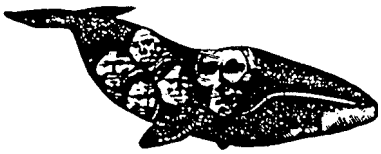

Alaska Eskimo Whaling Commission

P.O. Box 570 ·Barrow, Alaska 99723 · Phone: (907) 852 2392

July 30, 2007

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

RE: Comments on Draft Programmatic Environmental Impact Statement: Seismic Surveys in the Beaufort and Chukchi Seas in 2007

Dear Mr. Payne:

The Alaska Eskimo Whaling Commission appreciates the opportunity to submit the enclosed comments on the Minerals Management Service's and National Marine Fisheries Services' Draft Programmatic Environmental Impact Statement concerning Seismic Surveys in the Beaufort and Chukchi Seas in 2007.

If you have any questions or would like to discuss these matters, please call me at my office: 907-852-0350.

Sincerely,

/s/ Harry Brower
Chairman

cc: Edward Itta, Mayor North Slope Borough
Senator Ted Stevens
Senator Lisa Murkowski
Congressman Don Young
John Goll, Regional Director, MMS Alaska

COMMENTS OF THE ALASKA ESKIMO WHALING COMMISSION ON THE U.S. MINERALS MANAGEMENT SERVICE'S AND THE U.S. NATIONAL MARINE FISHERIES SERVICE'S DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT (D-PEIS) FOR OUTER CONTINENTAL SHELF SEISMIC SURVEYS IN THE BEAUFORT AND CHUKCHI SEAS – 2007

July 30, 2007

INTRODUCTION

The AEWC remains strongly opposed to offshore oil and gas development in the Arctic Ocean. Our coastal villages rely heavily on the ocean for our cultural and nutritional well-being. Of particular importance to the ten villages of the Alaska Eskimo Whaling Commission is our bowhead whale subsistence hunt. In essence, our subsistence bowhead whale hunt defines us as Inupiat and Yupik Eskimo people. Our goal is to protect our bowhead whale resource and subsistence hunt and to educate others on the importance of this resource and on the unique characteristics of our traditional culture.

Despite its many gifts of natural resources, the Arctic Ocean's dangerous sea and ice conditions make it an extremely risky environment in which to develop oil and gas. Offshore oil and gas development produces noise that sends the bowhead whale offshore and away from our hunters. This puts our hunters at increased risk. If our hunters perish at sea in pursuit of our whales, or if they abandon the hunt because it becomes too dangerous, our people and our culture could die out. Resource managers at the National Marine Fisheries Service (NMFS) and the Minerals Management Service (MMS) must consider our people's needs in planning their oil and gas exploration projects.

MMS is obliged to balance the development of the mineral resources of the Outer Continental Shelf with the protection of the human, marine and coastal environments. 43 USC §1332(4) and 1334(a). The human environment includes and is exemplified by our bowhead whale subsistence communities on the Arctic coast.[1] The OCSLA authorizes the Secretary of the Interior to regulate the development of the OCS in consideration of the effects of that development on our culture and the physical environment in which we conduct our hunt. 43 USC § 1332(3). Therefore, MMS must permit geophysical exploration of the Arctic Ocean subject to the environmental safeguards that would protect the availability of bowhead whales for subsistence harvest.

[1] The term "human environment" means the physical, social, and economic components, conditions, and factors which interactively determine the state, condition, and quality of living conditions, employment, and health of those affected, directly or indirectly, by activities occurring on the outer Continental Shelf. 43 USC § 1331(i).

The provisions of the Marine Mammal Protection Act further solidify federal agencies' obligation to protect marine mammal subsistence hunting. Under the MMPA, NMFS is obliged to ensure that its permitting program has no unmitigable adverse impact on the availability of marine mammals for subsistence use. MMPA 101(a)(5)(D). Therefore, any arctic marine seismic operations that NMFS authorizes cannot jeopardize the availability of bowhead whales for subsistence take.

The National Environmental Policy Act functions as a third check on the hazards to the continuation of our subsistence culture from federally permitted oil and gas exploration activities. NEPA's action-forcing provision requires federal agencies to consider practical, feasible alternatives to a proposed major federal action. 42 USC § 4332 (C)(iii). While NEPA requires no particular substantive result, Congress enacted the law to influence federal agency decisions toward the goal of assuring the preservation of the human environment. *Id.* at 4321, 4331.

The AEWC believes that, with current geophysical exploration technology, the most effective, yet appropriately cautious, approach to gathering the geophysical information needed to make informed leasing choices is to follow Alternative 9 and permit one seismic vessel per planning area. We believe this is the best choice in light of two important facts: First, OCS operators have not demonstrated their willingness to monitor the safety and exclusion zones set by NMFS in previous Incidental Harassment Authorizations for seismic activity in the Chukchi Sea. Second, very few data exist that could shed light on bowhead whale use of habitat, especially in the Chukchi Sea.

Therefore, the agencies' selection of Alternative 9 would promote the protection of our traditional bowhead whale subsistence hunt, while allowing MMS and industrial OCS operators to obtain the required geophysical data.

If MMS and NMFS find that they cannot limit seismic permits to one source vessel per planning area, they should choose Alternative 8 as the preferred alternative and add to it a 120 dB exclusion zone for cow/calf pairs and critical aggregations of bowhead whales. Also, the cumulative effects analysis needs to be updated and taken seriously, as it is these effects that, if not carefully monitored and mitigated, are the greatest potential to disrupt our hunt, and our lives, permanently.

Finally, we request that NMFS and MMS postpone decisions based on the PEIS until after the independent peer review panel has reviewed and commented on the cumulative effects analysis of the 2006 monitoring report.

COMMENTS

I. Monitoring of Proposed Safety or Exclusion Zones Is Crucial to Establishing Effective Measures to Mitigate the Adverse Impacts to Bowhead Whales From a Seismic Program in the Beaufort and Chukchi Seas.

Monitoring serves two functions indispensable to Arctic OCS operations that have the potential to disrupt our hunt and harass our bowhead whales. First, monitoring is critical to the determination of the actual level of take of marine mammals as required by NMFS regulations. Second, it provides the information needed to assist regulators, operators, participating North Slope Borough scientists, and the AEWC in designing effective mitigation measures to ensure that bowhead whales continue to be available for harvest in our traditional hunting areas.

Mitigation that results from good monitoring can be applied both in the long term and short term. In the long term, monitoring can provide the basis for the development of effective mitigation measures for future open water seasons of OCS operations, as stakeholders review and analyze monitoring data from the previous season.

In the short term—that is, during current seismic operations—monitoring is meant to alert operators, in real time, to the presence of marine mammals so that they can modify operations and avoid direct harm or harassment of those animals. Seismic operators must be able to detect marine mammals within the distances NMFS has prescribed. However, the 2006 season proved that OCS operators are not willing to conduct the monitoring that NMFS and MMS require, and the two agencies are not willing to suspend or revoke the IHA and G&G permits, respectively, in order to force operators to comply with monitoring requirements.

Additionally, the 2006 open water season monitoring report was incomplete, unsatisfactory, and lacked a cumulative effects analysis. One company even opted not to conduct monitoring of the 120 dB isopleth in the Chukchi Sea and sought a stay of the requirement in federal court. The AEWC requests that, before NMFS makes a final determination with regard to this PEIS, independent peer reviewers are given the chance to evaluate the 2006 monitoring report's cumulative impacts analysis, which is still underway.

Monitoring is the backbone of responsible, lawful oil and gas exploration in the Arctic Ocean. The AEWC is concerned that in 2006 open water season, the 120dB monitoring requirement was not enforced. The integrity of the analysis in the DPEIS is utterly dependent on the capability and willingness of oil and gas operators to monitor their activities and produce their data timely so that impacts can be properly mitigated. If this document is to have any meaning at all, NMFS and MMS must take seriously their responsibilities as federal regulators and enforce monitoring. If OCS operators cannot demonstrate that they are willing and able to conduct the required monitoring, the agencies should not grant them authorization to shoot seismic in the Arctic Ocean.

II. Alternative 9 Could Accomplish the Purpose and Need of the Proposed Action While Preserving the Availability of Marine Mammals for Subsistence Use.

The MMPA directs that oil and gas activity in the Beaufort and Chukchi Seas can go forward only in the presence of a finding that such activity will not have an "unmitigable adverse impact" on the availability of marine mammal subsistence resources for taking for subsistence uses. While NMFS is responsible for making this finding, the proscription also binds MMS, as the federal agency whose actions give rise to the need for the finding. Alternative 9 is the best choice to ensure that MMS meets the MMPA standard for protection of marine mammal subsistence resources.

The level of activity contemplated in the DPEIS is unprecedented and requires commensurate caution from permitting federal regulators. MMS and NMFS must protect marine resources in the face of this extraordinary level of planned activity taking place, especially in the Chukchi Sea, where virtually nothing is known of the bowhead whale's habitat use.

A. NMFS and MMS should not exclude Alternative 9 from consideration because it could be the best choice among the alternatives, enabling industry to acquire the geophysical data while limiting activity so as to protect marine mammal subsistence hunting.

NEPA tasks MMS and NMFS with sharply defining the issues and providing a clear basis for choice among options though a rigorous, objective evaluation of all reasonable alternatives. 40 CFR §1502.14. Alternative 9 limits the number of geophysical vessels to one source vessel per season in the Chukchi and Beaufort Seas. MMS and NMFS, by excluding Alternative 9 from further evaluation, miss a valuable opportunity to evaluate an alternative that could accomplish the purpose and need of the underlying proposal while protecting marine mammal subsistence resources of the OCS. Without evaluating Alternative 9, there is no clear basis for choice among the options, since a valid, feasible option is excluded from consideration.

The DPEIS rules out Alternative 9 and any alternative that considers limiting the number of seismic permits or vessels in a single season. The agencies irrationally reason that a "programmatic, regional scenario does not support analyses that quantify and identify differences in the potential impacts between one, two three or four permits." DPEIS at II-10. However, NEPA contemplates precisely such analyses of alternatives, so long as they reasonably can meet the purpose and need of the underlying action. 40 CFR §1502.14. Nothing in law or logic precludes an evaluation of a narrower scope of activity simply because the proposed action or a previous "programmatic" analysis (here, the 2006 Programmatic Environmental Assessment) considered a broader scope of activity.

Furthermore, MMS reasons that there is no need to evaluate the potential impacts of an single seismic survey because the 2006 seismic PEA found that four surveys would

have no significant impact; therefore, one survey can be presumed to have no significant impact. However, if this alternative would meet purpose and need, its having no significant impacts is a mark in its favor, and the agencies should not only consider it, but should select it as the preferred alternative.

The agencies dismiss Alternative 9 because they estimate, based on historic permitting and industry signals, that industrial operators might request up to six permits per planning area per season. The potential requests of industry should not be the guiding factor for this analysis. To the contrary: if NMFS and MMS were to adopt Alternative 9 as the preferred alternative, they would give oil and gas companies an incentive to share vessels and/or data—fewer source vessels would operate, eliminating the chance that concurrent operations would create overlapping ensonified areas. Also, companies that need geophysical data might well consider other means of collecting the required information, such as on-ice seismic data acquisition or newer electromagnetic imaging technology for geophysical applications.

According to MMS, limiting permits would not be effective because more than one vessel is allowed under a single permit. This reasoning discounts, MMS's and NMFS's ability to condition permits so as to allow only one vessel per permitted survey.

Inexplicably, MMS rejects this possibility because of an existing regulation that appears to guarantee every operator a G&G permit by noting that if the application is rejected, the Regional Director will advise the applicant of necessary changes to make the application approvable. 30 CFR 251.5(b). However, the OCSLA states that the Secretary may promulgate rules and regulations that are necessary and proper to protect the correlative rights in the OCS and the conservation of the natural resources of the OCS. 43 USC 1334 (a). Therefore, MMS easily could amend the rule; such a procedural rulemaking would not even require notice and comment under the Administrative Procedure Act. 5 USC § 553.

B. The Agencies Should Permit the Minimum Number of Seismic Surveys That Would Meet Geophysical Data Needs While Ensuring No Unmitigable Adverse Impact on the Availability of Subsistence Marine Mammals.

Contrary to the agencies' supposition, limiting surveys or source vessels to one per planning area will not necessarily prevent industry and government from making informed decisions, evaluating the potential for offshore oil and gas resources, or determining the presence of geologic hazards. Rather, because individual permits can authorize extensive shooting, on one or multiple leases, a single vessel contracted to multiple oil and gas companies may be sufficient to acquire the needed geophysical data before the next lease sale in the new Five Year Program, which will not occur until 2009.

Because it is possible to accomplish the purpose and need of the proposed action under an alternative that considers limitation of permits to one permitted vessel per

planning area, MMS and NMFS should provide a detailed analysis of that alternative—Alternative 9.

C. In the Beaufort Sea, the AEWC strongly encourages MMS to limit geophysical operations for the following reasons.

1. *Increased Vessel Traffic From Other Activities.*

With the increase in NPR-A leasing and development in recent years, the amount of vessel traffic transiting the Beaufort Sea during the open water season has intensified. Additionally, the amount of commercial vessel traffic in the Beaufort Sea is on the rise. As past research and the monitoring at Northstar demonstrate, vessel traffic can elicit avoidance behavior in fall migrating bowhead whales. Therefore, the level of activity and energy in the water associated with work not related to OCS oil and gas leases, cumulatively, is at an all-time high and must be taken into account as MMS considers its options for permitting work on the OCS.

2. *Sensitivity of Bowhead Whales to Industrial Noise.*

Monitoring of the 1996 through 1998 seismic surveys associated with the Northstar unit indicate that bowhead whales may begin to deflect around a seismic source at a distance of approximately 35 km and may stay offshore for "50 km or more" to the west of the seismic source. Thus, while these surveys identified the now well recognized "20 km zone" of near total avoidance, the 20 km "radius" in fact occurred principally to the north of the sound source. Avoidance distances to the east and west appear to have been greater, possibly 85 km or more, or more than 50 miles total – from a single seismic vessel. (See Richardson, *et al.*, "Marine Mammal and Acoustical Monitoring of Western Geophysical's Open-Water Seismic Program in the Alaskan Beaufort Sea," September, 1998, Section 5.3.5, p. 5-60.)

Therefore migrating bowhead whales appear to deflect around an active seismic vessel at significant distances. Furthermore, the traditional knowledge of our AEWC whaling captains demonstrates that the whales begin to show disturbed or "skittish" behavior well before they begin to deflect. The "zone of influence" from active seismic is greater still than the "zone of avoidance." Depending on the nature of the seismic activity and the level of ambient noise at a given time, this distance could be quite large.

It is critical that the agencies analyze potential impacts in the context within which they will occur – for the Beaufort Sea, that context includes unprecedented levels of vessel traffic and the presence of an offshore production unit, as well as the presence of ever increasing seismic activity in the Canadian Beaufort Sea. Seismic operations in the Canadian Beaufort promise to become a more prominent element of the cumulative effects picture in the near future.

It is reasonable to expect that geophysical operations would be not be clustered together. They would be planned for areas well dispersed across the Alaskan Beaufort

– e.g., the Eastern Beaufort, Camden Bay, and Smith Bay. If so, whales leaving the ensonified environment of the Canadian Beaufort and deflecting around active seismic in the Eastern Alaskan Beaufort would be looking ahead to additional seismic activity directly in their path, as well as the vessel traffic and/or drilling sounds associated with Sivulliq, Northstar, West Dock, and the Oooguruk units.

Given the overall level of industrial activity in the Beaufort Sea, the AEWC urgently requests that MMS and NMFS restrict Beaufort Sea geophysical operations to a single survey per planning area, at least during the fall bowhead whale subsistence hunt.

III. If MMS Does Not Limit the Number of Seismic Permits Through Alternative 9, NMFS and MMS Should Select Alternative 8 as Their Preferred Alternative Because It Has the Best Chance to Protect Marine Mammals and the Marine Mammal Subsistence Hunting.

In its environmental analysis, NMFS and MMS properly recognize the likelihood of potentially significant impacts created by the permitting of multiple, simultaneous seismic operations in the Beaufort and Chukchi Seas. The agencies correctly acknowledge the high degree of uncertainty due to the extensive lack of data on the locations and behaviors of arctic marine life, especially in the Chukchi Sea. DPEIS III F.3.c. The AEWC emphatically agrees with the agencies' conclusion that the high level of uncertainty here requires a conservative approach to mitigation of potential impacts of permitted activities.

While we would prefer a limitation of the number of permitted source vessels in each planning area, of the remaining alternatives, Alternative 8 comes closest to ensuring the protection of the bowhead whale subsistence hunt. It establishes 180/190 dB exclusion zones and a 160 dB safety zone, as well as requirements for specific temporal, spatial, and operational restrictions to further reduce potential impacts to feeding/socializing/ migrating aggregations of bowhead and gray whales and bowhead cow/calf pairs.

We applaud the prospect of NMFS incorporating CAA–like provisions into incidental harassment authorizations. NMFS would apply these operational/spatial/temporal restrictions only if industry and the AEWC fail to agree to a CAA or other plan of cooperation. Since a great deal of stress has been put on our communities recently while trying to negotiate specific timing provisions of a CAA, we are grateful to see NMFS taking some of the burden.

The AEWC believes the greatest level of protection should be afforded cow-calf groupings and larger aggregations that might include pregnant females. We therefore recommend that NMFS, as it did in 2006, incorporate a 120 dB safety zone around seismic source vessels for cow-calf pairs and critical aggregations of bowhead whales if it selects Alternative 8. Significantly, NMFS and MMS already have endorsed this supplemental mitigation measure, as described in the 2006 PEA for seismic in the Beaufort and Chukchi Seas and in subsequently issued IHAs to 2006 seismic operators.

As noted elsewhere in these comments, NMFS and MMS must enforce monitoring requirements and commit to suspend the permits of any seismic operator which does not conform with monitoring requirements.

IV. NMFS and MMS Must Conduct a Rigorous Cumulative Impacts Analysis.

A. The Cumulative Impacts Analysis is not Updated from the 2006 Programmatic Environmental Assessment.

The importance of evaluating cumulative effects cannot be overstated, yet MMS and NMFS have failed to update the Cumulative Impacts Analysis from the 2006 PEA. In addition to depriving the public of the chance to review an updated analysis, it shows a disregard for the reviewing public. Given that cumulative effects are of primary concern to our subsistence people, we are especially disheartened by this oversight.

The assessment of cumulative effects has assumed an even greater significance since the events of open water season 2006, in which companies went about monitoring impacts reluctantly, and very late in the season. As noted above, one company obtained from federal court a stay of an important monitoring requirement in its permit.

From a technical standpoint, federal, state and local agencies and oil and gas companies have had a difficult time assessing impacts from even a single industrial operation. Evaluation of impacts from multiple operations has not been adequate. It is therefore extremely difficult for NMFS and MMS to determine what the cumulative impacts from multiple oil and gas activities will be. This is another reason for NMFS and MMS to use caution when permitting seismic activities, which is why we first support Alternative 9, the most conservative of the alternatives, and next Alternative 8, which has good potential to achieve the purpose and need of the proposed action while protecting our traditional bowhead whale hunt—so long as appropriate mitigation and associated monitoring are implemented and enforced by the agencies. If OCS operators are not required to adhere to the permit stipulations and mitigation measures, then NEPA review becomes irrelevant.

B. MMS Must Conduct a Cumulative Effects Analysis to Comply with NEPA and to Avoid Permitting Activities that Collectively Have an Unmitigable Adverse Impact on the Availability of Marine Mammals for Subsistence Purposes.

Council on Environmental Quality regulations require that agencies consider cumulative actions which, when viewed with other proposed actions, have cumulatively significant impacts. These actions and impacts should therefore be discussed in the same impact statement. 42 USC §1508.25. MMS and NMFS, in failing to update the Cumulative Impact Analysis, do not meet this requirement. The agencies should review all the activity for each planning area—including sources of noise from non-seismic activities, such as vessel traffic attending offshore and onshore oil and gas development—and assess the long term impacts of seismic surveys in that context.

It is imperative that the cumulative impacts analysis be updated, if for no other reason than because the incidental harassment authorization process does not include an evaluation of cumulative effects of multiple, concurrent seismic surveys in a single season. NMFS evaluates each survey or proposed authorization in isolation from other activities. If MMS were to permit six surveys in each sea, and the overlapping areas of ensonification harassed bowhead whales so that they swam far offshore and away from our subsistence hunters, then MMS and NMFS would be responsible for having permitted an unmitigable adverse impact on marine mammals for subsistence use. MMS and NMFS should therefore update the Cumulative Impacts Analysis.

V. Technical Comments

The following comments are attributed to:

Dr. Christopher W. Clark
Bioacoustics Research Program, Cornell Laboratory of Ornithology
Senior Scientist, Department of Neurobiology and Behavior
Cornell University

1. Page I-9: The authors need to qualify better and more clearly dB levels (e.g., received level, pressure, rms, re. 1 µPa). For instance, if source levels or received levels were always zero-to-peak pressure, they would not be rms. The authors should explain underwater sound measurement nomenclature and units, especially different ways of stating sound pressure level, intensity and energy.

2. Page I-10: For clarity, consistent units should be used for speed, distance, area (e.g., sometimes use miles/h, knots, km/h).

3. Page II-6: Alternative 2 /Proposed Action: The proposed action should include basic mitigation and monitoring actions so it will be possible to compare it to the other alternatives.

4. Page II-6: Alternative 5: Mitigation and monitoring need not be dependent on aerial surveys. The agencies should implement a near-real-time, mitigation-monitoring program. A good example is a program currently in place for Northern right whales off Massachusetts relative to liquefied natural gas terminal activities.

5. Generally, the agencies should implement mitigation (not monitoring that amounts to a post-hoc evaluation) that provides a conservative buffer to protect bowhead whales from exposure to sound pressure levels above 160 dB (rms re 1 µPa). The agencies also should require monitoring and documentation instances of bowhead whales exposed to sound levels ≥ 120 dB. The authors refer in Alternative 5 to monitoring, but monitoring, of itself, does not constitute

mitigation. Conversely, monitoring is susceptible to being used to allow an action to proceed in the absence of mitigation capable of significantly reducing the chance that bowhead whales will be exposed to received levels known to cause a strong avoidance—and therefore a potentially biologically significant—response.

6. The agencies' logic for setting harassment thresholds is seriously flawed, and the implications are both biological and procedural with respect to seismic permits in the Arctic Ocean. After a certain distance, on the order of a few tens of kilometers, the seismic airgun array source is no longer an "impulse" as used by the MMS and industry. It becomes a tonal downsweep with salient features similar to a biological signal. Therefore, the designation of the 160 dB received level as the threshold for Level B harassment is not valid. The observations of bowheads avoiding seismic operations at range is compelling evidence of this conclusion. Although after traveling some kilometers from the airgun source array, this sound retains an onset, it no longer sounds like, or retains the fundamental properties of, an explosion or impulse.

   Northern right whales reacted to playback of frequency-modulated downsweeps by quickly coming to the surface, and this response was interpreted as a negative reaction to the FM downsweep (Nowacek, D. P., M. P. Johnson and P. L. Tyack. 2003. "North Atlantic right whales (Eubalaena glacialis) ignore ships but respond to alerting stimuli". Proceedings of the Royal Society of London, B:Biological Sciences. 227-231).

7. Another important consideration is the transformation of the original short-duration, high peak level seismic impulse into a different sound form as it propagates through the underwater and seafloor substrate. The sound's original duration of 100ms is stretched into a sound lasting many seconds. NMFS should acknowledge this phenomenon and require appropriate mitigation.

8. Page III-7: Throughout this section there is an over-reliance on Richardson et al. (1995.) While this work has been an excellent basic reference for the topic, it is not necessarily the definitive source of scientific information or interpretation. Furthermore, a tremendous amount of new information on this topic has been generated in the last 12 years. As a result of this over-reliance on Richardson et al. (1995) there are oversimplifications and some misrepresentations of the actual scientific evidence related to biological sounds and anthropogenic sources (see for example, III.B.1.b(1).) This problem also arises later in descriptions of airgun array acoustic characteristics, where, by referencing to Richardson et al. (1995), the text leads the reader to assume that airgun arrays in 2007 are the same as those in 1995. If this is true, one would assume that the arrays proposed under this DPEIS are the same as those in 1995. Have these arrays been adequately calibrated so as to fully describe the spectral intensity characteristics in the horizontal and vertical domains?

9. The authors need to quantify the proportion of time and area for which the ambient noise levels are changed by anthropogenic activities from known operations.

10. Section III.B.2, Sound Propagation. The document's working definition of an impulse needs to be clearly defined. This is a critical issue because the NMFS mitigation criterion depends on the application of this term to industry generated sounds – i.e., 160 dB received level for level B harassment vs. 120 dB.

11. The authors should include and cite the Gulf of Mexico results from Tyack et al. These results show that a) model predicted received levels at tagged foraging sperm whales did not match actual measured received levels on individual whales, and b) visual observation of the foraging individuals at the surface did not reveal responses in contrast to behavioral responses as revealed from tag data. That scientific, empirical information specifically contradicts several of the assumptions in this document about potential impacts on whales and the perception that visual observations by marine mammal observers are adequate precautions. Furthermore, the exclusion of these tagged sperm whale data from this DPEIS, while including Tolstoy et al., is worrisome and suggests that the document is incomplete.

12. Section III.B.3. Sound propagation in the vertical versus horizontal direction needs to be clarified. Although airgun arrays are designed to direct most of the sound energy downward into the seafloor, a great deal of energy propagates horizontally. The DPEIS should specifically include calibration results for the different arrays in the horizontal dimension. Statements such as "…multiple guns would emit energy at about 10-120 Hz, and pulses can contain significant energy up to at least 500-1,000 Hz…" serve to underscore the lack of quantitative information on airgun array sound characteristics. DPEIS p. III-11.

13. What is the logical support for concluding that an airgun sound that starts as an impulse at the source should be characterized as an "impulse" as received at a whale after it has propagated through the shallow, coastal waters of the North Slope?

14. Page III-11. The final paragraph, Masking: Just because the ambient noise level at a particular range from the seismic source is equal to the received level of that source, does not mean that the source is masked and undetectable. The time-bandwidth product of the seismic sound at range provides a gain that increases the effective detection area.

15. Page III-14. The first paragraph, third sentence under III.C.3 Air Traffic: "Sound levels from both …. are at low frequencies …." should be reworded because it improperly mixes sound level and frequency.

16. Page III-77. The text says that “Bowheads also **may** migrate under ice…” It is not a question of “may.” Bowheads migrate under ice – full stop.

17. There are other, better references than Koski et al. 2004 (an IWC-SC paper, not a publication; and the reference is incorrect) regarding the pulses of migrating bowheads during the spring off Barrow, as this was being documented during the spring bowhead census in the 1980s.

18. Page III-99. There are now compelling examples, both short-term and long-term, in which visual observations of animals were ineffective at detecting impacts (e.g., Tyack et al. sperm whales in Gulf of Mexico; Bejder et al. 2006) = [Bejder, L., Samuels, A., Whitehead, H., Gales, N., Mann, J., Connor, R., Heithaus, M., Watson-Capps, J., Flaherty, C and Krützen, M. 2006. Decline in relative abundance of bottlenose dolphins (*Tursiops* sp) exposed to long-term disturbance. Conservation Biology. XX:XXX doi: 10.1111/j.1523-1739.2006.00540]. Lack of observed separation of cow/calf pairs **is not evidence of no impact**. All these observations were for short periods of time. As with several other types of critical activities for whales, there would be a very strong selective benefit to a mother and a calf NOT to separate when threatened by something, so it is illogical to suggest that cow/calf pairs would do anything but stay together. Furthermore, the impact from a novel and potentially threatening event would most likely be physiologically mediated and expressed, something that has not been monitored in whales under such circumstances. Such a physiological response can lead to decreased milk production or a lower quality (less fat content, disruption of hormone levels etc.) of milk.

19. Page III-101. Agency actions can reduce uncertainty by assuming worst case situation until adequate data and accumulated knowledge say otherwise. Thus, for example, although one does not know the details of six 2D/3D permits per planning area (assume per year’s season), this should be assumed as the working condition, just as the maximum number of support vessels, overflights etc. should all be considered as the conditions under which the permitee would be allowed to operate. This is how NMFS has dealt with the US Navy’s SEIS for LFA sonar, or permits related to LNG developments near a critical habitat for endangered Northern right whales.

20. The authors should articulate clearly that bowheads are extremely well adapted low-frequency (<1000 Hz) acoustic specialists. The agencies should then base their mitigation and monitoring requirements in the context of the whales’ abilities in this regard.

21. Page III-104. Since blue whales and fin whales produce sounds as low as 8 Hz, and most song notes are below 20Hz, it would seem that their hearing sensitivity was good down to that frequency and saying that “some baleen whales may hear infrasounds” is an understatement. Either baleen whales hear infrasonically or they have another sense yet to be discovered.

22. Page III-105. The section on hearing damage needs to consider effects of chronic exposure, not just acute exposure, in terms of hearing loss. Later the document discusses chronic exposure but not in terms of hearing loss.

23. The document needs to incorporate results from long-term studies on humans demonstrating the significant impacts of noise on human health and development, and the synergistic effects of noise coupled with other factors. See papers by Gary Evans (e.g., Evans, G.W. 2003. A multimethodological analysis of cumulative risk and allostatic load among rural children. Dev. Psych. 39(5):924-933.)

24. Page III-106. Correction needed on masking. It is not that the "sound the animal needs to hear must be of greater intensity" [than the background noise] to be detected, as there is gain provided by a sound's time-bandwidth product (assuming the sound is not noise) that allows one to detect a sound with intensity that is below ambient noise in the same frequency band.

The following technical comments are attributed to

Robert Suydam
Wildlife Biologist
North Slope Borough Department of Wildlife

1. MMS must invest in research and development for alternative technologies to acquire geophysical data in the arctic outer continental shelf.

2. To the extent possible and wherever practicable, MMS should encourage OCS operators to conduct seismic operations on-ice rather than offshore.

3. Pg. III-230 Native Views Concerning Cumulative Effects on Subsistence-Harvest Patterns. The quotations are at least 10 years old, and in the case of Kaktovik, 30 years old. While this demonstrates Alaska Native prescience on cumulative impacts, the agencies should include in the DPEIS more recent quotations that reflect the current Native perspective on accumulated impacts from oil and gas development activities.

4. Pg. II-3, Proposed Mitigation: NMFS and MMS have not shown that the mitigation measures are effective. For example, it is not clear that “ramp up” is effective are eliminating physical injury to marine mammals. Data must be collected to determine whether mitigation measures actually provide mitigation from effects from seismic. The same concept applies to the size of exclusion or safety zones. Are they of sufficient size to prevent physical harm to marine mammals from seismic sounds?

5. Pg. II-4, Monitoring of the Seismic Survey Area: Preliminary analysis of 2006 data showed that oil and gas companies are not able to effectively monitor exclusion or safety zones around active seismic operations. For exclusion zones, companies are supposed to be able to monitor the entire zone so they can shut down seismic surveys in the event a marine mammal enters the zone. If an animal enters the zone, it might sustain physical harm if airguns are not shut done. Results from 2006 show conclusively that companies are not able to monitor exclusion zones even under decent weather and lighting conditions, let alone in rougher seas or with less light. This situation is even more substantial when monitoring zones in which marine mammals might show behavioral responses to seismic. Industry is not able to monitor these zones that might cause behavioral changes around the seismic vessels. Therefore data are not being collected to determine the impacts of seismic on marine mammals nor are data available to develop adequate mitigation measures. If NMFS and MMS are going to approve seismic operations in the Beaufort and Chukchi seas, then oil and gas companies must show that they can adequately monitor safety zones to protect marine mammal hearing and

the larger behavioral zones to reduce impacts to behavior that could lead to population level impacts.

6. Pg. II-4, Additional Proposed Mitigation Measures for MMS G&G Permits: Compliance with mitigation measures for G&G Permits or for protecting marine mammals must be monitored. It was clear in 2006 that NMFS and MMS did not conduct compliance monitoring of industry to ensure that mitigation measures were adhered to. Without this information, it is impossible to evaluate the effectiveness of mitigation measures.

7. Pg. III-12 and –13, Cumulative Activity Scenario, Marine Seismic Surveys: NMFS and MMS fail to consider seismic and other industrial activities in the Canadian Beaufort Sea in the cumulative activity scenario. GX Technology is planning seismic exploration off the Mackenzie River Delta in Canada in 2007. Even though the DPEIS will not be completed in time for the 2007 season, it is reasonable to expect that other oil and gas activities will occur in the Canadian Beaufort Sea in future years. These activities must be considered in the cumulative effects assessment.

8. Pg. III-17, Cumulative Activity Scenario, Industrial Development: NMFS and MMS fail to include the development of a coal mine adjacent to the Chukchi Sea in their cumulative activity scenario. The Arctic Slope Regional Corporation is developing a coal mine between Point Lay and Point Hope just inland of the Chukchi Sea coast. This activity has the potential to also impact the same bowhead and beluga whales that will be impacted by seismic activities in the Chukchi and Beaufort seas. The coal mine must be included in the cumulative affects assessment.

9. Pg. III-21, Terrestrial Mammals: The assessment of impacts to terrestrial mammals is not sufficient. Seismic surveys in the Chukchi and Beaufort seas will require helicopters for re-supply and crew change. Thus, terrestrial mammals may be displaced from traditionally used areas possibly resulting in an impact to the terrestrial mammal populations and to subsistence hunting. Helicopter traffic associated with re-supply and crew change must be considered.

10. Pg. III-23, Significance Thresholds for Resource Categories, bowheads: The significance threshold for bowhead whales is likely not sufficient. One of the most substantial shortcomings in the threshold is that NMFS, MMS or industry are not able to determine whether seismic surveys affect the survival or reproduction of one or many bowhead whales. Further, it is not clear how NMFS or MMS will have industry monitor these types of impacts. A better threshold is needed that can be assessed and measurable is needed. Because NMFS and MMS cannot determine how seismic affects survival or reproduction of bowheads or other marine mammals, they should instead

develop thresholds that can be measured, such as the number of animals that can be disturbed or displaced from their migratory path.

11. Pg. III-24, Criteria for the evaluation of the potential for significant effects on endangered whales: NMFS and MMS has chosen to use Potential Biological Removal (PBR) to establish the level effects of seismic activities on bowhead whales. This is not appropriate. When NMFS developed PBR, the approach was to be used only for evaluating impacts from commercial fishing on marine mammals and not other activities. Further, PBR relates to direct takes (i.e. death) of marine mammals and not behavioral effects. PBR did not consider behavioral effects in the development of the model for assessing impacts from commercial fishing. Therefore, NMFS must develop a different approach for assessing significant impacts to marine mammals from seismic activities other than with PBR.

12. Pg. III-110, Potential Effects of High-resolution Site Clearance Seismic Surveys…: These paragraphs are an oversimplification. High-resolution surveys do use less energy than full seismic surveys, however, the impacts may still be substantial. For example, Shell Offshore Inc. used a small airgun, 280 in3, in 2006 for a high-resolution seismic survey in Camden Bay. The sounds from a test of this airgun showed that the sounds finally attenuated to a level of 120 db at about a distance of about 20km. The level of 120 dB of industrial sounds has been shown to cause avoidance of an area by bowheads. Thus, high-resolution surveys will contribute substantially to the amount of anthropogenic sounds in the Beaufort and Chukchi seas and may significantly impact marine mammals.

Further, NMFS and MMS state that high-resolution seismic will have little impact to bowheads. The studies they reference, however, do not use airguns of the same size as NMFS and MMS state will be used for high-resolution surveys (Pg. I-11 and –12). The referenced surveys used an airgun of 40 in3, whereas Pgs. I-11 and –12 state the airguns will be 90 to 150 in3. The studies should be given little weight in the analysis of impacts unless the design corresponds to how industry will conduct its high-resolution seismic surveys.

13. Pg. III-114: The discussion about the study examining the impacts from seismic surveys on bowhead whales is inadequate. First, the DPEIS should have acknowledged at the very beginning of discussion that the study showed the bowheads were essentially excluded from an area within a radius of 20km around an active seismic vessel. Instead it is stated, “[b]ased on 1996-1998 data, there was little or no evidence that bowhead headings, general activities, or swimming speeds were affected by seismic exploration.” This statement as currently written in the DPEIS is incorrect. The results from the 1996-1998 study showed that the received sound levels during these seismic surveys at 20km from the source vessel were estimated to be about 120 db.

Second, the discussion about the lasting impacts from seismic surveys was inadequate. The DPEIS stated that the effects lasted only 24 hours. The analysis in Miller et al. (1999) was preliminary and further, the results could be interpreted that the effects to bowheads from seismic surveys lasted at least 96 hours. Essentially, the data presented in Miller et al. (1999) are not sufficient to evaluate the lasting effects from seismic exploration. The NSB has made similar comments numerous times to MMS.

14. Pg. III-120 to –121, Effects from other vessel traffic associated with seismic surveys: NMFS and MMS failed to include important information in this section of the DPEIS. British Petroleum (BP) has been conducting detailed studies of the effects from industrial activities associated with the Northstar Production Island in the central Beaufort Sea (Richardson 2005, 2006, 2007). These studies have shown that bowheads are deflected away from the noisiest activities associated with Northstar. These sounds were mostly from vessel traffic. The studies have shown that bowheads are deflected northward, away from Northstar when re-supply vessels visit the island. The sounds levels that bowheads receive are likely near ambient, again showing that bowheads are highly sensitive to low levels of industrial sounds. This Northstar study should be included in the analysis presented in the final PEIS.