et al.*, 1996; IMG, 2002; Hassel *et al.*, 2003). To date, fish mortalities associated with normal operations are thought to be slight. Saetre and Ona (1996) modeled a worst-case mathematical approach on the effects of energy on fish eggs and larvae, and concluded that mortality rates caused by exposure to sounds are so low compared to natural mortality that issues relating to stock recruitment should be regarded as insignificant.

Limited studies on physiological effects on marine fish and invertebrates to acoustic stress have been conducted. No significant increases in physiological stress from sound energy were detected for various fish, squid, and cuttlefish (McCauley *et al.*, 2000) or in male snow crabs (Christian *et al.*, 2003). Behavioral changes in fish associated with sound exposures are expected to be minor at best. Because only a small portion of the available foraging habitat would be subjected to sound pulses at a given time, fish would be expected to return to the area of disturbance within anywhere from 15 to 30 min (McCauley *et al.*, 2000) to several days (Engas *et al.*, 1996).

Available data indicate that mortality and behavioral changes of various fish or invertebrates do occur within very close range (less than 2 m (6.6 ft)) to the energy source. The proposed acquisition activities in distinct areas in the Chukchi Sea would impact less than 0.1 percent of available food resources, which would have little, if any, effect on a marine mammal's ability to forage successfully.

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

acquisition areas and timing of the activities.

## Effects of Seismic Noise and Other Related Activities on Subsistence

The disturbance and potential displacement of marine mammals by sounds from seismic activities are the principal concerns related to subsistence use of the area. Subsistence remains the basis for Alaska Native culture and community. Marine mammals are legally hunted in Alaskan waters by coastal Alaska Natives. In rural Alaska, subsistence activities are often central to many aspects of human existence, including patterns of family life, artistic expression, and community religious and celebratory activities. The main species that are hunted include bowhead and beluga whales, ringed, spotted, and bearded seals, walrus, and polar bears. The importance of each of these species varies among the communities and is largely based on availability.

Communities that participate in subsistence hunts that have the potential to be affected by Shell's open-water marine survey program in the Chukchi Sea proposed survey areas are Point Hope, Point Lay, Wainwright, Barrow and possibly Kotzebue (however, this community is much farther to the south of the proposed project area).

Point Hope residents subsistence hunt for bowhead and beluga whales, polar bears, and walrus. Bowhead and beluga whales are hunted in the spring and early summer along the ice edge. Beluga whales may also be hunted later in the summer along the shore. Walrus are harvested in late spring and early summer, and polar bears are hunted from October to April (MMS, 2007). Seals are available from October through June, but are harvested primarily during the winter months, from November through March, due to the availability of other resources during the other periods of the year (MMS, 2007).

With Point Lay situated near Kasegaluk Lagoon, the community's main subsistence focus is on beluga whales. Each year, hunters from Point Lay drive belugas into the lagoon to a traditional hunting location. The belugas have been predictably sighted near the lagoon from late June through mid- to late July (Suydam *et al.*, 2001). Seals are available year-round, and polar bears and walrus are normally hunted in the winter. Hunters typically travel to Barrow, Wainwright, or Point Hope to participate in bowhead whale harvest, but there is interest in reestablishing a local Point Lay harvest. Shell's activities are scheduled to avoid

the traditional subsistence beluga hunt, which annually occurs in July.

Wainwright residents subsist on both beluga and bowhead whales in the spring and early summer. During these two seasons the chances of landing a whale are higher than during other seasons. Seals are hunted by this community year-round, and polar bears are hunted in the winter.

Barrow residents' main subsistence focus is concentrated on biannual bowhead whale hunts. They hunt these whales during the spring and fall. Westbound bowheads typically reach the Barrow area in mid-September and are in that area until late October (e.g., Brower, 1996). Autumn bowhead whaling near Barrow normally begins in mid-September to early October but may begin as early as late-August if whales are observed and ice conditions are favorable (USDI/BLM, 2005). Whaling near Barrow can continue into October, depending on the quota and conditions. Other animals, such as seals, walrus, and polar bears are hunted outside of the whaling season, but they are not the primary source of the subsistence harvest (URS Corporation, 2005).

There could be an adverse impact on the Inupiat bowhead subsistence hunt if the whales were deflected seaward (further from shore) in traditional hunting areas. The impact would be that whaling crews would have 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. This potential impact is mitigated by application of the procedures established in the 4MP. Adaptive mitigation measures may be employed during times of active scouting and whaling within the traditional subsistence hunting areas of the potentially affected communities. Shell does not plan to begin activities until after completion of the spring bowhead hunts. However, there is a possibility that their data acquisition will not be completed prior to the start of the fall bowhead hunt in Barrow. However, it is not expected that the whales will be deflected further offshore before reaching Barrow since Shell's survey will occur approximately 225 km (140 mi) west of Barrow. The whales will be traveling westward through the Beaufort Sea from Canada and will reach Barrow before entering the survey area in the Chukchi Sea. Based on these factors, Shell's Chukchi Sea survey is not expected to interfere with the fall bowhead harvest in Barrow. In recent years, bowhead whales have occasionally been taken in the fall by coastal villages along the Chukchi coast,

but the total number of these animals has been small.

Shell has adopted a spatial and temporal operational strategy for its Chukchi Sea operations that should minimize impacts to subsistence hunters. Operations will not begin prior to the close of the spring bowhead hunt in the Chukchi coastal villages and will closely coordinate with and avoid impacts to beluga whale hunts and walrus hunts through subsistence advisors.

The timing (late summer and fall after many of the Chukchi Sea communities have harvested sizeable portions of their marine mammal quota) and distance (approximately 113 km (70 mi) or more) from shore, as well as the low volume airguns that are proposed to be used and the proposed mitigation measures described later in this document, are expected to mitigate any adverse effects of the surveys on the availability of marine mammals for subsistence uses. NMFS does not expect subsistence users to be directly displaced by the proposed survey because subsistence hunters usually do not travel this far (113 km [70 mi]) offshore to harvest marine mammals. Additionally, because of the significant distance offshore and the lack of hunting in these areas, there is no expectation that any physical barriers would exist between marine mammals and subsistence users. Based on this information, NMFS has preliminarily determined that Shell's proposed open-water marine survey program in the Chukchi Sea in 2009/2010 will not have an unmitigable adverse impact on subsistence uses.

#### **Plan of Cooperation (POC)**

Regulations at 50 CFR 216.104(a)(12) require IHA applicants for activities that take place in Arctic waters to provide a POC or information that identifies what measures have been taken and/or will be taken to minimize adverse effects on the availability of marine mammals for subsistence purposes. Shell has prepared and will implement a draft POC for its 2009 activities. The POC also describes concerns received during 2008. Shell developed the POC to mitigate and avoid any unreasonable interference from their planned activities with North Slope subsistence uses and resources. The POC is, and has been in the past, the result of numerous meetings and consultations between Shell, affected subsistence communities and stakeholders, and Federal agencies. The POC identifies and documents potential conflicts and associated measures that will be taken to minimize any adverse effects on the availability of marine mammals for subsistence use.

The Draft POC document was distributed to the communities, subsistence users groups, NMFS, and USFWS on May 15, 2009. To be effective, the POC must be a dynamic document which will expand to incorporate the communications and consultation that will continue to occur throughout 2009 and 2010. Outcomes of POC meetings are typically included in updates attached to the POC as addenda and distributed to federal, state, and local agencies as well as local stakeholder groups that either adjudicate or influence mitigation approaches for Shell's open-water programs.

Shell has held and plans to hold additional community meetings in Barrow, Wainwright, Point Hope, Point Lay, and Kotzebue regarding its 2009 Chukchi open-water marine survey program. Some of the community POC meetings that have already occurred include: February 2, 2009, in Barrow; March 24, 2009, in Point Hope; March 25, 2009, in Kotzebue; March 26, 2009, in Wainwright; and April 22, 2009, in Point Lay. Shell plans to focus on lessons learned from the 2008 open-water program and begin preparing mitigation measures (beyond those already identified elsewhere in this document) to avoid potential conflicts. During 2009, Shell will continue to meet with the marine mammal commissions and committees including the Alaska Eskimo Whaling Commission (AEWC), Eskimo Walrus Commission (EWC), Alaska Beluga Whale Committee (ABWC), Alaska Ice Seal Committee (AISC), and the Alaska Nanuq Commission (ANC). Throughout 2009, Shell anticipates meeting with the marine mammal commissions and committees active in the subsistence harvests and marine mammal research.

Also during 2009, Shell will meet at least twice with the commissioners and committee heads of ABWC, ANC, EWC, and AISC jointly in co-management meetings. During a pre-season co-management meeting Shell will present pre-season planning to the commissioners and committee leads in order to gather their input on subsistence use concerns, consider their traditional knowledge in the design of project mitigations, and to hear about their involvement in research on marine mammals and/or traditional use. Following the season, Shell will have a post-season co-management meeting with the commissioners and committee heads to discuss results of mitigation measures and outcomes of the preceding season. The goal of the post-season meeting is to build upon the knowledge base, discuss successful or unsuccessful

outcomes of mitigation measures, and possibly refine plans or mitigation measures if necessary.

In addition, Shell will meet with North Slope officials and community leaders on an as-requested basis before the 2009 open-water season in order to discuss the proposed activities. Lastly, Shell intends to discuss adaptive conflict avoidance mechanisms to address concerns expressed by subsistence users in the North Slope communities.

The POC also specifies times and areas to avoid in order to minimize possible conflicts with traditional subsistence hunts by North Slope villages for transit and open-water activities. As mentioned elsewhere in this document, Shell does not plan to conduct survey activities until the close of Point Lay's spring beluga hunt, which usually occurs each year in July. Additionally, Shell has stated that vessel transits in the Chukchi Sea spring lead system will not occur prior to July 1, 2009, and July 1, 2010.

#### Proposed Mitigation and Monitoring

As part of its application, Shell has proposed implementing a 4MP that will consist of monitoring and mitigation during their open-water shallow hazards data acquisition activities in the Chukchi Sea during the 2009/2010 open-water season. The program consists of monitoring and mitigation during Shell's various activities related to survey data acquisition, including transit and data acquisition. This program will provide information on the numbers of marine mammals potentially affected by the survey program and real-time mitigation to prevent possible injury or mortality of marine mammals by sources of sound and other vessel related activities. Monitoring efforts will be initiated to collect data to address the following specific objectives: (1) improve the understanding of the distribution and abundance of marine mammals in the Chukchi Sea project areas; and (2) assess the effects of sound and vessel activities on marine mammals inhabiting the project areas and their distribution relative to the local people that depend on them for subsistence hunting. These objectives and the monitoring and mitigation goals will be addressed through the utilization of vessel-based MMOs on the survey source vessels. Additional information can be found in Shell's application.

#### Proposed Mitigation Measures

The proposed survey program incorporates both design features and operational procedures for minimizing

potential impacts on cetaceans and pinnipeds and on subsistence hunts. The design features and operational procedures have been described in the IHA application submitted to NMFS and requests for LOAs submitted to USFWS and are summarized here. Survey design features include:

- Timing and locating survey activities to avoid interference with the annual fall bowhead whale and other marine mammal hunts;
- Selecting and configuring the energy source array in such a way that it minimize the amount of energy introduced into the marine environment and, specifically, so that it minimizes horizontal propagation;
- Limiting the size of the acoustic energy source to only that required to meet the technical objectives of the survey; and
- Early season field assessment to establish and refine (as necessary) the appropriate 180 dB and 190 dB safety zones, and other radii relevant to behavioral disturbance.

The potential disturbance of cetaceans and pinnipeds during survey operations will be minimized further through the implementation of several ship-based mitigation measures, which include establishing and monitoring safety and disturbance zones, speed and course alterations, ramp-up (or soft start), power-down, and shutdown procedures, and provisions for poor visibility conditions.

#### (1) Safety and Disturbance Zones

Safety radii for marine mammals around airgun arrays are customarily defined as the distances within which received pulse levels are greater than or equal to 180 dB re 1  $\mu$ Pa (rms) for cetaceans and greater than or equal to 190 dB re 1  $\mu$ Pa (rms) for pinnipeds. These safety criteria are based on an assumption that seismic pulses at lower received levels will not injure these animals or impair their hearing abilities, but that higher received levels might have such effects. It should be understood that marine mammals inside these safety zones will not necessarily be seriously injured or killed as these zones were established prior to the current understanding that significantly higher levels of impulse sounds would be required before injury or mortality could occur (see Southall *et al.*, 2007).

Shell anticipates that monitoring similar to that conducted in the Chukchi Sea in 2007–8 will also be required in 2009. Shell plans to use MMOs onboard the survey vessel to monitor the 190 and 180 dB (rms) safety radii for pinnipeds and cetaceans, respectively, and to

implement appropriate mitigation as discussed in this document.

In addition, a 160–dB (rms) vessel monitoring zone for bowhead and gray whales will be established and monitored during all survey activities. Whenever an aggregation of 12 or more bowhead or gray whales are observed during a vessel-monitoring program within the 160–dB zone around the source vessel, the survey will not commence or will shutdown until MMOs confirm they are no longer present within the 160–dB safety radius of surveying operations (see the "Power-downs and Shutdowns" subsection later in this document). The radius of the 160–dB isopleth based on modeling is 1,400 m (0.87 mi).

During previous survey operations in the Chukchi Sea, Shell utilized early season sound source verification (SSV) to establish safety zones for the previously mentioned sound level criteria. As the equipment being utilized in 2009 is similar to that used in 2008, Shell will initially utilize the derived (i.e., measured) sound criterion distances from 2008. An acoustics contractor will perform the direct measurements of the received levels of underwater sound versus distance and direction from the energy source arrays using calibrated hydrophones. The acoustic data will be analyzed as quickly as reasonably practicable in the field and used to verify (and if necessary adjust) the safety distances.

#### (2) Ramp-up

A ramp-up of an energy source array provides a gradual increase in energy levels, and involves a step-wise increase in the number and total volume of energy released until the full complement is achieved. The purpose of a ramp-up (or "soft start") is to "warn" cetaceans and pinnipeds in the vicinity of the energy source and to provide the time for them to leave the area and thus avoid any potential injury or impairment of their hearing abilities.

During the proposed survey program, the operator will ramp up energy sources slowly, if the energy source being utilized generates sound energy within the frequency spectrum of cetacean or pinniped hearing. Full ramp-ups (i.e., from a cold start after a shut down, when no airguns have been firing) will begin by firing one small airgun. The minimum duration of a shut-down period, i.e., without air guns firing, which must be followed by a ramp-up typically is the amount of time it would take the source vessel to cover the 180–dB safety radius. The actual time period depends on ship speed and the size of the 180–dB safety radius,

which are not known at this time. However, previous SSV measurements indicate that the 180-dB safety radius for the 4 x 10 in<sup>3</sup> airgun array is approximately 160 m (525 ft).

Ramp-up, after a shutdown, will not begin until there has been a minimum of a 30 min period of observation by MMOs of the safety zone to assure that no marine mammals are present. The entire safety zone must be visible during the 30 min lead-in to a full ramp-up. If the entire safety zone is not visible, then ramp-up from a cold start cannot begin. If a marine mammal(s) is sighted within the safety zone during the 30-min watch prior to ramp-up, ramp-up will be delayed until the marine mammal(s) is sighted outside of the safety zone or the animal(s) is not sighted for at least 15–30 minutes: 15 min for small odontocetes and pinnipeds, or 30 min for baleen whales (large odontocetes do not occur within the project area).

During periods of turn around and transit between survey transects, at least one airgun (or energy source) will remain operational. The ramp-up procedure still will be followed when increasing the source levels from one airgun to the full array. Keeping one airgun firing, however, will avoid the prohibition of a cold start during darkness or other periods of poor visibility. Through use of this approach, survey operations can resume upon entry to a new transect without a full ramp-up and the associated 30-min lead-in observations. MMOs will be on duty whenever the airguns are firing during daylight and during the 30-min periods prior to ramp-ups as well as during ramp-ups. Daylight will occur for 24 hr/day until mid-August, so until that date, MMOs will automatically be observing during the 30-min period preceding a ramp-up. Later in the season, MMOs will be called out at night to observe prior to and during any ramp-up. The vessel operator and MMOs will maintain records of the times when ramp-ups start and when the airgun arrays reach full power.

### (3) Power-downs and Shutdowns

A power-down is the immediate reduction in the number of operating energy sources from all firing to some smaller number. A shutdown is the immediate cessation of firing of all energy sources. The arrays will be immediately powered down whenever a marine mammal is sighted approaching near or close to the applicable safety zone of the full arrays but is outside the applicable safety zone of the single source. If a marine mammal is sighted within the applicable safety zone of the single energy source, the entire array

will be shut down (i.e., no sources firing). Although MMOs will be located on the bridge ahead of the center of the airgun array, the shutdown criterion for animals ahead of the vessel will be based on the distance from the bridge (vantage point for MMOs) rather than from the airgun array a precautionary approach. For marine mammals sighted alongside or behind the airgun array, the distance is measured from the array.

Following a power-down or shutdown, operation of the airgun array will not resume until the marine mammal has cleared the applicable safety zone. The animal will be considered to have cleared the safety zone if it:

- (1) Is visually observed to have left the safety zone;
- (2) Has not been seen within the zone for 15 min in the case of small odontocetes and pinnipeds; or
- (3) Has not been seen within the zone for 30 min in the case of mysticetes.

For the aggregation of 12 or more bowhead or gray whales, the acoustic equipment will not be turned back on or return to full power until the aggregation has left the 160-dB isopleth or the animals forming the aggregation are reduced to fewer than 12 bowhead or gray whales.

### (4) Operations at Night and in Poor Visibility

Shell plans to conduct the site clearance and shallow hazards survey 24 hr/day. Regarding nighttime operations, note that there will be no periods of total darkness until mid-August. When operating under conditions of reduced visibility attributable to darkness or to adverse weather conditions, infra-red or night-vision binoculars will be available for use. It is recognized, however, that their effectiveness is limited. For that reason, MMOs will not routinely be on watch at night, except in periods before and during ramp-ups. As stated earlier, if the entire safety zone is not visible for at least 30 min prior to ramp-up, then ramp-up may not proceed. It should be noted that if one small energy source has remained firing, the rest of the array can be ramped up during darkness or in periods of low visibility. Survey operations may continue under conditions of darkness or reduced visibility.

### (5) Speed and Course Alterations

If a marine mammal (in water) is detected outside the safety radius and, based on its position and the relative motion, is likely to enter the safety radius, the vessel's speed and/or direct course would be changed in a manner

that does not compromise safety requirements. The animal's activities and movements relative to the source vessel will be closely monitored to ensure that the individual does not approach within the safety radius. If the mammal is sighted approaching near or close to the applicable safety radius, further mitigative actions will be taken, i.e., either further course alterations or power-down or shutdown of the airgun(s).

### *Proposed Marine Mammal Monitoring*

Vessel-based monitoring for marine mammals will be conducted throughout the period of survey operations. The 4MP will be implemented by a team of experienced MMOs, including both biologists and Inupiat personnel. All MMOs will be approved by NMFS prior to the start of operations. At least one observer on the survey vessel will be an Inupiat who will have the responsibility of communicating with the Inupiat community and (during the whaling season) directly with the Subsistence Advisors in coastal villages.

The MMOs will be stationed aboard the survey source vessel throughout the active field season. The duties of the MMOs will include watching for and identifying cetaceans and pinnipeds; recording their numbers, distances, and reactions to the survey operations; initiating mitigation measures when appropriate; and reporting the results. MMOs aboard the survey source vessel will be on watch during all daylight periods when the energy sources are in operation and when energy source operations are to start up at night. Each MMO shift will not exceed more than 4 consecutive hours, and no MMO will work more than 3 shifts in a 24 hr period (i.e., 12 hours total per day) in order to avoid fatigue.

Crew leaders and most other biologists serving as observers in 2009 will be individuals with experience as observers during one or more of the 1996–2008 monitoring projects for Shell, WesternGeco, or BP and/or subsequent offshore monitoring projects for other clients in Alaska, the Canadian Beaufort, or other offshore areas. Biologist-observers to be assigned will have previous marine mammal observation experience and field crew leaders will be highly experienced with previous vessel-based monitoring projects. Qualifications for those individuals will be provided to NMFS for review and acceptance. Inupiat observers will be experienced in the region and familiar with the marine mammals of the area. An MMO handbook, adapted for the specifics of the proposed survey programs from the

handbooks created for previous monitoring projects will be prepared and distributed beforehand to all MMOs (see Shell's 4MP for additional details on the handbook). Observers, including Inupiat observers, will also complete a 2-day training and refresher session on marine mammal monitoring to be conducted shortly before the anticipated start of the 2009 open-water season. The training session(s) will be conducted by marine mammalogists with extensive crew-leader experience during previous vessel-based monitoring programs.

#### (1) Monitoring Methodology

The observer(s) 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 x 50 reticle binoculars, supplemented with 20 x 50 image stabilized binoculars, and night-vision equipment when needed. Personnel on the bridge will assist the MMOs in watching for pinnipeds and cetaceans.

The observer(s) will give particular attention to the areas within the "safety zone" around the source vessel. These zones are the maximum distances within which received levels may exceed 180 dB re 1  $\mu$ Pa (rms) for cetaceans or 190 dB re 1  $\mu$ Pa (rms) for pinnipeds. MMOs will also be able to monitor the 160 dB re 1  $\mu$ Pa (rms) radius for Level B harassment takes, as this radius is expected to be a maximum of 1,400 m (0.87 mi). The 160-dB isopleth (1,400 m [0.87 mi]) will also be monitored for the presence of aggregations of 12 or more bowhead or gray whales.

Information to be recorded by MMOs will include the same types of information that were recorded during previous monitoring programs (1998–2008) in the Chukchi and Beaufort seas (Moulton and Lawson, 2002; Patterson *et al.*, 2007). 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 the source vessel, apparent reaction to the source vessel (e.g., none, avoidance, approach, paralleling, etc.), closest point of approach, and behavioral pace;

(2) Time, location, heading, speed, activity of the vessel, and operational state (e.g., operating airguns, ramp-up, etc.), sea state, ice cover, visibility, and sun glare; and

(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, the operational state (e.g., number and size of operating energy sources), and water temperature (if available), water depth, sea state, ice cover, visibility, and sun glare will also be recorded at the start and end of each observation watch and, during a watch, every 30 min and whenever there is a change in one or more of those variables.

Distances to nearby marine mammals, e.g., those within or near the 190 dB (or other) safety zone applicable to pinnipeds, will be estimated with binoculars (7 x 50) containing a reticle to measure the vertical angle of the line of sight to the animal relative to the horizon.

Observers will use a laser rangefinder to test and improve their abilities for visually estimating distances to objects in the water. 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. (Previous SSV measurements indicate that the 190-dB safety radius for the 4 x 10 in<sup>3</sup> airgun array proposed for use during Shell's site clearance and shallow hazards survey is approximately 50 m (164 ft), well within the range of 70 m (230 ft)). 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.

When a marine mammal is seen within the safety radius applicable to that species, the geophysical crew will be notified immediately so that mitigation measures described previously in this document can be implemented. As in 1996–2001 and in 2006–2008, it is expected that the airgun arrays will be shut down within several seconds—often before the next shot would be fired, and almost always before more than one additional shot is fired. The MMO will then maintain a watch to determine when the mammal(s) is outside the safety zone such that airgun operations can resume.

Night vision equipment ("Generation 3" binocular image intensifiers or equivalent units) will be available for use when needed. Prior to mid-August, there will be no hours of total darkness in the proposed project area. The operators will provide or arrange for the following specialized field equipment for use by the onboard MMOs: reticle binoculars, 20 x 50 image stabilized

binoculars, "Big-eye" binoculars, laser rangefinders, inclinometer, laptop computers, night vision binoculars, and possibly digital still and digital video cameras.

#### (2) Field Data-recording and Verification

The observers will record their observations onto datasheets or directly into handheld computers. During periods between watches and periods when operations are suspended, those data will be entered into a laptop computer running a custom computer database. The accuracy of the data entry will be verified in the field by computerized validity checks as the data are entered and by subsequent manual checking of the database printouts. These procedures will allow initial summaries of data to be prepared during and shortly after the field season and will facilitate transfer of the data to statistical, graphical, or other programs for further processing. Quality control of the data will be facilitated by the start-of-season training session, subsequent supervision by the onboard field crew leader, and ongoing data checks during the field season.

#### (3) Acoustic Sound Source Verification Measurements

As part of the IHA application process for similar shallow hazards and marine survey acquisition in 2006–2008, Shell contracted JASCO Research Ltd. to conduct acoustic measurements of vessel and energy source arrays on source and support to broadband received levels of 190, 180, 170, 160, and 120 dB re 1  $\mu$ Pa (rms; see Table 1 of Attachment A in Shell's application).

The radii measured by these previous SSV tests will be utilized as temporary safety radii until current SSV measurements of the actual airgun array sound are available as mentioned earlier in this document. The measurements will be made at the beginning of the field season and the measured radii used for the remainder of the survey period.

In 2009, Shell plans to utilize similar equipment aboard its survey source vessel. Shell intends to make new SSV measurements at the start of its proposed 2009 Chukchi Sea surveys even though the equipment planned for 2009 surveying operations are similar to the one used in 2006–2008. Verification measurements will be performed on or as close as possible to the actual survey locations, with ice conditions being the limiting factor.

The objective of the SSV tests planned for 2009 in the Chukchi Sea will be to measure the distances in the broadside and endfire directions at which

broadband received levels reach 190, 180, 170, 160, and 120 dB re 1  $\mu$ Pa (rms) for the energy source array combinations that may be used during the survey processes. The configurations will include at least the full array operating and the operation of a single source that will be used during power downs. The measurements of energy source array sounds will be made at the beginning of the survey, and the distances to the various radii will be reported as soon as possible after recovery of the equipment. The primary radii of concern will be the 190 and 180 dB safety radii for pinnipeds and cetaceans, respectively, and the 160 dB disturbance radii. In addition to reporting the radii of specific regulatory concern, nominal distances to other sound isopleths down to 120 dB (rms) will be reported in increments of 10 dB.

Data will be previewed in the field immediately after download from the OBHs. An initial sound source analysis will be supplied to NMFS and the operators within 120 hr of completion of the measurements and analysis, if possible. The report will indicate the distances to sound levels between 190 dB re 1  $\mu$ Pa (rms) and 120 dB re 1  $\mu$ Pa (rms) based on a fits of empirical transmission loss formulae to data in the endfire and broadside directions. The 120 hr report findings will be based on analysis of measurements from at least three of the OBH systems. A more detailed report including analysis of data from all OBH systems will be issued to NMFS as part of the 90-day report following completion of the acoustic program (see the "Reporting" section later in this document).

Airgun pressure waveform data from the OBH systems will be analyzed using JASCO's suite of custom signal processing software that implements the following data processing steps:

- Energy source pulses in the OBH recordings are identified using an automated detection algorithm. The algorithm also chooses the 90 percent energy time window for rms sound level computations.

- Waveform data is converted to units of  $\mu$ Pa using the calibrated acoustic response of the OBH system. Gains for frequency-dependent hydrophone sensitivity, amplifier and digitizer are applied in this step.

- For each pulse, the distance to the airgun array is computed from GPS deployment positions of the OBH systems and the time referenced DGPS navigation logs of the survey vessel.

- The waveform data are processed to determine flat-weighted peak SPL, rms SPL, and SEL.

- Each energy pulse is Fast Fourier Transformed to obtain 1-Hz spectral power levels in 1 s steps.

- The spectral power levels are integrated in standard 1/3-octave bands to obtain band sound pressure levels for bands from 10 Hz to 20 kHz. M-weighted SPL's for each airgun pulse may be computed in this step for species of interest.

The output of the above data processing steps includes listings and graphs of airgun array narrow band and broadband sound levels versus range and spectrograms of shot waveforms at specified ranges. Of particular importance are the graphs of level versus range that are used to compute representative radii to specific sound level thresholds.

#### (4) Chukchi Sea Acoustic Arrays

Shell and ConocoPhillips are jointly funding an extensive acoustic monitoring program in the Chukchi Sea in 2009. This program incorporates the acoustic programs of 2006–2008 with a total of 44 recorders distributed both broadly across the Chukchi lease area and the nearshore environment and intensively on the Burger and Klondike lease areas. The broad area arrays are designed to capture both general background soundscape data and marine mammal call data across the lease area. From these recordings, it is anticipated that Shell (and others) may be able to gain insights into large-scale distribution of marine mammals, identification of marine mammal species present, movement and migration patterns, and general abundance data.

The intense area arrays are designed to support localization of marine mammal calls on and around the leasehold areas. In the case of the Burger prospect, where Shell intends to conduct shallow hazards data acquisition, localized calls will enable investigators to understand response of marine mammals to survey operations both in terms of distribution around the operation and behavior (i.e., calling behavior).

#### (5) Aerial Surveys

No manned aerial overflights are anticipated during the 2009 shallow hazards and marine survey activities. In the Chukchi Sea, all shallow hazards activities will be conducted beyond 113 km (70 mi) from shore and well away from coastal communities or nearshore concentrations of subsistence resources. The strudel scour survey will be conducted beyond 8 km (5 mi) from shore and will utilize sources of low energy and frequencies outside the

hearing ranges of cetacean and pinniped species in the area. Additionally, the energy source to be utilized by Shell for the proposed survey operations are minimal by comparison to larger scale seismic operations. It is not anticipated that manned overflights would accomplish any direct mitigative effects or monitoring purpose. Although no manned aerial surveys are planned as part of the 4MP, NMFS believes that the monitoring and mitigation measures proposed by Shell in its 4MP will be sufficient to reduce impacts on marine mammals to the lowest level practicable.

#### (6) Monitoring Plan Independent Peer Review

The MMPA requires that monitoring plans be independently peer reviewed "where the proposed activity may affect the availability of a species or stock for taking for subsistence uses" (16 U.S.C. 1371(a)(5)(D)(ii)(III)). Regarding this requirement, NMFS' implementing regulations state, "Upon receipt of a complete monitoring plan, and at its discretion, [NMFS] will either submit the plan to members of a peer review panel for review or within 60 days of receipt of the proposed monitoring plan, schedule a workshop to review the plan" (50 CFR 216.108(d)). Shell's 4MP was discussed by meeting participants at the Arctic Stakeholder Open-water Workshop in Anchorage, Alaska, on April 6–8, 2009. On April 24, 2009, NMFS received a letter from the AEWC, which noted that while there was discussion of the 4MP at the workshop, they do not believe that there was ample review of the plan and wanted to know NMFS' plans to hold an independent peer review in order to meet its statutory requirement.

NMFS has considered the AEWC's request and has decided to establish an independent peer review panel to review the 4MP for Shell's activities during the 2009/2010 open-water season. Panelists are selected by NMFS, in consultation with the Marine Mammal Commission, AEWC and/or other Alaskan native organizations as appropriate, and the applicant. Selected panelists are experts who are not currently employed or contracted by either the affected Alaskan native organization or the applicant. NMFS plans for this independent peer review of the 4MP to occur during the comment period for this proposed IHA. After completion of the peer review, NMFS will consider all recommendations made by the panel, incorporate appropriate changes into the monitoring requirements of the IHA (if issued), and publish the panel's findings and

recommendations in the final IHA notice of issuance or denial document.

## Reporting

### SSV Report

A report on the preliminary results of the acoustic verification measurements, including as a minimum the measured 190-, 180-, and 160-dB (rms) radii of the airgun sources, will be submitted within 120 hr after collection and analysis of those measurements at the start of the field season. This report will specify the distances of the safety zones that were adopted for the survey.

### Technical Reports

The results of the 2009 Shell vessel-based monitoring, including estimates of "take" by harassment, will be presented in the "90-day" and Final Technical reports, as required by NMFS under IHAs. Shell proposes that the Technical Reports will include: (1) summaries of monitoring effort (e.g., total hours, total distances, and marine mammal distribution through study period versus operational state, sea state, and other factors affecting visibility and detectability of marine mammals); (2) summaries of the occurrence of power-downs, shutdowns, ramp-ups, and ramp-up delays; (3) analyses of the effects of various factors, influencing detectability of marine mammals (e.g., sea state, number of observers, and fog/glare); (4) species composition, occurrence, and distribution of marine mammal sightings, including date, water depth, numbers, age/size/gender categories (if determinable), group sizes, and ice cover; (5) sighting rates of marine mammals versus operational state (and other variables that could affect detectability); (6) initial sighting distances versus operational state; (7) closest point of approach versus operational state; (8) observed behaviors and types of movements versus operational state; (9) numbers of sightings/individuals seen versus operational state; (10) distribution around the acoustic source vessel versus operational state; and (11) estimates of take by harassment. The take estimates will be calculated using two different methods to provide both minimum and maximum estimates. The minimum estimate will be based on the numbers of marine mammals directly seen within the relevant radii (160, 180, and 190 dB (rms)) by observers on the source vessel during survey activities. The maximum estimate will be calculated using densities of marine mammals determined for non-acoustic areas and times. These density estimates will be

calculated from data collected during (a) vessel based surveys in non-operational areas, or (b) observations from the source vessel or supply boats during non-operational periods. The estimated densities in areas without data acquisition activity will be applied to the amount of area exposed to the relevant levels of sound to calculate the maximum number of animals potentially exposed or deflected. This report will be due 90 days after termination of the 2009 open-water season and will include the results from any seismic work conducted in the Chukchi/Beaufort Seas in 2009 under the previous IHA, which expires on August 19, 2009, or upon issuance of this proposed IHA.

### Comprehensive Monitoring Reports

In November, 2007, Shell (in coordination and cooperation with other Arctic seismic IHA holders) released a final, peer-reviewed edition of the 2006 Joint Monitoring Program in the Chukchi and Beaufort Seas, July–November 2006 (LGL, 2007). This report is available on the NMFS Protected Resources website (see **ADDRESSES**). In March, 2009, Shell released a final, peer-reviewed edition of the Joint Monitoring Program in the Chukchi and Beaufort Seas, Open Water Seasons, 2006–2007 (Ireland *et al.*, 2009). This report is also available on the NMFS Protected Resources website (see **ADDRESSES**). A draft comprehensive report for 2008 (Funk *et al.*, 2009) was provided to NMFS and those attending the Arctic Stakeholder Open-water Workshop in Anchorage, Alaska, on April 6–8, 2009. The 2008 report provides data and analyses from a number of industry monitoring and research studies carried out in the Chukchi and Beaufort Seas during the 2008 open-water season with comparison to data collected in 2006 and 2007. Reviewers plan to provide comments on the 2008 report to Shell shortly. Once Shell is able to incorporate reviewer comments, the final 2008 report will be made available to the public.

Following the 2009 open-water season, a comprehensive report describing the acoustic and vessel-based 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 program into an assessment of 2009 industry activities and their impacts on marine mammals. The report will help to establish long term data sets that can assist with the evaluation of changes, if

any, in the Chukchi Sea ecosystem. The report 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 report will consider data from many different sources including differing types of acoustic systems for data collection (net array and OBH systems) and vessel based observations. Collection of comparable data across the wide array of programs will help with the synthesis of information and allow integration of the data sets over a period of years. Data protocols for the acoustic operations will be similar to those used in 2006–2008 to facilitate this integration.

### Endangered Species Act

NMFS previously consulted under section 7 of the ESA on the issuance of IHAs for seismic survey activities in the Beaufort and Chukchi Seas. In a Biological Opinion issued on July 17, 2008, NMFS concluded that the issuance of seismic survey permits by MMS and the issuance of the associated IHAs for seismic surveys are not likely to jeopardize the continued existence of threatened or endangered species (specifically the bowhead, humpback, and fin whales) under the jurisdiction of NMFS or destroy or adversely modify any designated critical habitat. The 2008 Biological Opinion takes into consideration all oil and gas related activities that are reasonably likely to occur, including exploratory (but not production) oil drilling activities. NMFS believes that Shell's proposed activities described and analyzed in this document for the 2009/2010 open-water season are adequately analyzed in the 2008 Biological Opinion. Therefore, NMFS does not plan to conduct a new section 7 consultation.

### National Environmental Policy Act (NEPA)

NMFS is currently conducting an analysis, pursuant to NEPA, to determine whether or not this proposed activity may have a significant effect on the human environment. This analysis will be completed prior to the issuance or denial of this proposed IHA.

### Preliminary Determinations

Based on the information provided in Shell's application, Shell's answers to the supplemental information request, this document, the 2006 and 2007 Final Comprehensive Reports, and the 2008 Draft Comprehensive Report, NMFS has preliminarily determined that the impact of Shell conducting its proposed

open-water marine survey program (site clearance and shallow hazards and strudel scour surveys) in the Chukchi Sea during the 2009/2010 open-water season may result, at worst, in a temporary modification in behavior (Level B Harassment) of small numbers of 12 species of marine mammals, will have no more than a negligible impact on the affected species or stocks, and will not have an unmitigable adverse impact on the availability of such species or stock for taking for subsistence purposes, provided the mitigation measures described previously in this document are implemented.

While the number of potential incidental harassment takes will depend on the distribution and abundance of marine mammals (which vary annually due to variable ice conditions and other factors) in the area of survey operations, the number of potential harassment takings is estimated to be small (less than one percent of any of the estimated population sizes) and has been mitigated to the lowest level practicable through incorporation of the measures mentioned previously in this document. NMFS anticipates the actual take of individuals to be lower than the numbers presented in the analysis because those numbers do not reflect either the implementation of the proposed mitigation measures or the fact that some animals will avoid the sound at levels lower than those expected to result in harassment.

In addition, no take by death and/or serious injury is anticipated, and the potential for temporary or permanent hearing impairment will be avoided through the incorporation of the mitigation and monitoring measures proposed earlier in this document. This determination is supported by the fact that: (1) given sufficient notice through slow ship speed and ramp-up of acoustic equipment, marine mammals are expected to move away from a sound source prior to it becoming potentially injurious; (2) TTS is unlikely to occur, especially in odontocetes and pinnipeds, until sound levels above 180 dB re 1  $\mu$ Pa (rms) and 190 dB re 1  $\mu$ Pa (rms), respectively, are reached; and (3) injurious levels of sound are only likely very close to the vessel (approximately 160 m (525 ft) for the 180 dB (rms) radius and 50 m (164 ft) for the 190 dB (rms) radius). No rookeries, mating grounds, areas of concentrated feeding, or other areas of special significance for marine mammals occur within or near the planned area of operations during the season of operations.

NMFS has preliminarily determined that Shell's proposed open-water marine

survey program in the Chukchi Sea in 2009/2010 will not have an unmitigable adverse impact on the subsistence uses of bowhead whales and other marine mammals. This preliminary determination is supported by the information in this **Federal Register** Notice, including: (1) Survey activities will not begin prior to the closure of the spring bowhead hunt in Chukchi coastal villages; (2) Shell will closely coordinate with and avoid impacts to beluga whale hunts through subsistence advisors; (3) activities are scheduled to avoid the traditional subsistence beluga hunt, which annually occurs in July in the community of Point Lay; (4) Barrow is east of the proposed project area, so the animals will reach Barrow before entering the project area on their fall westward migration through the Beaufort and Chukchi Seas; (5) the fact that survey activities will occur more than 113 km (70 mi) or more from shore, and most cetaceans and pinnipeds are hunted much closer to the shore; and (6) that several of the mitigation and monitoring conditions proposed for the IHA (described earlier in this document) are designed to ensure that there will not be an unmitigable adverse impact on subsistence uses of marine mammals.

#### Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to authorize the take of marine mammals incidental to Shell's 2009/2010 open-water marine survey program in the Chukchi Sea, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: May 26, 2009.

**James H. Lecky,**

*Director, Office of Protected Resources,  
National Marine Fisheries Service.*

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## DEPARTMENT OF DEFENSE

### GENERAL SERVICES ADMINISTRATION

### NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

[OMB Control No. 9000-0097]

#### Federal Acquisition Regulation; Submission for OMB Review; Taxpayer Identification Number Information

**AGENCIES:** Department of Defense (DOD), General Services Administration (GSA), and National Aeronautics and Space Administration (NASA).

**ACTION:** Notice of reinstatement request for an information collection requirement regarding an existing OMB clearance.

**SUMMARY:** Under the provisions of the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35), the Federal Acquisition Regulation (FAR), Regulatory Secretariat has submitted to the Office of Management and Budget (OMB) a request to review and approve a request to reinstate a previously approved information collection requirement concerning Taxpayer Identification Number Information. A request for public comments was published at 73 FR 20613 on April 16, 2008. No comments were received.

Public comments are particularly invited on: Whether this collection of information is necessary; whether it will have practical utility; whether our estimate of the public burden of this collection of information is accurate, and based on valid assumptions and methodology; ways to enhance the quality, utility, and clarity of the information to be collected; and ways in which we can minimize the burden of the collection of information on those who are to respond, through the use of appropriate technological collection techniques or other forms of information technology.

**DATES:** Submit comments on or before July 1, 2009.

**ADDRESSES:** Submit comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to: General Services Administration (GSA) Desk Officer, OMB, Room 10236, NEOB, Washington, DC 20503, and a copy to the General Services Administration, Regulatory Secretariat (VPR), 1800 F Street NW., Room 4041, Washington, DC 20405. Please cite OMB Control No. 9000-0097, Taxpayer Identification Number Information, in all correspondence.

**FOR FURTHER INFORMATION CONTACT:** Mr. Ernest Woodson, Procurement Analyst, Contract Policy Division, GSA, (202) 501-3775.

#### SUPPLEMENTARY INFORMATION:

##### A. Purpose

When the IRS issued its final regulations implementing section 6050M of the Tax Reform Act of 1986 (Pub. L. 99-514), the reporting requirements included the requirement to report certain modifications to contracts that were awarded before January 1, 1989, necessitating a revision to Subpart 4.9 of the FAR. As implemented by Section 6050M of the