

ARCTIC SEISMIC SYNTHESIS AND MITIGATING MEASURES WORKSHOP

PROCEEDINGS

*March 5 and 6, 1997
Barrow, Alaska*

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**March 5 and 6, 1997
Barrow, Alaska**

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PREFACE

These Proceedings include transcriptions of all of the workshop presentations by the whaling captains. Similar transcriptions of the scientific presentations were beyond the scope of the project. Detailed summaries of the scientific information are available in the published literature, such as in *The Bowhead Whale* book. Consequently, these Proceedings include only summaries of the presentations by scientists and others. The workshop was very successful in that there were some ground breaking discussions between whaling captains and scientists.

ARCTIC SEISMIC SYNTHESIS AND MITIGATING MEASURES WORKSHOP

INTRODUCTION

Although there is scientific evidence documenting the fall bowhead whale (*Balaena mysticetus*) migration and sensitivity of fall migrating bowhead whales to offshore seismic exploration, Eskimo hunters at Barrow, Nuiqsut, and Kaktovik remain concerned that cumulative offshore activities, especially seismic exploration, may have displaced fall migrating whales thereby impacting their subsistence hunt of the bowhead whale. The Minerals Management Service (MMS), Alaska OCS Region, undertook to sponsor a workshop during which these matters would be discussed and recommendations developed for mitigating potential effects.

The workshop was held at Ilisagvik College, in Barrow, Alaska, on March 5 and 6, 1997. Nearly 50 persons attended the workshop including whaling captains and crew from Barrow and the Villages of Nuiqsut and Kaktovik, as well as experts from the scientific community, regulatory agencies, and industry.

The first day of the workshop and part of the second day were devoted to presentations on seismic operations, the bowhead whale migration, high-energy seismic survey sounds and propagation, aerial observations of seismic-vessel effects on bowhead whales, current regulatory approaches and mitigating measures for open-water seismic operations. Testimony was also received from many of the whaling captains and crew members who attended the workshop. Summaries of the presentations by the scientists and transcripts of the testimonies received from the whaling captains and crew form the basis for these workshop proceedings.

After the presentations, the participants separated into several working groups. These working groups included:

- Working Group I
Zone of influence of seismic vessels;
- Working Group II
Communication among subsistence whalers, industry, and agencies;
communication options for conflict resolution;
- Working Group III
Possible technological methods of reducing effects; and
- Working Group IV
Potential research and monitoring projects, including co-managed or cooperative projects.

The entire group of participants remained together to discuss the issues in Working Group I. The recommendations from each working group also form part of this document.

The Minerals Management Service and MBC Applied Environmental Sciences, who coordinated the workshop, would like to acknowledge and thank all of the participants who took time from their busy schedules to meet on these important issues. In addition, we would like to thank Lenny Landis, Gary Gortz, and Ron Mancil from Ilisagvik College, as well as, Dario Leyva of the Naval Arctic Research Laboratory Hotel for their assistance in coordinating meeting room facilities, audio taping, food service, and hotel accommodations.

INTRODUCTORY REMARKS

STEVE TREACY MINERALS MANAGEMENT SERVICE

On behalf of the Minerals Management Service, I would like to welcome everyone. This workshop was set up about six months ago and has been discussed between MMS and the North Slope Borough (NSB), and Dr. Tom Albert of the NSB Department of Wildlife Management in particular. We are honored to have all of you here today. The goal of the workshop is to have everyone talk face-to-face about their impressions of the effects of seismic activities on the bowhead whale. We will do that for the first day and a half. After we have attempted, in good faith, to communicate on those issues, then we will break into three concurrent working groups. The objectives of the working groups are to get some innovative ideas from all participants on possible technological methods to reduce seismic effects, potential research and monitoring projects that might be needed, and ways we can improve communications between the whalers and industry.

DR. THOMAS ALBERT DEPARTMENT OF WILDLIFE MANAGEMENT NORTH SLOPE BOROUGH

Thank you Steve. Let me say that I hope that this process bears fruit. But first I have to make a general comment. I just found out that I was going to be involved in chairing this meeting about 20 minutes ago. We had anticipated that Dr. Newbury was going to be here to do that. But Steve Treacy and I will try to do what we can.

Last night the meeting of the Assembly of the North Slope Borough went on very long and will continue today. Unfortunately, that has changed our agenda. Mayor Ben Nageak probably will not be here this morning but will arrive after lunch. Jacob Adams and Oliver Leavitt, who are whaling captains, will not be here because they are on the Assembly.

I don't know exactly what the Mayor was going to say. But on behalf of the North Slope Borough, we certainly are glad to have an opportunity to meet. But as I pointed out to MMS a few minutes ago: I have been here for 18 years and I think I have been involved in more than 100 meetings somewhat similar to this where we talk about industrial impacts in one regard or another. I don't think it takes any imagination to understand the feelings of a lot of us, namely the whaling captains in this room and those of us that work with the Borough and the Alaska Eskimo Whaling Commission (AEWC). We have been through this so many times before. Someone needs to give the local people here, including me, good assurance that what happens at this meeting is going to matter. Things have been recorded at public meetings for 15 years or more. There must be somewhere in Anchorage or possibly farther away, a gigantic room full of tapes of public meetings on the North Slope that deal with industry in one way or another. So someone needs to give us local people some assurance that what we are going to struggle with for the next two days is going to matter. Is it going to be recorded or written down? What is going to happen to it? If there is a document, are we all going to get to see it beforehand and will it be used? I am not trying to rattle anyone's cage. I am just saying that these are the questions that I get asked all of the time. So someone besides me needs to answer that.

We hope that one of the things that comes out of this meeting is going to be a resolution or a path designed to allow us to find out what is really going on with the bowhead whales and industrial noise, primarily seismic. On the one hand we have some limited scientific data about which some of you well know we have a lot of questions. On the other side, we have the observations of dozens of whale hunters over many years. Some of them are here today to talk. Their information, in general, has been almost ignored in Environmental Impact Statement-type documents except for the last one. After a struggle, there was some information included. So we

have these two different views that we are going to hear. Someone, maybe this group, will help point the way to resolve these differences. What experiment or whatever needs to be done to get at the exact truth of what is going on? By far and away, the biggest problem that we have here is bowhead whale and seismic noise interaction. That is an issue that is just not going to go away. I think the time of confrontation may be coming. That is, people may just be at the end of their ropes. I hope we don't get into a confrontation. Let's try to figure out what is really going on.

STEVE TREACY-MMS

I want to assure everyone that we will try to record and transcribe the information, and that a draft will go to everyone for their input before the final comes out. We have already received requests for the transcripts of this meeting for use in the Northstar Environmental Impact Statement (EIS). We have been using more and more traditional knowledge in the MMS EISs. This is yet another chance to get more and better information which we can use. The information will be used.

**ROBERT BROCK
REGIONAL SUPERVISOR
LEASING AND ENVIRONMENT
MINERALS MANAGEMENT SERVICES**

Good morning. This meeting is very important to me. I am a firm believer that if you have different viewpoints that you get together and talk about them on any issue. We did this in the Mitigating Measures in Lease Sale 144. I think it was successful. We have done this more and more prior to writing an EIS on what the issues and the various presentations will be in that EIS. We have an EIS coming out this summer for Lease Sale 170, the next Beaufort Sea sale. I think that we will see that that, too, is successful.

We are here today to talk about seismic activity. But before we get into that, we keep hearing the terms "science" and "traditional knowledge" and I would like to take the first step here during this meeting to talk about "information" and not put a label on it. I think that it is all information and all good information regardless of the label "science" or traditional knowledge."

However, I do want to point out one thing: if you expect Washington, D.C. or MMS in Anchorage or anybody else to tell you what the answer is going to be on this issue, we are wasting our time. The issue is going to be settled right here in a room like this. And this is where the information is going to come out. No one is going to tell us or you or anyone else, what the satisfactory answer to this concern is going to be. I think this concern is going to be answered in forums just like this one. Ninety percent of the good of a workshop like this is in the conversation between now and when the recommendations are finalized. That gives everyone a chance to put their concerns on the table. I strongly urge each and every one of you to lay your concerns out on the table to discuss those concerns and not hold anything back. If you hold something back you have wasted your time. So let's get it out and talk about it and see if we can find our own solutions to these kind of concerns.

COMMENTS FROM THE MAYOR OF THE NORTH SLOPE BOROUGH

INTRODUCTION BY DR. THOMAS ALBERT

Please let me introduce Mayor Ben Nageak. A lot of you know Ben from his years of work in the Wildlife Department. He worked in and as the head of the Wildlife Department for a long time, and he knows probably all the MMS and LGL folks here. He has been a friend of mine for twenty years or more, but he still won't lend me any money! Ben Nageak, Mayor of the North Slope Borough.

MAYOR BEN NAGEAK

I remember when Tom and I both had hair! Mine was down past my shoulders and Tom had hair. Tom is a good friend of mine. Iisagvik College has done a great thing by naming this the Dr. Albert Conference Hall because of all the work he has done with everyone in the North Slope for many, many years. We thank you for your dedication.

I just want to welcome everybody here. I'm sorry I didn't get a chance to do it this morning. As you know I've had my feet in the fire since I've been on board as Mayor. But I've learned from all the firefighters with whom I've worked over the years, and I think I'm pretty comfortable with what we're doing. I want to thank you for coming.

This has been a workshop that's been a long time coming. I want to thank all of you from the villages for attending. Your knowledge of everything in the North is very important. I think it is time that the services and agencies that we work with do the listening as the whalers give them their direction. I think it's been borne out over the years, as I look at the maps, how difficult it is to get out and do the hunting when the whales miles and miles away. We were talking about that yesterday. In 1989 when there was activity in Barrow the whales were way to the east and a lot of that meat was spoiled. In some other areas where activity was, you can see what the harvest data have indicated: they have to travel many, many miles just to get to food. I was just talking with a young lady that stated that "Well, the water is cold." But you have to understand the whales generate a lot of heat—they have all that blubber for insulation. You know you're going to get spoiled meat because of that, no matter how long it takes. As soon as it dies, it doesn't breathe it out; it just keeps it in all that heat, so it spoils.

I am glad that you are here. I see familiar faces. I just want to thank you, and please listen to these whalers. The whalers have a lot of knowledge, as I indicated. We did have a lot of whales last year, close by. In fact, I was coming from a trip from Point Hope, I believe, and I flew right over Van Edwardsen; just right outside of town he had struck a whale. I guess it must not have been far away because he was the only boat towing that whale; it must not have been very far. It was just right outside by the gravel pit when I saw him. So that is an indication how whales behave when they are in a natural situation. And I think that is what the whalers have been trying to tell industry and the so-called "experts"—sorry, I didn't mean to offend most of you.

I learned from Tom Albert when I first met him that he would always talk with the Elders and with the people who have the knowledge. I used to see him over at Harry, Sr.'s house all the time, and he always invokes his name because he cared. That person cared about the knowledge of the people; the knowledge that the people gave. And Tom has tried to convey that message to you. I think that Tom has done a lot for the whalers. Not only the whalers, but the indigenous people who depend on the resources owe a lot to Dr. Albert. I am proud to say that he is my friend and my mentor. Like I said, I used to work for him. I used to shovel "poop" for him over at the animal research facility. As I indicated, I used to have hair down my back, and at that time

Tom didn't care about how you looked, just how you worked. I want to thank you Tom, personally.

I want to thank you the industry and the people who work for the agencies for coming here and listening to these people. I especially want to thank these whalers who have given up their time and their energy to work with you. I think those are keywords: "working with you." They have done that. It always has been one way, I think. I think it is time to have it both ways to learn from each other. I think that's the rationale behind this meeting.

Again, I want to welcome you, and I want to thank you for coming. Please enjoy yourself while you are here. We do have a good college here, thanks to Maggie Ahmaogak's husband, George, who was instrumental in making this a reality when I was the Executive Vice-President at the college. We did a lot in order to make this place grow. We received support from the past administration, and you see the results here.

If you know the history of the Naval Arctic Research Laboratory (NARL), this is the second stage or the third stage of the development of NARL. It used to be a military and research institution of both knowledge from the people and knowledge to the people. It's gone around full circle, and this is an indication of how important education is to our people. I want to thank you from the bottom of my heart, my predecessor George Ahmaogak and the staff and the money that was given. We're going to continue to provide that support as long as we are in the administration because we know how important it is. I want to thank you again for coming, and thank you whalers for giving your time and energy.

DR. THOMAS ALBERT

Thank you Mayor Nageak. I thank Ben for the nice things he said about all of us, and reminding you about this place. Some of you remember the old days when this was a Naval Arctic Research Lab—the largest arctic research center in the world, until our government decided that they wanted to become third class in arctic research. This is a good example, probably one of the few examples, of a defense establishment being turned over to the private sector as surplus property that is making a success of itself. The biggest thing going on here now is Iisagvik College and the Borough renting space here.

**BURTON REXFORD
ALASKA ESKIMO WHALING COMMISSION**

Good morning. My name is Mr. Burton Rexford, Chairman of the Alaska Eskimo Whaling Commission (AEWC) and I would like to welcome all of you to Barrow to meet on an important issue which concerns our whaling practices here in the Arctic.

First of all, let me discuss the importance of marine mammal resources to the subsistence and cultural livelihood of the Beaufort and Chukchi coastal communities. It is the bowhead whale that our people subsist on. In 1977, the AEWC was formed to represent the whaling communities in an effort to convince the United States Government to take action to preserve the Eskimos' subsistence hunt of the bowhead whale. The U.S. promised to undertake a major research effort to provide a better estimate on the population of the bowhead whale, and the United States also agreed to document the Alaskan Eskimo need for bowhead whales based on the subsistence and cultural need of each community. The AEWC exists today with a purpose to preserve and enhance a vital marine resource, the bowhead whale, including protection of its habitat, and to protect the Eskimo subsistence bowhead whaling.

Secondly, I would like to thank my fellow whaling captains from whom you will hear today, describing the types of interferences encountered by subsistence hunters as a result of Outer Continental Shelf (OCS) oil and gas development and the communities' concerns with respect to the impacts of this development on OCS living marine resources and on the continuing viability of subsistence activities in the Arctic OCS. In recent years, subsistence whalers have been forced by OCS oil and gas activity to travel farther offshore to take bowhead whales.

Finally, the AEWC has taken great efforts to help our whaling communities to engage the oil and gas industry in negotiated settlements to resolve conflicts related to the impact of OCS oil and gas development on subsistence activities. Included among these efforts is the negotiation of mutually-agreeable federal regulations designed to minimize these impacts while permitting the development to go forward.

I wish everyone an enjoyable time here in Barrow, and I am hoping that we will find a resolution to the problems we are faced with as whalers which are of mutual concern to the federal government. Thank you.

SEISMIC OPERATIONS: DATA REQUIREMENTS, EQUIPMENT, AND PROCEDURES

JOHN DAVIS AND JEFF MAYVILLE WESTERN GEOPHYSICAL ANCHORAGE, AK AND HOUSTON, TX

Western Geophysical (WGC) has maintained a marine presence in the Arctic from the late 1970s through 1993, and then briefly again in 1995. Western has not had any marine activity on the North Slope since late 1993 with the exception of a couple of days' testing with the *Arctic Star*.

Western Geophysical has conducted marine seismic activity worldwide and worked globally with fishermen, shrimpers, crabbers and subsistence hunters. We have been involved in numerous working agreements with the subsistence hunters and were active participants in helping to put together the original 1986 Oil/Whalers Working Groups. Bebo Bratos and Steve Carter both of WGC were involved in the Oil/Whalers Working groups through 1989. During the years from 1990 through 1994 whenever Western Geophysical conducted any seismic activity we utilized the Letter of Authorization (LOA) process under the Marine Mammal Protection Act. As mentioned earlier, since Western has not conducted any surveys since the LOA process expired in 1995, we have not been through or involved in the currently accepted process of Incident Harassment Authorization (IHA).

Western Geophysical has worked well with the Alaska Eskimo Whaling Commission (AEWC) and attempted to accommodate the whalers by stopping production and moving away from the whalers and bowhead whales. WGC was willing to listen to all requests for assistance and acted upon those requests whenever possible. Western helped by providing employment, fuel, radios, batteries, generators and transportation on occasion. Western's captains and crews were involved in at least two incidents during the 1985 summer season.

Modern day seismic surveys are now more oriented to 3-D acquisition rather than the 2-D survey acquisition used in earlier years. The 2-D surveys were traditionally done regionally or over a large sparsely sampled area.

Current acquisition methods use a smaller dense 3-D approach with surveys being concentrated into much smaller areas. Most of the Beaufort Sea 3-D's will be done close into shore in an attempt to tie the newly gathered 3-D data with the existing land/hardwater surveys. Additionally drilling advances allow drillers to drill beyond 20,000 ft horizontally will focus most activity to within 4-6 mi of mainland shoreline or existing islands.

In conclusion, our concerns (weather, short season, and uncertain ice conditions) are similar to those of the Subsistence Hunters. Communication between all parties involved in the waters of the Beaufort Sea and a day-to-day exchange of information is a must if we are to continue a successful coexistence in the Arctic.

QUESTIONS AND DISCUSSION:

Brad Smith: Have there been any advancements in computer modeling, remote sensing, or other technologies to get the needed information with less noise?

John Davis: The quality of the data is correlated with the data recovered. The higher the energy input, the deeper the penetration, and the cleaner the return signal. Therefore the noise level would probably stay the same but we could reduce the number of shots. The development of more sensitive receivers could also reduce the number of shots.

Steve Treacy: Can you focus the sound?

John Davis: There are ways of tuning the array. Signal energy is generally directed downward. It would be in our interest if the signal could be better focused downward.

Jeff Mayville: Seismic survey ships have now been designed and built to reduce noise. New technologies have been implemented and research and development is being examined.

Van Edwardsen: How far does the sound travel?

Jeff Mayville: The distance depends on water depth, subsurface geological structure, temperature, etc., but generally would be about 25 kilometers (km) (16 miles (mi)).

Van Edwardsen: How many shots per day?

Jeff Mayville: 1800 shots per day was the average for the North Slope. In Gulf of Mexico, the sounds could go as far as 73 km (45 mi).

James Killbear: To what depth?

Jeff Mayville: The depth of penetration is about 2000 meters (m) (6500 feet (ft)).

Brad Smith: How many vessels are used in 2-D vs. 3-D?

Jeff Mayville: In 2-D operations there are generally two vessels involved. The towed streamer or array of transducers is about 5 km (3 mi) long. In 3-D operations more vessels are involved. Two vessels are needed to lay out the cable, one airgun vessel and one support vessel to handle the receivers.

Chris Clark: What are the depths and degree of resolution for shallow targets?

Response: The degree of resolution is driven by the client's requirements. Most are shallow, about 6 km (15,000 ft) deep. The "box" examined is about 3 X 5 mi, and 5 mi deep.

Chris Clark: Is the repetition rate about 1 second (sec)? What is the pulse strength?

Response: The rate is about 10 to 15 sec between individual shots. The maximum is about 2900 shots/day. The strength is about 210 dB and about 200 milliseconds in length or duration.

Thomas Napageak: If you were going to the Beaufort Sea, with a plan, would you work with the Whaling Captains?

Jeff Mayville: Yes. Our objectives are similar, but we are there to make money, not subsistence hunting.

Thomas Napageak: In the past we did have a Plan of Cooperation, an agreement in-place: no geophysical work east of Cross Island during the bowhead migration. We found out that Western Geophysical was doing work outside of the line of agreement and did work at night.

Jeff Mayville: That is correct, Western Geophysical did work beyond the agreed line.¹

Van Edwardsen: How loud is the airgun or the boom?

Jeff Mayville: It can be heard over the sound of the outboard motor. It is loud. it's a pressure wave.

¹ Jeff Mayville later commented that he could not agree or disagree with Mr. Napageak's statement as he was not personally involved in that incident.

BEAUFORT SEA BOWHEAD WHALE MIGRATION

**STEVE TREACY
ALASKA OCS REGION
MINERALS MANAGEMENT SERVICE
ANCHORAGE, AK**

From 1979 to the present, the Minerals Management Service (MMS) has funded annual monitoring of endangered whales in arctic waters. Since 1987, MMS uses agency personnel to perform field work and reporting activities for the Beaufort Sea on an annual basis. Previous survey reports are available for inspection at the MMS library in Anchorage.

The primary goals of the ongoing program are to:

1. Provide real-time data to MMS and National Marine Fisheries Service (NMFS) on the general progress of the fall migration of bowhead whales across the Alaskan Beaufort Sea, for use in implementing overall limitations on seasonal drilling and geological/geophysical exploration;
2. Monitor temporal and spatial trends in the distribution, relative abundance, habitat, and behaviors (e.g., feeding) of endangered whales in arctic waters;
3. Provide annual analyses of long-term interyear trends in the median depth (or north-south positioning) of the migration axis of bowhead whales; and
4. Provide an objective wide-area context for management interpretation of the overall fall migration of bowhead whales and site-specific study results.

The annual survey program is based on a design of random field transects within established geographic blocks in and adjacent to Beaufort Sea sale areas offshore of Alaska. The study area includes Beaufort Sea Survey Blocks 1 through 12 between 140° W and 157° W longitudes, south of 72° N latitude. Addressing our major goals requires a sample design covering the entire area. We rely on other more site-specific studies for analysis of high-resolution behavioral effects.

Aerial surveys are based out of Deadhorse, Alaska, usually from the end of August through mid-October. The field schedule is designed to monitor the progress of the fall bowhead whale migration across the Alaskan Beaufort Sea. Particular emphasis is placed on regional surveys to assess fine-scale shifts in the migration pathway of bowhead whales in this area and on the coordination of effort and management of data necessary to support seasonal offshore-drilling regulations.

To define the migration axis, a separate file was created for bowhead whale sightings made while on random transects, regardless of distance from the transect line. The Beaufort Sea was divided into three regions in order to analyze east-west components of the known fall-migration corridor. Region I was delimited by 150° W and 153°30' W longitudes, south of 72° N latitude. Region II was between 146° W and 150° W longitudes, south of 71°20' N latitude. Region III was between 141° W and 146° W longitudes, south of 71°10' N latitude.

The median water depth used by bowhead whales during fall migrations is fairly consistent from 1982 through 1995 with the exception of 1983. The reasons for the offshore (deep-water) migratory route that year and the comparatively shallower route followed in other years may be attributable to general ice severity since 1983 barely had an open-water season at all.

In general, to prevent potential operational effects on subsistence whaling, any geophysical vessel explorations permitted during the fall follow stringent restrictions—including a provision to stop seismic operations when whales are visible from the vessel—as the bowhead whale migration progresses through the area of operations. For any explorations that occur during the fall, daily summaries of survey information are transferred from the field to Anchorage for use by MMS Resource Evaluation and by NMFS in implementing area-wide permit restrictions on high-energy seismic operations during periods of limited visibility.

One study in our agency's Alaska Environmental Studies Strategic Plan, FY 1998-1999, that would permit investigators to better compare historic sightings of whales and other wildlife with the level of oil-industry activity is entitled "Reference Manual and GIS Overlays of Oil-Industry and Other Human Activity (1970-1995) in the Beaufort Sea."

REFERENCE

Treacy, S.D. 1996. Aerial Surveys of Endangered Whales in the Beaufort Sea, Fall 1995. OCS Study MMS 96-0006. Anchorage, AK: USDOI, MMS, Alaska OCS Region, 120 pp.

SUMMARIES FROM THE SESSION ON HIGH-ENERGY SEISMIC SURVEY SOUNDS AND PROPAGATION

**CHRISTOPHER CLARK, Ph.D.
LABORATORY OF ORNITHOLOGY
BIOACOUSTIC RESEARCH PROGRAM
CORNELL UNIVERSITY
ITHACA, NY**

There is a continuing and growing concern over the potential impact of intense, human-made underwater sounds on marine mammals. There is also a sincere need to establish appropriate compliance conditions in support of species protection on this matter. Active noise producing systems such as those used for seismic survey, are one of the most acoustically insulting systems in use today. Such systems are finding increased applications in both shallow and deep water environments. On the shallow Arctic shelf, sound generated by seismic operations can be detected out to 100 nautical miles (n. mi.), and there is still uncertainty as to the effect of permafrost on the sound propagation. Although there is little direct scientific evidence on bowhead hearing, there is enough circumstantial evidence to suggest that these animals are highly specialized for low-frequency hearing and that hearing is their most important sense. Their voices are low, and their ears are adapted for listening in the low-frequency range. There are also numerous accounts from Eskimos describing bowheads as acoustically sensitive. Early in the scientific studies on the bowhead population, we were told many things about bowhead behavior in the ice that seemed improbable and without scientific support. However, after many years of research many of these claims proved to be correct (e.g., whales migrating under heavy ice, or pushing up ice to breathe). During the migration, bowheads are very vocal. Early in the season they sing long episodes of countercalling as if they were keeping track of one another. There is also some evidence to suggest that bowheads use the reverberations of their calls to help navigate through the mosaic of spring ice. Therefore, all things considered, there are good reasons to believe that bowheads are acoustically sophisticated and rely heavily on sound to survive, and that we should heed Native statements on the matter of seismic impacts on bowhead whales.

**CHARLES R. GREENE, JR., Ph.D.
GREENERIDGE SCIENCES, INC.
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Geophysical exploration with high-energy impulsive sources has been occurring for decades and much has been written about it. A useful summary of techniques, including references, is contained in Richardson, et al. 1995. This presentation did not review that material but presented recent results from the BP Exploration (Alaska)(BP)/Northern Geophysical of America survey of August-September 1996 at BP's Northstar Prospect. For the Northstar survey, an 11-gun array of 120 cubic inch (cu. in.) airguns was used. For horizontal sound propagation, the source level was estimated to be 222 dB re 1 μ Pa-m on a root-mean-square (rms) pressure basis. The frequency content was concentrated approximately from 50 to 150 Hz, although higher frequency energy was present at significantly lower levels. Received levels at distances beyond about 2 km were found to decrease at an average spreading loss rate of about 44 dB/decade, although there was considerable variability. At the greatest distance at which the airgun signals were received, 67 km, the rms pulse levels were on the order of 77 dB re 1 μ Pa, very close to the minimum ambient noise levels observed during the entire project. Received levels were lower when the water depth at the source was less than 9 to 10 m. More complete and up-to-date results are in the technical report on this work, which is in preparation (Greene 1997).

REFERENCES

- Greene, C.R. 1997. Physical acoustics measurements. Chapter 3 in LGL and Greeneridge (1997). 64 p. (in draft form).
- LGL and Greeneridge. 1997. Northstar marine mammal monitoring program, 1996: Marine mammal and acoustical monitoring of a seismic program in the Alaskan Beaufort Sea. Report in preparation by LGL Limited and Greeneridge Sciences, Inc. for BP Exploration (Alaska), Inc. and National Marine Fisheries Service. 245 p. (in draft form).
- Richardson, W.J., C.R. Greene, Jr., C.I. Malme, and D.H. Thomson. 1995. Marine mammals and noise. Academic Press, San Diego, CA. 576 p.

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Acoustic characteristics of Arctic sound propagation are uniquely defined by the upward bending sound paths which exist throughout the Arctic during most of the year, and the ice generated ambient noise. This unique feature of the Arctic ocean forces all sound energy to interact with the under ice surface (or open water surface in the marginal ice zones during summer months). Generally, the rougher the under ice surface, the more sound energy is scattered, resulting in less sound energy in forward directions. Sound propagation is frequency dependent, with lower frequency sound (less than 50 Hz) reaching much farther distances than higher frequency sounds. Shallow water sound transmission is also affected by the bottom. Some of the sound energy is absorbed and scattered by the bottom, again resulting in less sound energy in forward directions. The bottoms of the Chukchi, Beaufort and Lincoln Seas have been found to propagate low frequency sound very effectively (in water depths greater than 100 m), i.e., sound travels well through the bottoms in these areas and can be received in the water column at considerable distances from the source. The Navy has successfully modeled sound propagation in numerous Arctic environments. An important aspect of the acoustic environment is the naturally occurring noise.

In the Arctic, noise is typically generated from the movement and deformation of the ice surface. There is a seasonal dependence to the noise at all frequencies, with levels being highest in the winter and spring months (Nov-Mar) and lowest in the summer months (June-Aug). Fall and spring months are characterized by extremely variable noise levels. Shallow water environments typically have lower average noise levels but are more variable due the absorption and scattering characteristics of both the under ice surface and the bottom. The loudest reported naturally occurring noise levels were recorded during pressure ridge formations and had levels from 130-170 dB.

SUMMARY OF THE QUESTIONS AND DISCUSSION WHICH FOLLOWED THE PRESENTATIONS BY DR. CLARK, DR. GREENE, AND MS. MIRE

A question was asked about the influence of the current on sound. Ms. Mire responded that at low frequencies, where you are talking about sound that can go over the entire Arctic Ocean, the effect of the current is pretty minimal. The sound certainly is directional and you get a lot more noise from shear zones than you do from the open ocean or under the pack ice.

Dr. Albert brought up the question if the seismic work can detect areas of permafrost and how can they get that information. Dr. Greene responded that the U.S. Geological Survey in Menlo Park, CA has that type of information but that they do not have the specific survey data. Jeff Mayville stated that typically seismic companies work and gather data for a client. Usually the seismic companies do not process the data. He agreed with Dr. Albert that there should be some way of getting information on permafrost. Steve Treacy stated that he thought that idea was a good one and that MMS would consider that recommendation in the future.

Fred Kanayurak asked Dr. Chris Clark about his 1984 study and the number of whales in open water versus during complete ice conditions. Dr. Clark responded that "What you see is not what you get." In that you observe fewer whales in comparison with the number that you can hear. You can hear an animal a long way off, but you don't necessarily know where it is. Mr. Kanayurak stated that since visual observations were used to determine the quota system then they have been cheated. Mr. Brad Smith commented that Mr. Kanayurak may be right.

Van Edwardsen asked Dr. Clark about how far seismic shots can be heard. Steve Treacy mentioned the 45 mi figure from the Gulf of Mexico. Dr. Clark stated that he thought that the discrepancies between what he was reporting and what Dr. Greene was reporting have to do with different systems. The system that they were describing, an 11-gun array, is not the same system that was operating in the summertime in 1981 or 1982.

Dr. Clark went on to state that when the pulse is farther and farther away, there is more spreading of the sound. It would be like a wave going up and down; lower in frequency as time went on.

Mr. Eli Nukapigak mentioned that the Nuiqsut whalers do their whaling during really calm weather. He asked if seismic sounds are louder in calm weather? Dr. Charles Greene responded that in very calm weather with flat seas, there is very little scattering of sound from the surface and so higher frequencies may travel farther than they do under rough seas when the sea surface will scatter the higher frequency energy. But the low frequency energy, below 100 Hz, which is what is in the seismic signal to begin with, is not going to be bothered by rough or smooth seas. They are going to go underwater just beautifully.

BOWHEAD RESPONSES TO SEISMIC, AS VIEWED FROM AIRCRAFT

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This presentation discusses three of the main types of information that biologists have collected concerning the responses of bowhead whales to seismic sounds:

- (1) observations during 1980-84 in the Canadian Beaufort Sea during a disturbance project funded by MMS (Richardson et al. 1986);
- (2) results from four tests of bowhead responses to seismic boats in the Alaskan Beaufort Sea during 1984, also funded by MMS (Ljungblad et al. 1988); and
- (3) preliminary results from the first year of a project to monitor bowhead and other marine mammal reactions to a marine seismic program in nearshore waters of the Prudhoe Bay area in 1996 (Richardson [ed.] 1997).

The 1996 monitoring work was funded by BP Exploration (Alaska), Inc. (BPXA) and is often referred to as the Northstar program. The preceding presentation by Charles Greene included considerable information about the sound characteristics from the 1996 Northstar seismic program.

This version of the presentation was prepared based on a transcribed tape recording of the oral presentation, edited to be understandable without reference to the slides and overhead transparencies that were shown. Also, references to publications summarized in the presentation are included. A transcript of the discussion following the presentation is also included.

Types of Acoustic Effects on Marine Mammals

What do we know about the effects that man-made underwater sounds can have on whales in general and bowheads in particular? In addition to disturbance effects, the main topic of discussion in this presentation, there are three additional general categories of acoustic effects that we know, or suspect, can occur (Richardson et al. 1995):

(1) *Disturbance reactions*, discussed below.

(2) *Masking of underwater sounds* that may be important to the animals. These can be sounds from other mammals of the same species (bowhead calls in this case), or possibly the reverberations of a bowhead's own calls from the ice or some other object in its environment. Other natural sounds may also be important to the animals. If there are strong man-made sounds, they may make it more difficult for the bowheads to hear these sounds. Masking effects are probably considerably less for seismic exploration than for many other man-made sounds because seismic pulses are intermittent. There is a strong signal for only about 1% to 3% of the time, e.g., a 0.1 sec to 0.3 sec pulse followed by a 10-15 sec gap when there is little man-made sound in the water. In contrast, the continuous sounds from a drill rig, dredge or boat normally have lower source levels but are continuous, creating more potential for masking.

(4) *Physiological stress*: Essentially nothing is known about noise-induced physiological stress in marine mammals. This topic is poorly understood even in humans, where it has been studied to a considerable degree. However, it is another category of possible effect on marine mammals.

(4) *Hearing impairment*, involving either a temporary reduction in the hearing sensitivity of the animal (Temporary Threshold Shift, TTS) or a permanent loss of hearing sensitivity as a result of exposure to very strong sounds, or to moderately strong sounds over prolonged periods

(Permanent Threshold Shift, PTS). We know that mammals close to an explosion can sustain damage to the ears (PTS) even if they are not quite close enough to be seriously injured in other ways. There has been considerable discussion as to whether received levels of seismic sounds are ever strong enough to cause PTS, TTS or other physiological effects on marine mammals (summarized in Richardson et al. 1995:372, 382). However, there are very few direct data concerning these types of effects in any type of marine mammal.

What types of reactions to man-made sounds do we see in bowhead whales and other marine mammals? The observed responses to underwater noise can be grouped into four main categories:

(1) *Tolerance*: We often see no obvious changes in the behavior of marine mammals, including bowheads, that are exposed to seismic or other types of man-made sounds. The mammals seem to be going about their normal activities—feeding, socializing, migrating, etc.

(2) *Subtle changes in behavior*: At other times the mammals may be engaged in seemingly-normal activities, but we can detect subtle behavioral changes, e.g., reduced durations of surfacings or dives. Sometimes these behavioral effects are so subtle that we cannot recognize anything unusual while watching the animals. However, if we time a large number of surfacings or count the number of blows during many surfacings, we can sometimes demonstrate through statistical analysis that there was a small but statistically significant change in behavior when the animal was exposed to seismic or other types of sounds.

(3) *Conspicuous changes in activity*: Sometimes the mammals show a conspicuous change in activity when exposed to man-made noise. For example, a resting animal may start to move, or a feeding animal may cease feeding. We have seen these types of responses to seismic exploration as well as other human activities.

(4) *Avoidance reactions*: Bowhead whales and other marine mammals typically swim away when seismic or other vessels approach within some distance. Short-term avoidance reactions by bowheads to seismic vessels and some other industrial activities are well documented. However, the possibility of long-term displacement is of even greater importance, and there is not much scientific information about that issue. Long-term effects are much more difficult for scientists to study than are shorter-term behavioral reactions.

The source levels of the seismic pulses from airgun arrays are very high. In general, the received levels of seismic sounds, like other underwater sounds, diminish with increasing distance. However, with a fairly large airgun array, it is possible for the received levels of the seismic pulses to be above the natural background sound level and still be detectable at least as far as 100 km (54 n. mi. or 62 land miles) away from a seismic vessel operating over the middle portion of the continental shelf (Greene and Richardson 1988). With a smaller array operating in shallow nearshore waters, as in BPXA's Northstar seismic program in 1996, the sounds usually diminish below the natural ambient level and become undetectable at a somewhat lesser distance (Greene 1997).

Reactions to Seismic Exploration in Summer

Types of Observations: During 1980-84, we observed bowheads exposed to actual and simulated seismic operations in the Canadian Beaufort Sea (Richardson et al. 1986). (1) On 21 occasions we observed bowhead whales that were exposed to pulses of seismic sound from seismic ships 6 to 99 km away (3.2-53 n. mi. away). We know they were exposed to seismic sounds because we dropped sonobuoys into the water near the whales to measure the sounds reaching the animals. (2) On five additional occasions, we conducted experiments with a single, small 40

cu. in. airgun, observing bowhead behavior before, during, and after the bowheads were exposed to noise pulses from the single airgun. We used the single airgun close to whales to simulate a large array of airguns farther away. We hypothesized that, when we saw reactions at some distance from a single airgun, we might expect reactions to a full-scale airgun array as much as 10-15 times as far away. (3) Finally, we conducted one experiment in which a full-scale seismic boat operating under our direction travelled past a group of bowhead whales.

At times during the 1980-84 study, several different seismic boats were operating simultaneously in the Canadian Beaufort Sea (Richardson et al. 1987). These included not only vessels with arrays of airguns but also, in shallower waters, seismic operations with sleeve exploders or open-bottom gas guns. Those devices emit low-frequency sound pulses similar to the airgun pulses, although not quite as strong as the pulses from the larger airgun arrays (Greene and Richardson 1988).

Subtle Effects at Long Distances: In the Canadian Beaufort Sea during summer, bowheads seen 6-99 km (3-53 n.mi.) from seismic boats and exposed to measurable seismic pulses usually continued to move at normal speeds. There was no indication that they were moving away from the seismic boats. They continued to emit underwater calls of the usual types, although perhaps a little less often than normal (estimated 11.1 calls/whale-hour with seismic vs. 14.3 calls/whale-hour without seismic). These bowheads were engaged in the normal kinds of activities that we see in summer, including social interactions with one another, apparent feeding in the water column or near the bottom, and sometimes traveling. Occasionally we observed a bowheads at the surface playing with logs while exposed to seismic noise. However, log play, like all of the other activities observed with seismic noise, was also observed in the absence of seismic (Würsig et al. 1989). In most respects, the behavior of these whales seen 3-53 n.mi. from seismic boats and exposed to sound pulses looked generally normal to us.

However, statistical analysis of the surfacing, respiration, and dive cycles of bowheads exposed to seismic indicated that these cycles differed from those of bowheads that were not exposed to seismic or other kinds of human activities. The average duration of time at the surface, number of blows per surfacing, and duration of dive all tended to be lower with seismic. There was no major difference in the intervals between successive blows with and without seismic.

These data were not from controlled experiments. They were based on comparisons of some whales that were exposed to seismic versus other whales at other locations without seismic pulses. Whale behavior naturally differs from day to day and place to place. However, I suspect that the differences were attributable to seismic. The characteristics of surfacing-respiration-dive cycles by bowheads 3-53 n.mi. from seismic boats (fewer blows per surfacing, shorter surfacings, and shorter dives) were the same as we have seen when bowheads react to other kinds of human activities (Richardson and Malme 1993). Also, the same pattern was noted by Ljungblad et al. (1988) during their experiments with four seismic boats that approached close to bowheads (see below).

This implies that there are some subtle effects of seismic at long distances. The data were not adequate to do show how far the subtle effects on surfacing-respiration-dive cycles may extend. We suspected that this effect was evident as much as 39 n.mi. from the seismic boat on at least one occasion. Additional data are needed to confirm whether subtle behavioral effects extend that far from seismic boats. These subtle behavioral effects at long distances from seismic boats may be related to the "skittish" behavior of bowheads that Iñupiat whalers have reported when seismic boats are operating in the region.

Single Airgun Experiments: Five single-airgun experiments were done at various distances from summering bowhead whales. The first three tests were at 3-5 km (1.6-2.7 n.mi.). We did not see any obvious effect on the behavior of the bowheads when the single airgun began operating at those distances. The sound levels received by bowheads 1.6-2.7 n.mi. from the single airgun were not precisely known, but probably similar to those roughly 10 or 15 times farther away from a seismic vessel with a full-scale array of airguns.

The fourth test was slightly closer, 1.1-2.4 n.mi., and on that occasion the whales began to swim away when the airgun began firing. During a fifth test, the airgun was only 0.1-0.6 n.mi. from the whales, and the closest whales swam strongly and directly away when the airgun began firing. (The fifth test was terminated prematurely when a previously-unseen bowhead was sighted within 0.1 n.mi.) Given that some bowheads reacted to the single 40 cu. in. airgun at distances of 1-2 n.mi., one might expect them to react in a similar way to a full scale airgun array at much greater distances.

The fact that bowheads swam directly away is interesting in itself. It indicates that bowheads could tell the direction from which the seismic sounds were coming. Airgun sound is mainly at low frequencies. Some people have questioned whether whales can localize the direction from which low-frequency sound is arriving. It is obvious, from the reactions of various whales to the calls of their own species as well as the bowhead reactions to our airgun, that they must be able to do this.

Close Approach by Full-Scale Seismic Vessel: The third type of information that we collected during the summer study in the Canadian Beaufort Sea concerned the reactions of a group of feeding bowhead whales to a full-scale seismic boat made available by Geophysical Services Inc. (GSI). A 47 L (about 2870 cu. in.) array of airguns was used. A group of 6 bowheads were feeding in relatively shallow water (depth 18 m). They were diving down to the bottom and bringing up mud. The seismic boat had been operating in the area for a number of days. When the GSI vessel was released for use in our experiment, it approached with airguns shooting, then shut down the airguns for 33 min at a range of 4.9 n.mi. while maneuvering through ice, resumed firing at range 4.0 n.mi., and continued on a straight line through a position 0.8 n.mi. to the side of the feeding whales.

The whales started to orient away as the seismic vessel began approaching from 4 n.mi. away, but continued to dive and to bring mud to the surface until the seismic boat came within 2 n.mi. The whales then ceased feeding and moved away from the ship's track. Two whales that we could recognize moved about 1 n.mi. from their original position.

Tests of Bowhead Reactions to Seismic in Autumn 1984

This section briefly summarizes tests done by Ljungblad et al. (1988) in the Alaskan Beaufort Sea. In cooperation with Western Geophysical, Ljungblad et al. had the opportunity to conduct four experiments with seismic boats. Three experiments involved full-scale airgun arrays; one involved a single 80 cu. in. airgun.

Ljungblad found that, as the boats started firing their airguns and approached the whales, the whales ultimately swam away, showing obvious avoidance reactions and other changes in behavior. There has been considerable discussion about the details of these tests, including the distances at which the whales started to react and the relevance of the tests to the issue of migrating bowheads reacting to an operational seismic program. In any case, reaction distances would be expected to vary considerably from day to day and place to place, depending upon the water depth, sound propagation conditions, and the particular source boat, not to mention the

natural variability in how whales react on different occasions. The main point is that the whales obviously showed strong avoidance at a distance on the order of several kilometers.

In addition, Ljungblad et al. (1988) collected behavioral data before, during and after their four tests. They found the same pattern of change in surfacing, respiration and dive cycles that I described earlier: During exposure to the active seismic vessel, there were shorter surfacings, fewer blows per surfacing, and shorter dives. This seems to be a general pattern. In addition to being evident at distances within 5 n.mi. during the tests by Ljungblad et al., we saw the same pattern among bowhead whales as much as 39 n.mi. from seismic boats. A similar pattern has been seen in gray whales exposed to airgun pulses in the Bering Sea (Malme et al. 1988).

Monitoring of Bowhead Reactions to Seismic in Autumn 1996

The seismic program conducted for BPXA during September 1996 was located in the Northstar area northwest of Prudhoe Bay, within 6 n.mi. of the barrier islands (Richardson [ed.] 1997). A relatively small airgun array was used; its total gun volume was 1320 cu. in. Aerial surveys in prior years have showed that the center of the bowhead migration corridor through this area is normally between the 20- and 50-m depth contours, about 10 to 30 n.mi. seaward of the barrier islands. The prior-year survey data were collected under a wide range of conditions, including light, moderate and heavy ice years, and years with widely varying amounts of offshore industrial activities. However, most bowhead sightings in 1994-95, two light ice years with very little offshore industrial activity, were in the same corridor.

During the 1-21 period of September 1996, we flew aerial surveys of the seismic operating area, and of waters to the west, north and east of that area, each day when weather allowed. This included two days of surveys after the seismic program ended on 18 September. In addition, the Minerals Management Service flew less intensive surveys in the same region on some days. The combined data from the two teams included 58 sightings by LGL and 29 sightings by MMS within the Northstar region. The bowhead migration corridor in 1996 was generally in the same area as it had been during 1994-95 when there had been no seismic, and in other prior years (Miller et al. 1997).

We did a more detailed analysis to check for possible diversion during periods with active seismic exploration. We tabulated the number of sightings of bowheads in each 10-km (5.4 n.mi.) distance-from-shore interval at times during 1996 with seismic and at other times during 1996 when there was no seismic. We also determined the amount of survey effort with and without seismic in each distance-from-shore interval. This allowed us to calculate "sightings per 100 km of surveys" in each distance-from-shore interval, with and without seismic. These figures take account of varying amounts of survey effort at different distances offshore.

The highest sighting rates were in the zones 10-20 km from shore when there was no seismic, and 20-30 km offshore when there was seismic (5.4-11 n.mi. vs. 11-16 n.mi. offshore). This difference is consistent with the possibility that the whales were being displaced farther from shore during times with seismic exploration in nearshore waters. However, this difference was not statistically significant, and it is difficult to interpret because of the small number of sightings and other complications (Miller et al. 1997). We need more data before we will be able to draw firm conclusions. Even with near-daily surveys, there are not enough sightings during any one season to allow detailed analysis and firm conclusions. If the same monitoring effort were repeated in one or two additional years, stronger conclusions could be drawn.

A number of whales seen in September 1996 were heading in seemingly strange directions, mainly east. However, in 1995, a year with no seismic or other significant industrial activities offshore, there was also a strange pattern with a substantial proportion of the whales

heading north, northeast or southeast, or south. These data include only the whales that were recorded as traveling and exclude the whales that were socializing. Also, during 1996, the proportion of headings in unexpected directions was high at times without seismic as well as at times with seismic. In general, the unexpected distribution of headings in 1996 was suggestive of a seismic effect. However, the similar distributions at times during 1996 and 1995 when there was no seismic suggest that there may have been some other explanation. Again, the small sample size from a single year of seismic monitoring limits the conclusions that can be drawn.

The distribution, movements and behavior of bowheads near seismic vessels in the Alaskan Beaufort Sea have also been monitored in a less intensive way during several prior years. It would be useful to re-examine those data. At least one case of strong avoidance was reported as far as 24 km (13 n.mi.) from an approaching seismic boat (Koski and Johnson 1987).

Summary of Aerial Observations

Biologists' present understanding of the reactions of bowhead whales to seismic exploration is based on small numbers of observations that are difficult to interpret because of variability in bowhead behavior. Bowheads do different things at different times, whether or not there is seismic. Given this variability, it is often difficult to know whether the present activity of a bowhead is "normal" or otherwise.

Strong pulses of seismic noise are often detectable 25-50 km (13-27 n.mi.) from seismic ships, and in some situations seismic pulses are weakly detectable at 100 km (54 n.mi.) or even farther away. However, during monitoring and experimental studies, strong reactions by bowheads have rarely been recognized farther than 8 km (4 n.mi.) away. Bowhead whales have often been observed in areas where they were tolerating exposure to strong seismic sounds. However, there is a limit to their tolerance. We are trying to better define and understand just what that limit is.

Observations during summer and early autumn show that most bowhead whales interrupt their previous activities and swim strongly away when a seismic ship approaches within about 7.5 to 8 km (4 n.mi.). At the distances where this strong avoidance occurs, received levels of seismic pulses typically are high, about 150-180 dB re 1 μ Pa. The surfacing, respiration and dive cycles of bowheads engaged in strong avoidance also change in a consistent pattern involving unusually short surfacings and dives, and unusually few blows per surfacing. These avoidance and behavioral effects among bowheads close to seismic vessels are strong, reasonably consistent, and relatively easy to document.

Less consistent and weaker disturbance effects probably extend to longer distances and lower received sound levels at least some of the time. Bowheads often tolerate much seismic noise and, at least in summer, continue to use areas where seismic exploration is common. However, the same pattern of change in surfacing, respiration and diving cycles has sometimes been seen in bowheads as much as 73 km (39 n.mi.) from seismic ships. Most of these whales were engaged in seemingly normal activities, and were not swimming away from the seismic boat. However, at least one case of strong avoidance has been reported as far as 24 km (13 n.mi.) from an approaching seismic boat.

Many of the observations on which the above summary is based involved bowheads that were not actively migrating. Actively migrating bowheads may react in a somewhat different manner than bowheads engaged in feeding or socializing, i.e. by deflecting their migration corridor away from the seismic vessel. Monitoring of bowhead migration past a nearshore seismic operation during September 1996 (BPXA's Northstar project) provided evidence consistent with the possibility that the closest whales may have been displaced several miles seaward during

periods with seismic. Even so, the main migration corridor during times with seismic was within 20-30 km (11-16 n.mi.) from shore and within 10-20 km (5.4-11 n.mi.) of the closest edge of the area with seismic exploration—well within the ensonified area. Also, the migration corridors with and without seismic overlapped broadly. To confirm and quantify the extent of seaward displacement, a larger sample size than could be obtained in 1996 alone is needed. Re-examination of monitoring data collected in prior years could also be helpful.

In general, the strength, conspicuousness, and consistency of disturbance effects from seismic pulses probably diminish with increasing distance and decreasing received sound level. As with other noisy human activities and other whale species, there is no one distance within which reactions occur consistently, and beyond which there are no reactions. With graded responses of this type, it is difficult to establish conclusively how far from the source the effects extend. When sample sizes are small and variability is high, lack of statistical proof that effects extend to a certain distance does not prove the lack of an effect. Subtle and/or occasional effects probably extend to longer distances than can be proven statistically with existing data. However, it is also noteworthy that some bowheads, migrating and otherwise, have been seen within 10-20 n.mi. of ongoing seismic operations, well inside the ensonified area.

REFERENCES CITED

- Greene, C.R., Jr. 1997. Physical acoustics measurements. *In*: W.J. Richardson (ed.) 1997 [see below].
- Greene, C.R., Jr. and W.J. Richardson. 1988. Characteristics of marine seismic survey sounds in the Beaufort Sea. *J. Acoust. Soc. Am.* 83(6):2246-2254.
- Koski, W.R. and S.R. Johnson. 1987. Behavioral studies and aerial photogrammetry. Chapter 4 *In*: LGL and Greeneridge, Responses of bowhead whales to an offshore drilling operation in the Alaskan Beaufort Sea, autumn 1986. Rep. from LGL Ltd., King City, Ont., and Greeneridge Sciences Inc., Santa Barbara, CA, for Shell Western E & P Inc., Anchorage, AK. 124 p.
- Ljungblad, D.K., B. Würsig, S.L. Swartz and J.M. Keene. 1988. Observations on the behavioral responses of bowhead whales (*Balaena mysticetus*) to active geophysical vessels in the Alaskan Beaufort Sea. *Arctic* 41(3):183-194.
- Malme, C.I., B. Würsig, J.E. Bird and P. Tyack. 1988. Observations of feeding gray whale responses to controlled industrial noise exposure. Pages 55-73 *in*: W.M. Sackinger et al. (eds.), Port and ocean engineering under arctic conditions, Vol. II. Geophys. Inst., Univ. Alaska, Fairbanks. 111 p.
- Miller, G.W., R.E. Elliott, W.R. Koski and W.J. Richardson. 1997. Whales. *In*: W.J. Richardson (ed.) 1987 [see below].
- Richardson, W.J. (ed.). 1997. Northstar marine mammal monitoring program, 1996: marine mammal and acoustical monitoring of a seismic program in the Alaskan Beaufort Sea. Rep. from LGL Ltd., King City, Ont., and Greeneridge Sciences Inc., Santa Barbara, CA, for BP Explor. (Alaska) Inc., Anchorage, AK, and Nat. Mar. Fish. Serv., Anchorage, AK, and Silver Spring, MD.

- Richardson, W.J. and C.I. Malme. 1993. Man-made noise and behavioral responses. Pages 631-700 in: J.J. Burns, J.J. Montague and C.J. Cowles (eds.), *The bowhead whale*. Spec. Publ. 2. Soc. Mar. Mamm., Lawrence, KS. 787 p.
- Richardson, W.J., B. Würsig and C.R. Greene Jr. 1986. Reactions of bowhead whales, *Balaena mysticetus*, to seismic exploration in the Canadian Beaufort Sea. *J. Acoust. Soc. Am.* 79(4):1117-1128.
- Richardson, W.J., R.A. Davis, C.R. Evans, D.K. Ljungblad and P. Norton. 1987. Summer distribution of bowhead whales, *Balaena mysticetus*, relative to oil industry activities in the Canadian Beaufort Sea, 1980-84. *Arctic* 40(2):93-104.
- Richardson, W.J., C.R. Greene Jr., C.I. Malme and D.H. Thomson. 1995. *Marine mammals and noise*. Academic Press, San Diego, CA. 576 p.
- Würsig, B., E.M. Dorsey, W.J. Richardson and R.S. Wells. 1989. Feeding, aerial and play behaviour of the bowhead whale, *Balaena mysticetus*, summering in the Beaufort Sea. *Aquatic Mamm.* 15(1):27-37.

QUESTIONS AND DISCUSSION:

Brad Smith: John, can you talk a little about reconciling Charles Greene's presentation showing that call rates were a lot higher outside the Northstar area than within it? There seemed to be a discrepancy between the acoustic data, showing a large difference, and the aerial data, which seemed to show very little effect. It seems from the acoustic data that a higher proportion of the whales near Northstar are being missed or that they are simply not vocalizing.

John Richardson: The best answer is that it is too soon to give an explanation for the difference in bowhead call rates near the two bottom-mounted acoustic recorders. The western unit was located just offshore of Northstar, west of Cross Island; the other unit was 45 km (24 n.mi.) to the ESE, east of Cross Island. Charles Greene obtained acoustic data for about 15 days. To date, only the first 5 days of data have been analyzed. Those were the first 5 days of September, at the start of the bowhead migration season. During those days, more whale calls were detected by the eastern unit.

- One possibility is that whales called less often when exposed to the seismic pulses, or tended to move farther offshore, or both.
- Another possibility is that, early in the migration season, more whales might be expected to occur near the eastern site than near the western site. If the effect was simply a seasonal effect, it should disappear as we look at the additional data farther into the season.
- Still another possibility is that bowheads may tend to linger in the eastern area. If you look at the maps of MMS aerial survey results over the years, there seem to be more bowhead sightings just east of Northstar (and east of Cross Island) than near Northstar west of Cross Island. This is so even if you ignore all the sightings during non-systematic "connect" and "search" flights and just consider the sightings along systematic north-south transects. We are now analyzing the sightings-per-unit-effort from aerial surveys east and west of Cross Island in prior years to determine whether bowheads really have tended to be more common east rather than west of Cross Island.

Steve Treacy: Historically, there has not been as much aerial survey effort expended west of Cross Island as has been expended east of Cross Island. However, in 1995 there was a big gap west of Cross Island despite the fact that we were looking very hard in that area. We just couldn't find them that year. Normally that has to do with the amount of effort.

John Richardson: Maybe, for some reason, bowheads linger east of Cross Island or travel faster when they are west of Cross Island, and do so for some reason unrelated to seismic. Alternatively, maybe the east-west difference in calling rates during early September 1996 did have something to do with seismic. We are now doing more analyses to try to understand what was happening. As you correctly point out, the call rate during early September seemed to be drastically different in the two areas, much more so than we found with seismic versus without seismic in the Canadian Beaufort.

[Analyses of the full 15 days of recordings from the two sites, completed after the workshop, confirmed that the total number of bowhead calls was higher at the eastern site than at the western site near Northstar. However, the ratio over the full 15 days was not as extreme as that during the first five days alone—see Richardson (ed., 1997) for details.]

Brad Smith: It might be good for the whaling captains to speak later about whether, in their experience, they have they seen more whales east or west of Cross Island.

Burton Rexford: It is difficult for me to listen to all of this [talk about whales] at 3.5 miles from the noise source. I have been out in the sea while the seismic is going on, and I never spotted the seismic boat for 60 miles. It is difficult for me to swallow that. I think that the next lawsuit will be about human integrity, not about marine mammals. I think the next lawsuit will be human integrity.

Chris Clark: What I heard you say, John, was that at 4 miles there is a fairly dramatic response relative to everything else that we have ever looked at in whales. You said it was obvious, etc. You didn't describe what the exposure levels were, did you? And if you did, could you repeat it? Do you have any idea how loud it was—what were the "received levels"?

John Richardson: Different people have measured the received levels of seismic sounds in slightly different ways. However, as Charles Greene explained earlier, received levels measured at distances around 4 miles have been on the order of 160 dB, 165 dB or in some cases 170 dB when measured on an average (rms) pulse pressure basis relative to 1 microPascal. These are the received levels at and above which the reactions by bowheads are obvious, and below which the reactions are less consistent.

Chris Clark: Would those results equate to the reaction thresholds that we have seen in gray whales, where Malme et al. showed gray whale responses to airgun pulses at received levels on the order of 160-170 dB?

John Richardson: Yes, the measurement procedure that Charles Greene described is similar to that in the Malme et al. work in which you were involved. The reaction thresholds of bowhead and gray whales to seismic pulses seem to be generally comparable and are far higher than the reaction thresholds of both species to continuous industrial sounds.

Chris Clark: The interesting thing is that, in the gray whales, the responses weren't so obvious. It required a statistical approach to demonstrate that there was a response; it was not a really obvious response. You said that there were also reactions out to greater ranges, although the numbers aren't large enough to draw a statistically viable conclusion. I get the sense that you think there is a graded response with range, which probably translates to exposure. These responses could be up to 10 miles or so away.

John Richardson: Yes, there seem to be graded responses. The farther away the whales are, and the lower the received sound levels, the less conspicuous the reactions by bowheads. This is not to say that the whales at longer distances are not reacting; it is just that they are not reacting in ways that are easy to see at a glance. Also, a lower proportion of the individual whales are reacting. It is relatively easy to demonstrate that there are obvious and strong effects close to the noise source. The farther out you go, the harder it becomes to demonstrate scientifically that there are effects. I don't want to get into a discussion of statistical power. However, when disturbance effects are graded with distance, it is quite likely that real effects extend somewhat farther than the maximum distance where you can demonstrate them statistically with a given set of data. When the effects gradually diminish with increasing distance, the collection of additional data increases statistical power and allows you to detect an effect slightly farther away.

I think that this gradation of response with increasing distance and decreasing sound level has a large influence on our ability to detect disturbance effects at various distances. When the conspicuousness of effects diminishes gradually with increased distance and when sample sizes are small, it is not possible to determine the maximum distance at which a disturbance effect can occur.

Chris Clark: You have pointed that, in the presence of seismic pulses, several measures of behavior changed in a somewhat consistent way in various different studies: there were shorter dive times, shorter surfacing times, and fewer blows per surfacing. Overall, did that mean that the animals were spending less time underwater? With both reduced surface times and reduced dive times in the presence of seismic, it seems that the proportion of time underwater may have averaged out to be about the same with and without seismic.

John Richardson: Your last point is correct. There was not much difference in the proportion of time below the surface with and without seismic, as surfacings and dives both tended to be shorter with seismic. One might suspect that, with seismic, whales would spend more time at or near the surface where the received levels of seismic sounds are known to be lower than at deeper depths. However, this idea is not supported by the data that I have seen so far.

When exposed to seismic sounds, gray whales show the same pattern of change in their surfacing, respiration and diving cycles as do bowheads: shorter surfacings, shorter dives, and fewer blows per surfacing. That is another cross-species similarity, and tends to reinforce my suspicion that bowheads exhibiting this same pattern at fairly long distances from seismic boats (3-39 n.mi.) were, in fact, showing reactions to seismic—not strong avoidance, but reactions nonetheless.

Steve Treacy: I think one of the important questions of the day is that we are trying to communicate with the whalers about their observations. Burton has dramatized some of the differences between some of the scientific findings and what the whalers may be seeing. I think it would be useful if, as was done for the gray whales off California, you could estimate the distance at which 10% of the bowhead whales show these kinds of reactions. Or indicate what percent react when within 3 or 4 miles radius—you indicated that it is "most". At what distance would you say that ten percent would start to react?

John Richardson: The correct answer from a scientific viewpoint is that we do not have nearly enough data to determine the distance at which 10% of the bowheads react. Most bowheads, certainly well over half, show quite obvious reactions at distances up to about 4 miles. The distance at which 10% of the bowheads show strong reactions would exceed 4 miles. However, at present we have too few data to estimate that distance.

Thomas Napageak: I appreciate the pictures that you showed comparing bowhead sightings during the times with seismic and with no seismic in the Northstar area. However, I would like to fall back to the time that Kuvlum and the seismic operation was going on at Camden Bay. I don't think you clearly understand our observations as subsistence hunters. From your overview on aerial flights, the whales are easy to see. You can see them in the water. In a little dinky boat, you only see what you can see. You say 3 miles—that is over the horizon for us in a little boat. During the Kuvlum operations, the whales were so spooked that we lost two boats. One sank; both sank, as a matter of fact. One sank 30 miles north of Cross Island; that was where we finally ran into some bowhead whales because of all the activity at Kuvlum. That is when Western Geophysical was doing their seismic while the bowhead whales were sleeping.

You know, I have just about enough nerve to file a lawsuit because we lost two boats that were worth, to a whaling captain, pretty close to \$75,000 of one individual's earnings: outboard motor, boat, shoulder guns, and all of the stuff. His whole position to feed the community was lost because of seismic and exploration activity at Kuvlum.

Without seismic and exploration, from Cross Island we go out 1.5 to 2 miles; there are whales there. As a matter of fact, we see them from the island before we go out there. But when there is activity, we have to go 30 miles north. You said that bowheads can get as close as 3 miles. But once they turn, how long does it take them to get back to their regular migratory path? I would like you to answer that one for me.

John Richardson: I can't answer that based on specific data, but it is obvious that it would take them a long time. In fact if bowheads are deflected anywhere near that far offshore, those individual whales would be highly unlikely to come back to the point of deflection. They would have traveled far to the west before they would resume their normal migration path.

One thing I might add: We have observed bowhead whales showing what we describe as subtle changes in behavior at fairly long distances away from a seismic boat, perhaps as far as about 39 miles. Those observations may be consistent with what you describe as their increased "spookiness." If the subtle changes in behavior were really caused by the seismic boat, bowheads exposed to distant seismic may be in an unusual behavioral state, and may react to things like the approach of a whaling boat differently and more warily than they would in other situations. I don't see those two observations, yours and ours, as being in conflict. I think they might, in some way, be related to one another.

Fred Kanayurak: In your first presentation with your slides, we noticed that you said your seismic activity approached the whales. Was that the process that you used when you sighted the whales: you approached them and then later turned on the seismic activity when you got close to the whales? Is that what I am understanding from your presentation?

John Richardson: Our one experiment with the full-scale seismic boat was done almost as you described. However, the airguns had been shooting steadily as the seismic boat headed more or less toward the feeding whales from many miles away. Then it stopped shooting at a distance of 4.9 n.mi. in order to maneuver through ice. After 33 minutes, when it was 4.0 n.mi. away from the whales, it resumed shooting and headed just to the side of the feeding whales. Thus, the seismic boat did stop shooting and then start again, but it had also been shooting beforehand as it was approaching from many miles away.

Fred Kanayurak: I am interested in reactions of stationary whales in comparison to whales that are approaching. These are two different situations. When you are hunting any stationary animal, for example on a snow machine, they stay stationary until you get close enough or until they are spooked. Then you no longer see them. However, when you are stationary and you are making

noise, the animal won't even get that close. Similarly, whales approaching seismic activity seem to divert away from the seismic activity as they approach. Stationary whales and whales that are approaching are different situations.

A good example occurred during the bowhead whale hunt in the fall of 1989, when there was some seismic activity going on. Let me read this for you:

During the fall 1989 hunt, in the Barrow area, there were boats going out at least for three weeks without sighting any bowhead whales on the original migratory route that we used to approach them from. During this time, the traditional hunting area to the north and northeast of Point Barrow was repeatedly searched and no whales were seen. Unfortunately, during this time hunters would see a seismic ship operating, probably the *Arctic Rose*. In 1989 I think the *Arctic Rose* was up here. After much frustration, hunters went further and further. Finally one of the whaling captains took a bowhead whale off Cape Simpson about 45 mi from Point Barrow. Later on three additional whales were caught around that area, by Jacob Adams, Ben Itta, and also Joash Tukle. These strikes were all in the same area, about 45-50 mi from the point. This caused us to lose the meat. Actually it rotted before it was brought to shore. It took 22 to 26 hours to tow the whales in to the area where we butcher them.

So, to complete my statement:

The distance was so great we had to haul fuel two times over to refill the boats that were towing these whales. Under normal conditions, with no displacement of the migration route, the whales are taken within a few miles of Point Barrow, and towing to shore only takes 2 to 5 hours. This way we save every part of the whale. The meat is shared, the muktuk is shared, etc. Usually it would take about 2 to 5 hours; that was about the most we have gone.

When there is no disturbance, most hunting occurs offshore of the coast between Point Barrow and the Tapkaluk Islands about 12-15 mi, extending offshore about 3-5 mi. These hunting areas are close enough so we can tow in our whales within 5 hours. This is the area in which most whales are seen and hunted when there is no industrial disturbance. This is the most important part of our general hunting area off Point Barrow. This is the migration route that we are talking about.

John Richardson: In response to the first part of your statement, I agree that the types of reactions and the reaction distances are likely to be different when a seismic boat approaches a stationary or near-stationary whale in comparison to those when migrating whales pass a seismic boat. I agree that migrating whales are likely to deflect away from the seismic boat. Deflection has been observed for migrating bowheads exposed to other types of industrial activities, and for migrating gray whales exposed to seismic and other industrial sounds.

**COMMENTS BY SUBSISTENCE HUNTERS
REGARDING IMPACTS OF SEISMIC NOISE TO FALL MIGRATING
BOWHEAD WHALES AND TO THE SUBSISTENCE HUNT**

INTRODUCTORY REMARKS

**DR. THOMAS ALBERT
DEPARTMENT OF WILDLIFE MANAGEMENT
NORTH SLOPE BOROUGH**

I have been watching and reading what has been done on impact assessment for a long, long time. We are haunted by the study done by my good friend Don Ljungblad² and some of his associates in which they came up with this 7.5 km data. Dr. Richardson mentioned the study as one of the sources of data for impacts occurring at something on the order of 7 or 8 km (3-4 mi). Since this study was brought up as one of the "legs," you might say, that this stands on, I need to comment on it. Everything that I am going to say, I have said to my friend Don Ljungblad, in person and in writing several times.

Let's take a look at the four experiments that were done in 1984 (or whenever it was) by Don Ljungblad and his associates. As Dr. Richardson pointed out, there were four separate experiments where seismic boats were brought near whales, and the bottom line of it all came out to be that when the ship gets within 7 km (about 3 mi), the whales begin to show significant effects. In every environmental impact statement and every industrial publication that I have seen since then, this study is heralded as evidence that the ship has to get very close to the animal before you find an effect.

In the years that I have been doing this, I have been able to see two major areas of investigation on bowhead whales. One is the population study off Point Barrow and the other is industrial impacts. Over many years now, I have been struck by a couple of things. One of which is the scientific wisdom on both of these, population and impacts, is different from what the whaling captains say. And in 1978, 1979, or 1980, when I first got into this, as a scientist, it was easy for me to believe the limited amount of scientific information that was available about bowhead populations. It was harder for me to believe what individual whaling captains told me. Until I listened to one captain after another. In particular Harry Brower, Sr. and some other people

² The following are several studies on this subject:

Reeves, R., D. Ljungblad, and J. Clarke. 1983. Report on Studies to Monitor the Interaction Between Offshore Geophysical Exploration Activities and Bowhead Whales in the Alaskan Beaufort Sea, Fall 1982. Report from Hubbs-Sea World Research Institute, 1700 South Shores Road, San Diego, CA 92109 and Naval Ocean Systems Center (Code 5131), San Diego, CA 92152 to Alaska OCS Region, Minerals Management Service, Anchorage, AK. 38 p. plus appendices.

Ljungblad, D., B. Würsig, S. Swartz, and J. Keene. 1985. Observations on the Behavior of Bowhead Whales (*Balaena mysticetus*) in the Presence of Operating Seismic Exploration Vessels in the Alaskan Beaufort Sea. Report from SEACO, Inc., 2845-D Nimitz Blvd., San Diego, CA 92106 for Alaska OCS Region, Minerals Management Service, Anchorage, AK. 78 p.

Ljungblad, D., B. Würsig, and S. Swartz. 1986. Observations on the Behavior of Bowhead Whales (*Balaena mysticetus*) in the Presence of Operating Seismic Exploration Vessels in the Alaskan Beaufort Sea. Paper SC/38/PS1 presented to the 1986 meeting of the Scientific Committee of the International Whaling Commission. 44 p.

Ljungblad, D., B. Würsig, S. Swartz, and J. Keene. 1988. Observations on the Behavioral Response of Bowhead Whales (*Balaena mysticetus*) to Active Geophysical Vessels in the Alaskan Beaufort Sea. Arctic 41(3):183-194.

in this room as well as some people who are not in this room. The very small amount of scientific information that was available on bowhead population in the late 1970s basically said there were 2000 or fewer bowheads and that bowheads come swimming up the lead. They stay pretty much in the lead. That was the conventional wisdom. The International Whaling Commission (IWC) pretty much bought into it. I went to the International Whaling Commission in all those years too, so I know. As you all well know, after spending millions of dollars and many years of work, what the whaling captains said proved to be true. The limited amount of scientific information was proved to be wrong. We now know that there are a whole lot more than 2000 bowheads. We also now know that they don't have to stay in the lead. Thanks to Dr. Clark's work, it was proven scientifically what Harry Brower, Jake Adams, Arnold Brower, Sr., and all those captains were saying. The whales pass by on a wide front, ice or no ice, lead or no lead; sometimes as wide as 10 mi. And they are not afraid of the ice—they break the ice. And it took us years to be able to document this. So from my point of view—and I saw this with my own eyes a—little tiny bit of scientific information and a consistent stand by the hunters. We now know which one was right.

The only other instance where I have seen this is in industrial impacts associated with noise. I'm trying to be extremely clear here. I have seen this for many years—a minute amount of scientific information collected by John Richardson and Charlie Greene, who are good scientists—they can't go out and manufacture whales; they've done the best they can. And another study by our friend Don Ljungblad and his associates. But nevertheless, as John Richardson pointed out a little while ago, the numbers are tiny. The observations are few. But based on that, the "scientific wisdom" basically is that seismic boats don't really affect the whales a whole lot when the animals are somewhere around 7 km or so. But on the other hand, I'm reminded of all the people who have walked into my office over the years, beginning with Burton Rexford back there—so many times I thought he was going to shoot me for not doing something about this—people in Nuiqsut, such as Thomas Napageak, and all his associates. One after another kept saying the same thing: "What do you mean 7 km, 3 mi? We don't believe it." There's not a whaling captain on the North Slope who believes that.

I've come to the conclusion that either all these whaling captains are lying—which I don't think they are because they didn't lie to me in 1978 about the populations—or there is something wrong here. The effect of this noise is a whole lot more than 7 km. The limited data that Dr. Richardson showed you from the Northstar, for instance, for this year of the distribution of whales off of Cross Island and the Northstar site, during seismic operations the whales tended to be farther offshore—it may not be statistically significant, I don't know yet, but they tended to be; you saw the graph. Now rather than saying that is an interesting but unproven observation, I hope that when the final report is written they put in there that this is completely consistent with the comments of the hunters in Barrow and in Nuiqsut—farther offshore during seismic noise. But I'll bet you when their report gets written, it won't be there; but "7.5 km, Don Ljungblad, Richardson et al. 1987, 1984" that will be there. I'm not trying to offend John and Charlie; we've been through this before. I'm just asking that when you write the report next time, there are additional data to support those observations; the feelings and the sightings of these many people. It deserves at least some mention.

Now, that being said, let me take a quick look at the study that was cited several times today and is mentioned in every MMS EIS by Don Ljungblad and his associates—the four experiments. That information appeared first in an MMS report. It then appeared in a paper at the IWC Scientific Committee and finally as a paper in the journal *Arctic*. If you read the paper carefully, or the report, as I have done many times you find out they were trying to see what happens when a boat making seismic noise approaches the whales. They had something called a pre-exposure period, an exposure period, and a post-exposure period. Normally we would think of pre-exposure as a period of no noise. But after repeated harassment by me, that they had no pre-exposure period, they defined the pre-exposure not as no noise, which any normal person

would think, but as no noise from a seismic boat within 10 kilometers. In 3 of the 4 experiments, there was another seismic boat firing in the distance. So in 3 of the 4 experiments, the whales were already exposed to seismic noise before the test boat even turned on its little popper. In the one remaining study, where there was no other seismic boat out in the distance, the experimental seismic boat turned on its popper before the observation period began; namely, during the so called pre-exposure period. I don't understand how that study can get the credibility that it has received. It's an interesting piece of work, and it should have been published for sure, but there should have been caveats in it.

I just don't understand this. In one of the instances, when the seismic boat turned on its seismic array, the whales reacted immediately—7.2 km, I'll never forget it. Turn on the guns and whammo!—the whales react abruptly. And that was determined in that particular experiment to be the point at which a reaction occurred. Now think about that for a minute. As soon as they turned it on, the animals reacted, and somebody said, "Hmm, that's the point at which they react." What if the boat would have been 9 km or 10 km away—we don't have that information. So, it is an interesting study, but in my opinion, it should be less chiseled in stone than it is. If you want to use it in an EIS, that's great—but put in a few caveats that reflect reality. Anyway, that is something that I had to say since that study was brought up. We need to present both sides.

Now, we begin a series of talks by the whaling captains themselves to give their views. We've already heard some of them, the 1989 thing in Barrow was stupendous. There are several written statements by the whaling captains that I hope you will take with you that give the views of some of these folks (Attachment A).

So now we will have the chairman of each village whaling captain's association to say what they want to say. Then we will open it up for discussion. But this is the time for the whaling captains to get up and say something. If you think 3 mi is right, then say so. If you think something else is right, say so.

[There was a discussion off the microphone regarding producing a map showing drill sites and survey lines.]

That's a very good point—and maybe one of the things that should come out as a recommendation is that we ask MMS to produce a map that shows all the drill sites and seismic areas with a legend that shows the dates. Because every time we have a meeting we get into arguments about this.

Now let's hear from the president of the Barrow Whaling Captains Association, Fred Kanayurak, and then we'll have the Nuiqsut leader, Thomas Napageak, speak and then the Kaktovik leader, Joe Kaleak. Then everyone else will get a chance to speak.

**FRED KANAYURAK
PRESIDENT
BARROW WHALING CAPTAINS ASSOCIATION**

I want to welcome all of you. We are all glad to be here, to participate in the issue of subsistence hunting, as well as seismic operations. I talked earlier about the 1989 seismic activities where the *Arctic Rose* was involved. That was a fall season when only four whales were caught. I, myself, as a whaling captain, may not have been out on my own boat, but lots of us have always gone out with someone else who has a boat. We used to use these little 18 ft Lunds all of the time. Now they've got larger boats. But I was out at the time. I tried to recall who I went out with. We made several trips each day. We know when the migration of the whales occur,

about what day they actually start. With the seismic activity going on, we weren't able to spot any whales at the time. But when we finally did, after the first whale was caught, there was another one and then eventually we got four whales. But the meat was already spoiled by the time we got to the butchering site.

But in the past we have always hunted bowhead. I kept thinking about the culture and the actual activity of bowhead hunting. Culturally, we hear about it. But like I say, I've been out hunting thanks to my mentor Burton Rexford. Also my brother-in-law. That's where I first started whaling, I believe, and I've always been on his side when we're out there. The knowledge and experience that I learned from him I really appreciate. At this time I really would like to thank Burton for all these years and what he has taught me.

But things have been difficult at times, since seismic activity has started. We know for sure that the whales were diverted to migrate in a different route than what the original migration route was. That we all know for sure, because every year about fall time, if it's possible, when the ice conditions permit us get out there, we're actually about the same area which I talked about earlier, not too far from the Point; say about 13 mi east, and about 3.5 or 4 mi offshore. Especially last year I mentioned that there was some whaling activity. We still had quota left, and we listened to our Elders. We had enough whales; we shared them with other villages. We shared them, but then we still had quota when we stopped whaling, because we listened to our Elders. They said you have gotten enough. As soon as they had mentioned that, everybody, without argument, was on the shore. These are educated people that work together; a lot of teamwork is involved. This is all subsistence activity and we're proud to have come this far, from zero quota. And again, Burton, and his colleagues, his commissioners, have gotten us this far so that we are comfortable with the quota that has been given to us.

I would like to comment again that we know for sure that seismic activity does divert the whales from their migration route. Others will be speaking, so I'd like to stop here, and then maybe later on I'll come up again. Thanks a lot.

**THOMAS NAPAGEAK
PRESIDENT
NUIQSUT WHALING CAPTAINS ASSOCIATION**

This is one time I will speak bad about some people! The disturbance of the bowhead whales, as you will see in some of the statements brought in by the Nuiqsut Whaling Captains Association that not only drives the bowhead whales farther away from us but it endangers the lives of the people that are out there trying to get food for their tables.

But I read quite a bit of books myself, studies about the bowhead, and about the Letters of Authorization (LOA) that were issued to seismic operators. But one of the things that really caught my eye was this winter when I was reading the 1991 issuance of Letters of Authorization (LOA). Let me quote from it—evidently Western Geophysical was doing the seismic work, I hate to say that, but it's there:

"The LOA issued by National Marine Fisheries Service would have allowed Amerada Hess to take marine mammals while conducting seismic operations in a more efficient manner during the bowhead whale migration. This would have minimized interference with subsistence communities, but geophysical operations have been conducted simultaneously with the bowhead whale migration. Amerada Hess wishes to express its appreciation of the time and consideration of National Marine Fisheries Service in an issuance of this 1991 LOA."

It makes me wonder if the National Marine Fisheries Service (NMFS) really considered the Natives before they issued that LOA? Would MMS first consider the communities that are being affected by this disturbance in the migration? Or would they rather take the words of industry and go ahead and tell them to do their dirty work versus what the Natives are trying to do. I hate to say that, but like everyone else, I want to go to heaven, and you guys make me mad sometimes. It makes me closer to hell than where I am trying to go.

The statements (Attachment A) on the table back there describe some of Sam Taalak's latest testimonies. He was the person that was fighting up front when the quota was imposed on the Natives. He was a person who was strong enough to go the Department of the Interior and say, "Hunger knows no law." And it's very true today. We want to continue the spirit that he gave to us. Once this imposition on our subsistence starts hurting us, we don't want any law to stop us from doing what we rightfully ought to do.

**JOSEPH KALEAK
PRESIDENT
KAKTOVIK WHALING CAPTAINS ASSOCIATION**

My name is Joe Kaleak. I am the association president for Kaktovik. I would like to talk about a few things going back to the late 1970s when they were doing the first seismic activity. It has been going on all the way from Prudhoe Bay to Demarcation Bay—that's about a couple miles from the Canadian border. That's about 60 mi from Powter to that marker. So now we know they were doing some seismic work while there were whaling activities going on that year, but I just can't remember what year. Every morning, we went out if the weather was good: no fog and the ice conditions were good. Every morning when we went out, we never saw a seismic boat. Three or four days after, maybe, when we went out whaling again, for ten whaling captains and they had 5 or 6 crew on each boat, so that's dangerous when you take all your crew out, even if there's no ice. One time, when we went out, we saw one seismic boat going east, down by the whaling, on the south side of us, about 6-8 mi from the shore, and we went out about 12-15 off from the shore to look for whales. That day, we didn't see any whales. We didn't spot any whales going back home again. After we were going back home, we saw that seismic boat coming back at night; same boat coming back from the east, going toward Deadhorse. I can't remember what year it was. It kept going back and forth while our whaling season was going on. That year we didn't catch any whales until mid- or late October when we caught one. What are we doing whaling out there with our crew. So that was pretty bad; we had just our own CB radios then. That year, we didn't have any VHF radios to contact Deadhorse. We didn't have any communication that time; we just had our own regular CB radios for the whalers. So we couldn't contact that seismic boat that was going back and forth.

A few days later, going back again, but this time he turned to about 15 mi—same boat, and we were out looking for whales. I think that was a lot of time to keep our whales past the Canadian border; they just couldn't pass through all that boat traffic going back and forth from Deadhorse to Demarcation Bay. So it was really hard for the whalers who couldn't see any whales when they wanted them for their village.

Whalers from Kaktovik, hunting out of the Camden Bay area west of Kaktovik, have stated that they could hear the noise from the activities from their camp offshore. This level of noise will carry a distance and will send the bowhead whales into deep water. This is dangerous for those of the fall subsistence hunt as a small boat must tow up to a 40 ton whale back to the shoreline over 35 mi away. If we go out more than 30 or 40 mi to try to tow the whale back to our village the meat is going to be spoiled. Every time we catch a whale we like to have fresh meat for our community. Because of the seismic activity going on, we had to go out farther to find the whales

going out into deeper water which was dangerous for the whalers. For Barrow and Nuiqsut it is the same thing.

**ARCHIE AHKIVIANA
NUIQSUT WHALING CAPTAINS ASSOCIATION**

Good afternoon, my name is Archie Ahkiviana and I'm with the Whaling Captains Association of Nuiqsut. When the Kuvlum Project was going on, we had an accident at that time. We had to chase a spooked whale, with George Taalak, Sam Taalak, and Frank Long, and myself. We chased the spooked whale which was going at high speed; when it went up, it was going so fast, we rammed right into it. It threw George out of the boat. Then his father lost his steering wheel on the boat and couldn't steer. They couldn't get to George; so with my boat and my crew we went to him and just before he went down we got to him. That's how dangerous it is to go after a spooked whale when there are seismic activities. That was down below Flaxman Island. It is very dangerous to chase a spooked whale when seismic activities are going on. That year was very bad for us.

Another thing—I caught a whale while they were still having industrial activity in that area, but we had to travel out north, straight north, 30 mi out in order to sight a whale. At that time it was really nice weather, calm. When we got the whale and got ready to tow it home, the bad weather came upon us in less than 2-3 hr. While we towing, one boat started taking on water, so they asked me—since it was my whale—what were we going to do. And I said that we would just have to cut it loose and see if we could make it home. And at that time Thomas radioed to our station there and asked for help, to see if they could help us tow out, but they said no. But they finally came, though, and I thank them for that. There were strong winds, about 40-50 knots (kn), and really bad waves.

And when that ship came, we went right in behind it and spent the whole night up there. It was noon when we made it to Cross Island. Then we looked for that boat and my whale that day. Ben was on search and rescue at that time.

Well, I think the seismic activities have diverted the whale activity around that area. In 1995, there was no seismic activities to the east of us and we could spot whales on every side of us. That was a good year. We got all our quotas and we were only out there a couple of weeks or less.

**ROXY OYAGAK, JR.
NUIQSUT WHALING CAPTAINS ASSOCIATION**

Good afternoon. My name is Roxy Oyagak, Jr. I am a whaling captain from the village of Nuiqsut, Alaska. This testimony is from my actual experience as a subsistence hunter and a whaling crew member.

I am one of the registered whaling captains of the Nuiqsut Whaling Captains Association which has 11 whaling captains registered with the Alaska Eskimo Whaling Commission (AEWC) with over 40+ crew members.

The Nuiqsut Whaling Captains Association has a five-man Board of Directors, who meet on a regular basis and discuss issues that impact our subsistence whaling activities. The Nuiqsut Whaling Captains Association is a member of the AEWC, of which the Nuiqsut Whaling Captains Association elects its own Commissioner to serve on the AEWC.

The Nuiqsut Whaling Captains Association has gone on record opposing the ARCO operations, the Kuvlum Prospect in Camden Bay. Our opposition is based on our experience of what happened in the fall of 1989 in Cross Island.

The area that Kuvlum was working on was three miles wide by six miles long or 18 sq mi. The work was done so a bottom-founded drilling platform could be set in place.

In 1989, two whales were taken 20-35 mi north of Cross Island. Both whales were lost due to distance and adverse weather. Our crew had to travel approximately 35 mi, one way, between the finding and taking of the two whales for the village. However, they were lost.

It is very important to remember that the Kuvlum activity has had two major "noise makers" going on at the same time. These are: 1) drilling and associated activities (ice breakers, resupply ships, tugs, helicopters; and 2) the noise of the seismic exploration device and the noise of the seismic vessel.

Based on the industrial activity, there is an unmitigable adverse impact on the village of Nuiqsut on subsistence whaling by 1) causing whales to abandon the hunting area, 2) directly displacing the subsistence whalers, and 3) placing physical barriers between the subsistence whalers and marine mammals, including altering the normal bowhead whale migration route.

One very important reminder to MMS is that seismic activities displace the whales from their normal migration route and this to us is an unmitigable impact. I would like to see an improved site monitoring plan.

The subsistence bowhead whaling communities of Nuiqsut and the AEWG have tried to work with the industry to reduce the injuries to our whalers and to our whale hunt from the industry operations. In past years, we have had the Fall Conflict Avoidance and Communications Agreement (Plan of Cooperation). But this has not kept the industry from driving our whales away from their normal migration route.

Our Elders have begun to question the wisdom of these types of agreements. They tell us that we are entering agreements with those who drive the whales away from their migration path and their food. They tell us that we are entering agreements with people who do not care about the whales. Our Elders and our traditional religious leaders tell us that the whales know what we do. If we enter into agreements with agencies who do not honor the whales, the whales will know this and they will stop coming to us.

These types of agreements have not helped us and have driven the whales away from us. We must listen to our Elders and to our traditional religious leaders. We cannot have agreements with agencies who drive the whales from the path where they migrate and find their food!

COMMENTS FROM DR. TOM ALBERT

I have a comment about something brought up earlier. That is this "spookiness" of the whales. For many years, many captains who have talked to me have, without exception, talked about displacement. When a captain came in to talk to me, I knew he was going to say that the whales are displaced farther than you scientists think they are. But some of them would also talk about "spookiness"; when the whales were displaced out there and when the whaler would get near them, they were harder to approach and harder to catch. They spent less time on the surface. They were much more difficult to catch.

I don't know if "spookiness" or "wariness" is the right word, but there is something is happening with the behavior of these animals. Maybe not all of them but enough of them so that half of the captains that talk to me bring up this.

The other thing that was mentioned was that the captains from these three villages, Kaktovik, Nuiqsut, and Barrow, go along the axis of migration. The whales are traveling from east to west, it is not too hard to imagine that these whales are not unlike us. With these animals there are older ones and younger ones, newborns. They do a lot of talking, and maybe, just like people they communicate something other than just babble. It's not unrealistic to think if these animals which are coming from the east and hear something 25 mi ahead of them that is booming, that they say, "I don't know what that thing is. I have my kid here with me (or grandma)." Maybe the older whales say, "Let's start moving out a little bit and swim around this thing." One of the really good pieces of data that came out of John Richardson's and Charlie Greene's study years ago about a whale swimming around a drill rig is very well fiction. What I hear from the captains is that the same kind of thing is happening except it starts where the noise maker is and the animals go out and by the time they get to Nuiqsut, instead of being 5 mi offshore they're 25 mi offshore. By the time they get to Barrow, they are going to be 5 mi or 15 or 20 mi. This is something we hear over and over again. Just use your own imagination. If you were walking down the street and there is some sort of construction ahead of you tearing up the road, if you're trying to get to the store ahead, you are probably not going to go home and say, "I'm afraid, I have my family." You probably won't do that. You would assess the situation and move off to one side and give that thing some space. We have all done this in our own life. These whales will never win a Nobel Prize, but they're not stupid. They can hear noise like this far ahead of them and, just being prudent, will move off to the side.

**VAN EDWARDSSEN
BARROW WHALING CAPTAINS ASSOCIATION**

My name is Van Edwardsen. I am a Barrow whaling captain. We harvested our whale in 1991; I recall it because it was our very first whale. The Cabot drill rig was to the east and we looked and looked for whales. You can see a blow a long way off. On the day we caught our whale it was very calm. You could hear this drill rig very far off. So, we kept going farther out, farther out. The guy on the other crew finally saw a whale and called us on the VHF radio. We went crazy and started going for the whale. My Uncle Harry was there. It was so clear we could see the drill rig and hear it a long way off. In fact you could hear it from my father-in-law's fish camp about 35 mi inland. On a nice clear, calm day you could hear this drill rig. We had to beat the storm to bring in the whale. We were 26 mi out. We usually don't go that far. To tow the whale that far it usually takes 5-6 hours to come in. I pray to God for good weather, so we don't have to throw away the whale. I know what these guys go through. When I hear about Nuiqsut whaling, I say these guys have guts to go 30 mi out on a 21 ft boat. Try to ride 8 ft waves on a 21 ft boat!

My grandmother taught me that when you go to the ocean there is no place to put your hand down. You're just going to go in. It's dangerous out there. Thomas was from up here and I used to whale for Thomas. His hair was black and now it's all white.

We oppose the seismic testing. We do go way out there. I feel for Nuiqsut; they go a long way out. I take my cap off for Nuiqsut. They go all the way to Cross Island; that is a long run, if you ask me. I pray to God that there won't be a storm out there.

When Cabot was up by Cooper Island you could hear this noise so far off just like turbines, constantly humming. We asked other guys in the fish camp if they could hear the noise and they could. You can hear the noise from far upland.

**BEN ITTA
BARROW WHALING CAPTAINS ASSOCIATION**

I'm a whaling captain in Barrow and also I've been with North Slope Borough Search and Rescue for 12 years as a coordinator. My family has been whaling for generations; I myself have been out with whaling crews for more than 50 years. I've seen whales and their behavior. I have guided for 12 years in airplanes from middle 1950s to late 1960s. I have seen whales from the aircraft. According to Archie Ahkiviana who said that at 30+ mi from Cross Island they lost their two whales. I was out there looking for the whale attached to the boat. We even found the buoy which was attached to a harpoon which was used a few days earlier to pick up a lost whale. We never came up with the whale which was attached to the boat.

During my time of polar bear guiding, we used to go out from the last part of March to the first part of May and see two or three open leads. There would be whales, belugas, you name it.

When they started giving us quotas that were small, we argued. I told them that there are lots of whales out there. In 1995 I took my family to Nuiqsut in early October. The Nuiqsut whalers were getting ready to go out to Cross Island. We went out with the Nuiqsut whalers to Cross Island. There was no seismic activity at the time. Every day they got a whale. The whales were very close to shore. Whales were even seen at West Dock because there were no seismic activities.

During seismic activity, when we are out supporting the whalers, like in Nuiqsut or Kaktovik, we don't see any whales. In 1989 we put in a lot of hours looking for boats with whales. I learned after that the whales used to be very close to the island. But now with the seismic activities, they're so far out. When Michael got a whale, I supported the crew that towed my boat and whale. It takes a long time when there are seismic activities. I have been whaling for over 50 years. I know the behavior of the whales and I have seen them. I have been capsized by the whale. We people want a lot of information from you, just like Dr. Tom said.

**ELI NUKAPIGAK
NUIQSUT WHALING CAPTAINS ASSOCIATION**

My name is Eli Nukapigak. I am a resident of the village of Nuiqsut and also a member of the Nuiqsut Whaling Captains Association. I am going on record opposing the seismic activity that takes place during summer in July and continues into our bowhead whale harvest season. I have seen seismic work around the area of Cross Island during spring time and winter time. My crew and I went out to our whale camp to pick up our hunting cache so we could get ready for fall whaling. We went by Skidoo and there were so many wires all over the ice going to Cross Island for winter seismic activities. It was hard to cross the seismic lines to Cross Island. There seems to be no ending. There seemed to be so many wires on top of the ice with neverending activity during the winter. When you do your seismic work during the height of the harvest season with all of the those wires under the water, we will be unable to get our quota.

In whaling season there was a big ship planning to do some kind of activities while we were landing. There were a lot of whales on their regular route. Some of the whales started going

on other routes because we noticed that they changed their course. There were few on the regular route while the ship was stationed there. In September the whales start their migration and in October there are a lot of whales which pass by Cross Island and (inaudible) Island. I know that the migration time is never the same each year; they start early sometimes. I would not oppose seismic activity in the winter when our whaling season is not open. I oppose it during harvest season. July is the month when the ice is still bad and it is the month when the currents get so strong that it causes the ice to break up. You can see icebergs going by so fast it only takes a few minutes to watch them go out of sight. If the seismic can be done in winter time and have the same results as on Cross Island, what would be the reason to have seismic work in the open water season when they can get the same result in the winter as in the spring?

I would like to read the affidavit of what happened at that time. Frank Long, Jr. was past commissioner and president of the Nuiqsut Whaling Captains Association. (Mr. Nukapigak reads the affidavit of Mr. Frank Long, Jr. which can be found in its entirety in Attachment A).

"Every fall, within three to four days after Kaktovik reported seeing bowheads, we would begin to see them. The bowheads would move through Camden Bay, feeding as they went, and then begin to move through the barrier islands, both on the shoreward and seaward side of the islands, again feeding as they migrated.

The Kaktovik hunters take their bowheads directly off the shore or within a few miles of the shore of Barter Island, where their village is located, and in the days before oil exploration activity came to the Camden Bay area, the Nuiqsut hunters would take their bowheads from the shores of the barrier islands. Then, our normal hunting route was from 1 to 5 or 6 mi offshore from the islands.

It is very important for our hunters to be able to hunt nearshore, since our boats are very small—average of about eighteen feet, with some twenty feet—and the waters of the Beaufort Sea are very rough and heavily covered in ice and very dangerous.

Not only is it extremely dangerous for our crews to be far from shore in those waters, if we strike a bowhead, we must be able to tow it to shore quickly for butchering, since the meat of the bowhead will begin to spoil within as few as eight hours if we do not get it to shore and butcher it.

Since the 1970s, oil exploration, including drilling and seismic work has been going on in the Camden Bay area.

With the industrial activity in Camden Bay, we now see fewer and fewer bowhead whales. It is now very rare to see a bowhead swimming through the waters of the barrier islands. Where do these whales feed now?

Every year we tell the industry operators that they are driving the whales away and that they must stop the seismic and ice breaker operations long enough to let the whales pass. We tell this also to the U.S. National Marine Fisheries Service (NMFS). But no one listens.

The industry says that the ice drives the whales away, but we hunters know that the bowhead whale travels through ice. Before the industry, we saw whales every year—in ice years and in open water years. With seismic and drilling WE DO NOT SEE WHALES—in ice years or in open water years.

The U.S. National Marine Fisheries Service in Washington does not care about our people. According to the lawyers, they are supposed to protect us and our subsistence animals. But they say that as long as we can find animals to hunt then that means that we are not impacted.

They do not care about our people being 40 mi from the shore in the Arctic Ocean just to see a whale. They do not care that our whales turn into stinkers before we can tow them to shore. They do not care that we lose our boats and that it can cost a captain more than a year's income to replace a boat. Will they care when we lose people? I for one do not think so.

In the 1992 fall whale hunting season, the Nuiqsut whalers started heading out to Cross Island in mid-August. We would go out when the weather was decent enough to go in our small boats. This season we went north-northwest, north, and north-northeast of Cross Island and out to three open leads through three icepack floes.

We used up the three strikes allocated to Nuiqsut by landing two whales and losing one. This 1992 fall season, the whales were going around far north of the Kuvlum Project and headed for land after they got past the Kuvlum Project area."

These kinds of activities do happen here, but this is the first time that we have put them on record to let you know that Nuiqsut is the only village that goes out whaling from about 16 mi inland.

**GEORGE TAALAK
NUIQSUT WHALING CAPTAINS ASSOCIATION**

My name is George Taalak. I am the son of the late Sam Taalak, one of the registered whaling captains of the village of Nuiqsut, Alaska. I am attesting to my father's statement and submitting to Minerals Management Service as my testimony a copy of Sam Taalak's statement (See Attachment A). Sam Taalak's original statement was one of the documents submitted for court in the Kuvlum litigation in 1993, and is herewith submitted as my testimony.

"My name is Sam Taalak. I live in the village of Nuiqsut, Alaska. I am one of the ten whaling captains of Nuiqsut, registered with the Alaska Eskimo Whaling Commission (AEWC). I have hunted the bowhead whale as a member of a subsistence whaling crew for over 55 years. I have been the captain of my own crew for over 35 years. This testimony is from my actual experience as a subsistence hunter and a whaling captain.

In the days before oil exploration activity came to our subsistence whale hunting area of Camden Bay, we Nuiqsut hunters would take our bowheads from the shore of the barrier islands. Our normal hunting area was from 1 to 5 to 6 mi offshore from the islands. The Kaktovik hunters to our east tell us every year when they see the whales and they take their bowheads directly off the shore or within a few miles of the shore of Barter Island, where their village is located.

Before the oil industry, the bowheads would pass Barter Island and move into Camden Bay, milling around and feeding. Three or four days after we hear that Barter island sees whales, we would see the bowheads around the shores

of the barrier islands. But now, the whales pass Barter Island but they do not come in the same direction through Camden Bay into the waters around our barrier islands. There is so much noise and so much traffic that the bowheads disappear and in some years our crews in our small boats almost get run over by the big industry boats.

Our arctic environment is treacherous, but we know how to survive. With the oil industry it is more treacherous and they take away our resources that allow us to survive.

With terrible fall storms, snows, rough waters and ice, when we finally can hunt, we find ourselves in direct competition with the transport system of the oil exploration along our historical bowhead whale hunting routes.

When the drill rigs are in the area and the seismic and vessel traffic, the bowhead whales definitely change their regular routes. Time and time again we make trips all the way to Flaxman Island following the historical fall migration routes and produced NOTHING! NOTHING! NOTHING!

When the drilling or seismic activity is present, our crews must travel anywhere from 11 to 30 mi or more north of the barrier islands even to spot bowhead whales.

In addition, helicopters are an everyday curse to the whalers. It is not unusual to have helicopters fly over us while we are looking for whales just a few miles offshore. Supply vessels also utilize the same routes the bowhead whale uses. It is not unusual to travel along side of barges and other industry vessels while hunting. Alternate routes can be used by oil industry without hardship. Land routes can be utilized by helicopters heading to Kuvium sites instead of island hopping.

In all of my 55+ years as a subsistence hunter, I have never seen as much disturbance and difficulty hunting as I have seen in the past few years. I have never seen crews traveling so far from the land to find the whales that we must have to survive.

The industry is robbing us of our bowhead whales and I know that our other subsistence resources are being impacted too. You cannot even travel on the ice around our villages in the winter because there are so many seismic lines that you have to always stop not to get caught in them. The seals and polar bears will get caught in these lines too as the ice melts. But no one except the Eskimo is here to protect these wildlife.

I know that our lives are threatened. If our subsistence whale hunters continue to go farther out to find the whales, one year we will lose a crew. In the last two years we have lost two boats because the crews were so far from shore in very rough seas. Maybe next time we will lose the crew and the boat.

But we must hunt. It is how our people survive the harsh arctic environment. If we do not hunt, we will starve and we will not be Eskimos anymore. The oil industry is driving our bowhead whales away. But without the bowhead, we cannot be Eskimos.

I say this in written words so that the world will know. The oil industry has invaded our Beaufort Sea waters and they are holding a gun to the head of my Native people."

**HARRY BROWER, JR.
BARROW WHALING CAPTAINS ASSOCIATION**

Good afternoon. My name is Harry Brower, Jr. I'm a newly registered whaling captain. I just have a brief comment that I would like to make.

As mentioned earlier by Fred Kanayurak and Van Edwardsen that seismic boats have displaced whales and they tend to be out further out in the ocean in deeper water. I remember the time when Burton Rexford was out looking for whales and they hadn't returned overnight from searching for whales. They needed somebody to go out and deliver gas to them. So I volunteered, using my brother's boat, to take gas out to them. At that time we didn't have a Global Positioning System (GPS), all we had were CB radios.

We know that seismic boats make a lot of noise. We have experiences and instances of hearing booms of seismic boats but not seeing the boats because of they were over the horizon. That needed to get stated here and I wanted to bring it up and put it on record.

I've recently been working for the North Slope Borough, Department of Wildlife Management. When I started working I was asked to help document where bowhead whales were harvested in our community (See Attachment D). I had just learned to use the GPS when we were out doing fish studies at Teshekpuk Lake. I didn't trust the GPS. I didn't know about it. It was fairly new. I heard it was used by the military. One of my co-workers, Craig George, said we will go out and do an experiment and try this out and make sure you learn how to use this thing right, before they would let me take it out and use it in other areas of research.

We went to Teshekpuk Lake about 45-50 mi east of Barrow to do fish studies. I wanted to learn how to use the GPS to help document later on where bowhead whales were harvested. I wasn't very impressed with the unit; it was just a little plastic case. But there was a computer in it that I didn't know about.

We went out to the middle of the lake (and it is a fairly large lake, you can't see from one bank to the other) and dropped a buoy and then went back to shore. Craig had taken the position where we had left the buoy and said we would put a curtain over the front of the boat so you couldn't look out. All we did was use this instrument to get back to the buoy. I was driving the boat and Craig would give me directions, turn right, turn left, etc., explaining that you must follow the line on the unit. It goes from point one to point two, etc. It will take you back if you follow the headings and coordinates. After doing all of this several times, I started trusting in the GPS and how accurate it was.

After learning how to use the GPS, I started using it to collect information on harvest locations. We started in 1991 when I was going out with Van Edwardsen in his boat. After harvesting the whale, we would tell the others that we had a position on it. We got rigged up to tow the whale back to town. Some days you would end up being out 5-6 hr and end up traveling in dark or in the fog. We were closer to the Point, towing the whale, 5 or 6 mi out. It was getting darker all the time and the fog had rolled in. Van and I kept telling others how far we were from the Point and that we were getting closer and we were traveling at this speed. They kept questioning us about how we knew all of this information. We tried explaining about the GPS. One of the captains didn't trust us. We were about 0.5 mi from the Point and he said that he

didn't trust us and was going to check and see how far we were from shore. So he took off. I was not off the radio for more than a couple of minutes and we could hear his outboard spinning because he had drydocked his boat. Then he called back and asked if we were all right.

This is one of the instances where we are using the GPS and documenting the harvest locations. I just wanted to make sure that this information was known.

In this morning's discussions, I agree with Dr. Chris Clark in that the whale's hearing is the most important sense used by the whale. This has been passed on from my Elders here in Barrow when we are out whaling. My father always said to be quiet around the ice edge because whales would hear us from a distance. And they do hear you from a distance. If you make a sudden noise or stomp your feet on the ice, the whale will detect that and veer away from the source of the noise.

Regarding Dr. Richardson's comments when the seismic boats were doing their testing and the whales detecting the sound at 7 km—I don't think that's correct because I think they detect it farther than that. There are instances where captains from Nuiqsut have experienced the "spooky" behavior of the whale when they are trying to pursue the whales. Some of the whales use their tails to protect themselves or to keep the boats from getting any closer. I think that is a change that is noticed by the whalers from Nuiqsut.

**BURTON REXFORD
BARROW WHALING CAPTAINS ASSOCIATION**

It makes me wonder sometimes, listening to these whaling captains, how they were humiliated by the industry. I thought the only country that got humiliated was China. I think we're on top of them right now in human rights.

I support all the whaling captains testifying here. In 1979 I first came across a seismic boat here in Barrow. All that season there were three boats. Ben Itta was in my boat. He was one of the crew members. All through that season we scouted everyday when the weather was calm. We went as far as (inaudible) looking for whales. We never sighted one whale all through that season.

Then the ice set east of Point Barrow just before October. Then the seismic boat disappeared. On October 6—I remember this day—we sighted a bowhead. Then after that there were no more bowheads in the Barrow area. In 1980 we went through the same thing—no whales. In 1981, it was the same thing. We didn't spot any whales at all in those years. There was hardly anyone going out in those years. There were only three or four of us going out.

As a commissioner, I support my whalers and their testimonies. In 1989 there was intensive seismic activity at the Kuvlum Project. That year the whales were corralled just like corraling caribou or reindeer. They could not go past the seismic activity so they were displaced 30 to 40 mi out.

As a chairman of the AEWG I tried every way to stop the seismic activity in 1989. In 1984 we saw the reauthorization of the Marine Mammal Protection Act. I knew that I must get some language in there. I made several trips to Washington, D.C. I managed to get a small language in the Plan of Cooperation. It is in the Federal Register now. Without the Plan of Cooperation, they cannot go out on the Outer Continental Shelf.

I support all of you whalers. I think this is my last meeting as your chairman. I wish you well. Good luck.

**ARNOLD BROWER, JR.
PRESIDENT
NATIVE VILLAGE OF BARROW**

My name is Arnold Brower, Jr. I am a life-long resident of Barrow for 49 years. I am a whaler, subsistence hunter, a Tribal council member, and president of the Native Village of Barrow Tribal Council. I have represented the whaling community at the International Whaling Commission (IWC) as a U.S. Delegate, and worked with the American Eskimo Whaling Commission (AEWC) as past chairman. I have been involved with whale research regarding noise and acoustics offshore Barrow during spring whaling, and whale censuses. I am very familiar with all of those programs.

In my early whaling participation, I observed whaling near Point Barrow in the fall with small motor boats. Elders like my grandfather, Alfred Hopson, Sr., Richard Tukle, Tom Brower, Sr., Bruce Nukapigak, Vincent Nageak, Sr., and my father Arnold Brower, Sr. have been my mentors. They have been by my side, helped me, showed me discipline and how to observe events in whaling each time we set out for whaling in the spring or in the boat in the fall.

I remember very clearly that whales, sometimes pods of them, were so numerous that you are not able to boat into them, were 3 to 6 mi from the barrier islands, just off of Point Barrow in the 1960s and the 1970s. This was just beyond the limit of visibility, just over the horizon for an observer in a small boat. From Tapkaluk Island just west of Cooper Island all the way to Cooper Island you can see farther. These barrier islands have elevations of 0.5 to 2 ft and when you stand on them the whales are visible. When you sight these whales they are not very far away. My Uncle Tom has told me numerous times that the Point Barrow area seems to be a feeding area for the migrating whales. Whales are often found in large pods or schools approximately 2 to 5 mi off of these barrier islands, or even closer as they pass around Point Barrow.

Lately, since the 1980s and the 1990s, Barrow whalers have had to combat with the offshore seismic activities and offshore drill rigs that have displaced bowhead whales from their usual gathering areas where they are usually seen either feeding or milling around during the early mornings of each day. From generations of experience, we anticipate them; we know where they will be. But in recent times they are missing. When the offshore drill rig called CIDs was present, it was detrimental to us and our harvest of whales.

A harvested whale can easily feed the entire community for a whole day. However, when the harvested whale is taken far offshore it may sometimes take 10 hours or longer to tow it back to the butcher site. Because of internal heat, whale meat begins to spoil and decompose after 12 hours. We have had much meat wasted during the seismic and drilling activity seasons off Barrow since the arrival of offshore oil and gas activities. Other adverse incidents have occurred relating to the safety and welfare of the Barrow whalers. While towing harvested whales from far offshore, we have had to assist other whaler's boats due to bad weather conditions encountered due to the added distance necessary to tow the whales to shore for flensing.

These incidents have become common for both Barrow and Nuiqsut whalers. Trying to save one another, has become a major activity. I have been involved with search and rescue operations relating to some of the Nuiqsut whalers. Even my uncle, Ben Itta, has been over there

to help several times. The whalers have had to go farther to sea than their usual hunting areas because of the drilling structures and seismic operations.

Aboriginal whaling is the livelihood of the Iñupiat people protected by the federal government within their trust responsibility to the Aboriginal Iñupiat people of Alaska. In view of the adverse conditions imposed by the offshore oil and gas activities related to seismic and drilling, I want MMS to know that they should bear any costs related to adverse impacts associated with their offshore ventures during the whale migration and subsistence whaling. Offshore activity positively has an adverse impact on whalers and bowhead whale migration during the fall.

I know it takes you, the court, the federal government, and scientists to review my statement to make sure that it is a true statement. But all scientific work that I have seen so far has only attested to our testimonies.

Scientists today are carbon dating sea shells and clams, etc. that were thought to be millions of years old in the Grand Canyon because of the depth of burial, and those for the surface deposits were considered maybe 2000 years old. But you know when Mt. Saint Helens blew up, it created deposits similar to the Grand Canyon with colorations all the way down to the bottom, thousands of feet deep. The same things, clams etc., that were killed instantly on the same day, were found in the deposits had the same nature, by molecules, as those found at the bottom of the Grand Canyon.

So, there is no trust by my People of the scientists who do this kind of research. But you see that when MMS allows conditions to exist where seismic activity can continue after 5:00 o'clock or during the night while bowhead whaling or whale migration is taking place, you are allowing the operations to scare the whales from where they are supposed to be. You are allowing us to venture out into a vacuum. The whales are already displaced, that is what you are doing. I am surprised that there has not been any legal battle between any of these whaling associations and your ventures. I strongly urge you to take into serious consideration my People's testimony this week.

COMMENTS BY DR. TOM ALBERT

Some very interesting things have been said here today. Quite a few of them have been written down (Attachment A).

As you listen, remember some people may have the year or name wrong because it is back in time. But the observations are what count. There was a drill ship. There was a seismic boat. But these things happen.

I would like to say a word about Burton Rexford. I've known Burton since 1978. He's been chairman of AEWC longer than anybody and has fought as hard as anybody over this issue. He's very frustrated. I have talked to him over the years when he used to go out in 1979, 1980, 1981, and 1982 in the fall before many other people did. He would come in and we would talk about what he saw, etc. Hindsight is great, I should have kept very detailed notes. But the fact is, he and other guys have been out there making these observations. They are not blind and they are not children. These are people who know what they are doing. They might not have a Ph.D. in nuclear physics but they know what they are doing or they would be dead from being out there. But yet, their observations, in general, have been ignored.

How many whaling captains are in the Barrow whaling captain association? Forty-four or 45 whaling captains in Barrow. Look how many are in this room? When we try to get people to come to these meetings, the average guy says, "Why should I give up two days of my time or even one hour of my time?" "Has it ever done any good?" And I have to tell the him, "No, it has done no good." All of the comments that I write, that Burton writes, that these fellows say, none appears in writing. The last final EIS that came out had some significant language in it. But as Mr. Bob Brock knows there was a major confrontation getting ready to take place. As Burton alluded to, this is probably the last time any of us will take the time to do any of this. I know I've about had it, unless something comes of this meeting. People have come and put things down on paper, giving little speeches, etc., but if it gets fumbled up in some document and never appears in an EIS but Ljungblad, et al., that screwed-up experiment, shows up, if that thing keeps popping up like I know it will, and if there is no mention of any of this other stuff, then all you are doing, you MMS people and industry, is sending a signal. You are saying we'll come up and talk to you, check off the box, but that is it. We're not going to pay attention.

In the work that John Richardson and Charlie Greene and some others did and reported in 1987 on the SWEPI project, in the behavior section of that report, there were a couple of interesting observations. One was the sighting of 4 or 5 whales that reacted strongly to seismic noise at a distance of about 14 mi. That is almost never quoted. But it fits in with exactly what these whalers see. It does not fit in with the little 7.5 km studies that I will always challenge. If someone proves to me that my analysis of that experiment is wrong, I'll be glad to listen.

When the International Whaling Commission-Scientific Committee reviewed that project, they wrote one paragraph. You should read the two line recommendation that they came up with. It basically said, "Go do it right." It is not that they set out to do anything wrong. They're doing the best they can with very little observations. So something is wrong. A few hundred hours of observation on very few whales, in situations fraught with all kinds of observational difficulties that carry the day. It's not fair.

We can't convince people to come to these meetings because they say it doesn't do any good. Put yourself in the place of some of these whalers, in your community, your family, where you know what's going on. But what if someone were to come along and make few observations about your behavior and suddenly begin to question you? You lived there and have done these things so many times that you know they're true. You don't know what the standard deviation is but you know what's really happening. That's why we are here. These people have been out doing the observations: they don't have any gas chromatographs with them or electron microscopes. It's hard to do really precise observations.

It's a good thing we're doing this but if it doesn't bear fruit, I think people are going to be super-disappointed. There is a Northstar EIS coming up and there is another EIS coming up for MMS. We have our friends from the National Marine Fisheries Service here (we wish Ron Morris was here, because everyone has so much faith in him; not that we don't have faith in you Brad or anyone else, we are glad to see you here). Does any other captain or crew member want to say anything?

Joseph Kaleak: I just wanted to say thank you to all the captains from Nuiqsut, Barrow, and Kaktovik. I am a AEWC commissioner myself so I'll help 100 percent. Thank you.

Van Edwardsen: I just wanted to thank Tom Albert. Tom's been up here a long time. We've picked on him; we've done a lot of stuff to him. We were mean to these guys, but golly they're sticking it out. But these guys have stuck it out. We told Tom he's still on probation. He's still got 20 years.

Tom Albert: Thank you Van. I don't think anyone has been mean to us. From day one, in 1976, I've always had really good relations with everyone. The scientists who work up here a lot, like Charlie Greene, John Richardson, Don Ljungblad, Chris Clark, Steve Treacy that have come here for many years. I think almost all of them have had good relationships with everyone. Our friends in the seismic crews are usually willing to help people when the going gets tough or somebody is in trouble. You have helped people many times and the folks are thankful for that. Even though we disagree, we pretty much get along. By tomorrow, hopefully we will have identified what we need to do to get to the truth of this matter so we don't have to struggle with these two really divergent views.

Fred Kanayurak: I'd like to thank all my whaling captain colleagues from Nuiqsut, and especially Kaktovik, for coming down. I really want to thank the Whaling Commission, Burton Rexford, their officer and their administration, and Maggie and Julie. I wish Barrow would reconsider and re-vote on our commissioner situation. Burton has come a long way and has done tremendous work for us, not only for Barrow as a commissioner, but also for all of the whaling villages from Kaktovik down to St. Lawrence Island. Thanks for this opportunity. We talked about whales having hearing impairment from the sounds and the explosions. I have thought about it for a while. I hope when everyone leaves, they are aren't impaired in one ear and can absorb all of the testimony that has been given by the whaling captains today. Thank you.

Thomas Napageak: We've been hearing about Cross Island quite a bit today. Let me tell you a little bit about it. It's a "tropical island." (Laughter) If you have any plans for vacation, my travel agent "Western Geophysical..." What else can I say? We're appreciative about what's going on today. Thank you very much.

Steve Treacy: According to the second page of the agenda, we start at 8:30 tomorrow morning. We heard a lot of testimony from the whalers and the scientists. I think there's a lot of common ground to work with. It's not always clear. We'll get together in tomorrow's working groups and come away with a list of maybe ten things that we recommend. We'll watch and see how many get used. I appreciate the testimony of the whalers today. I appreciate George Taalak reading his Dad's letter. I know it meant a lot to you. It's very clear that whales mean a lot to everybody here.

[Note: The participating whaling captains and crew members added a written statement to their oral testimonies which can be found in Attachment B.]

CURRENT REGULATORY APPROACHES AND SPECIAL MITIGATING MEASURES FOR OPEN-WATER SEISMIC OPERATIONS

NATIONAL MARINE FISHERIES SERVICE

**BRAD SMITH AND KEN HOLLINGSHEAD
ANCHORAGE, AK AND SILVER SPRING, MD**

Good morning. I am Brad Smith. Again, I apologize that Ron Morris couldn't be here today. I think sometimes it's good to have familiar faces and people you've known to talk to you about these important issues. But hopefully, Ken and I will be able to present this as well as Ron might have if he was here.

I'm going to be quick because I know we want to get into the working groups and the work that they're going to be doing, the issues they're going to be addressing. And I'll be introducing Ken here in a second.

I just want to take a second to explain how the Alaska Region of National Marine Fisheries Service (NMFS) deals with two federal laws that affect the bowheads and the subsistence harvest. These are laws that are probably fairly well known to all of you; the Endangered Species Act and the Marine Mammal Protection Act.

Both of these prohibit anyone from taking bowhead whales with the exception, of course, of Alaska Natives for subsistence purposes.

The Endangered Species Act also requires that all federal actions be assessed as to whether or not they're going to jeopardize the continued existence of the species.

National Marine Fisheries Service in 1988 issued an Arctic Regional Biological Opinion which addressed the exploration phase of oil and gas development in the Beaufort Sea. Now that we're getting into a production mode with the Northstar operation, we will be issuing a new Biological Opinion. That is going to be done at the same time that we see the EIS for the Northstar project. So sometime probably within this year, NMFS will be issuing a new Biological Opinion on the effects of offshore production activities on the bowhead whale.

The second main federal law that concerns marine mammals is the Marine Mammal Protection Act. One of new features of this Act, as Burton Rexford mentioned yesterday, is that there are provisions for oil and gas companies to get authorization for the incidental harassment of marine mammals. But one of the tests that is applied to that, because of your efforts in working with Washington, D.C., is that anything that is done that is going to harass animals must be done in a way that doesn't have any unmitigable adverse effect on the availability of these animals for subsistence hunting. And that's a very important feature. That's something I think we want to talk about in the working groups today.

The Incidental Harassment Authorization (IHA) Program is administered out of our national offices in Washington, D.C. Ken Hollingshead has come from D.C. to talk to you about that. He heads the IHA program and I'm going to let Ken earn his airfare up here by talking about the IHA program.

Good morning. I'm Ken Hollingshead. I'm from the Washington Office of National Marine Fisheries Services, the Protected Resources Office. We deal with a large number of issues and the Small Take Program is only one part of it but it is a part that gets a lot of attention from the higher-up people.

Brad sort of took away about half of what I was going to talk about, so I'll just sort of intersperse with the parts that would be of use here.

When the Marine Mammal Protection Act was originally passed in 1972, they allowed for exemptions for Native subsistence takes and they also required an authorization for other activities.

They looked mostly at commercial fishing as being a take. Other activities were completely ignored. They were looked at as being benign, not having any effect. But there were a couple of problem areas. And in 1981, Congress amended the Marine Mammal Protection Act to allow for these takings, provided that the takings were what Congress called small (which they never defined, they let us do that) and having a negligible impact on the marine mammals or not having an unmitigable adverse impact on needs for subsistence takes in Arctic waters.

Two examples that would be of interest here that apply to these five-year authorization programs was the on-ice seismic work done in the Beaufort Sea and the open water seismic and early oil exploration programs.

These programs were difficult and not very many other people applied for them. The reason being is that they required a tedious set of regulations to implement. And in most cases, including the two examples I just mentioned, most of these takings are strictly for harassment. Now, I can answer the question on what is a take.

A take is defined in both the Marine Mammal Protection Act and the Endangered Species Act as, mostly for us, it means to kill, injure, or harass. Now, it also means to harm, capture, import. You know, there is a whole slew of other definitions. But the ones that pertain to the Small Take Program or the activities here are injury, kill, and harassment. And I'll get into the harassment definition in a minute.

Congress recognized that for a number of activities that were not going to result in mortality of marine mammals or serious injury of a number of marine mammals that probably some lesser level of regulation would be required. So they eliminated the need for a full set of regulations, which usually took about six to eight months or longer to implement. And they put in its place a requirement for an Incidental Harassment Authorization. But they limited it to one year, which meant that you had to then go through this process for ongoing activities year after year after year.

A number of applicants who were looking at this are now looking at the possibility of going back into a full set of regulations because their activities, although they were pretty benign, they had to go out for public comment each and every year. It was actually taking more time, more effort through either the applicant themselves or through their contractor to prepare all the documentation.

So with Congress' setting up a program for harassment, in another program, they defined harassment for it, not recognizing that it was also going to affect the Small Take Program. And for harassment, they made a definition that considered even a change in breathing rates as harassment. So you can see where the discussion we had yesterday where there were changes in breathing rates, changes in dive patterns, those are looked at as being a potential for harassment.

We recognize that these takings, or these harassments are extremely benign, at least in the lower 48. Up here, we still have, with the IHA, a requirement for not having an unmitigable adverse impact on needs for subsistence takings.

There are two requirements also for work in Arctic waters that Congress added on. And this is—as I understand because I was not part of it—an agreement between the oilers and the whalers. Each wanted to get something out of it and the oilers mostly wanted to get out of the burdensome five-year regulatory program and a long set of regulations. And the whalers wanted to get recognition of their subsistence needs.

So Congress wanted to make sure that two requirements were put into "Finding no unmitigable adverse impact." One was that the monitoring program was peer-reviewed by scientists and that they would come up with the best monitoring plan that was available. The second one was what was called the Plan of Cooperation. The Plan of Cooperation and the peer-review monitoring were both formulated during the early years under the five-year regulatory program. And essentially, it worked very well and we have continued that under the new Incidental Harassment Authorization program.

The Plan of Cooperation is very important. It is a program that is really an agreement between the oilers and the whalers. The National Marine Fisheries Service is a participant, a facilitator in that process. We want to make sure that the agreements are reached between the oilers and the whalers.

We recognize that not all activities would require a full-blown Plan of Cooperation. For example, if somebody wanted to build a new DEW line station or something that was not going to have an impact on marine mammals, but they needed an harassment authorization to build the station, for example. In their application for an Incidental Harassment Authorization, they could say we don't believe that this will have an impact on the subsistence needs of the Natives.

We, as part of our application process, when we accept that, we would go to the North Slope Borough if it was in the area of the North Slope Borough, or the AEWC and ask for their concurrence and ask if they believed that.

If that Plan of Cooperation isn't in there and they state that in their application, and the AEWC or North Slope Borough says, this is going to have an impact on our subsistence needs, whether it's for ringed seals or whether it's for bowhead whales, that would delay the processing of that application until we say, okay, you two sides meet and come up with a Plan of Cooperation.

When these agreed-upon mitigation measures are reached, then they should be put into the Plan of Cooperation and submitted as part of an application. We recognize, however, that not at all times that everybody won't agree to all measures. And that's where the National Marine Fisheries Service looks at itself as being the mediator or the arbitrator and to come up with an agreed upon plan that the activity can go forward.

The other part that was left over from our predecessor was that there was a definition put into the regulations that I did not change when I published the new interim regulations in 1995. And that is that an unmitigable adverse impact means an impact resulting from the specified activity:

- "1) that is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by:
- (1) Causing marine mammals to abandon or avoid hunting areas.
 - (2) Directly displacing subsistence users, or
 - (3) Placing physical barriers between marine mammals and the subsistence hunters, and

(4) that they cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met."

So, what we have here is really a cooperative program. The National Marine Fisheries Service wants to get the oilers and the whalers to agree among themselves with this Plan of Cooperation and then come up with the mitigation measures that will allow both objectives to be met.

QUESTIONS AND DISCUSSION:

Tom Albert: Thank you for making that clear presentation about the Incidental Harassment Authorization.

One thing that I've always wondered about is that it's not supposed to unduly interfere with the availability of the species for subsistence. And what we've been seeing is that people have pretty much been able to get the whales. But as you've heard several times here, and I've heard hundreds of times, they have to go farther and farther away and put themselves in a greater and greater degree of risk. And a few boats have been lost and a few people have almost died. At least as far as I'm concerned, it's only a question of time until several people are killed in this.

I guess my question is, do your regulations take into account not only the availability of the species for the hunt, but the fact that in order to get the animals, the personal risk to the hunter has increased markedly and is that somehow addressed in there?

Ken Hollingshead: I think it is qualitatively. And I think it's the needs. Every time situations change, we need to be flexible and we need to have lines of communication. But if you have seismic vessels out there, I would consider that as a barrier between the hunters and their subsistence needs, if you have seismic vessels out there. So if you're blocking the way to get to the whale, or they're driving the whales too far offshore so that it puts the health and welfare of the hunters in jeopardy, I think that is something that we need to take into account.

ALASKA OCS REGION MINERALS MANAGEMENT SERVICE

DENNIS THURSTON

Good morning. I thought what I would do was go over very quickly MMS' approach to regulation of seismic surveys.

Basically, it falls into two categories. There are the Geological and Geophysical (G&G) permits which are issued by the Resource Evaluation office. Those are the pre-lease surveys and generally those are larger, regional surveys, 2-D; and nowadays, 3-D. Then there are the post-lease seismic surveys, which are actually regulated by our Field Operations office. Those generally are high-resolution surveys for site clearance, geologic hazards, cultural resources, archaeology, and sometimes there are delineation surveys, 3-D surveys, that are contained within the lease.

Attached are three maps showing all the G&G seismic data acquired in the Beaufort Sea from 1970 through 1994 (Figures 1, 2, and 3). These maps do not show post-lease seismic surveys or the few 3-D seismic surveys that have recently been shot nearshore. Another point to

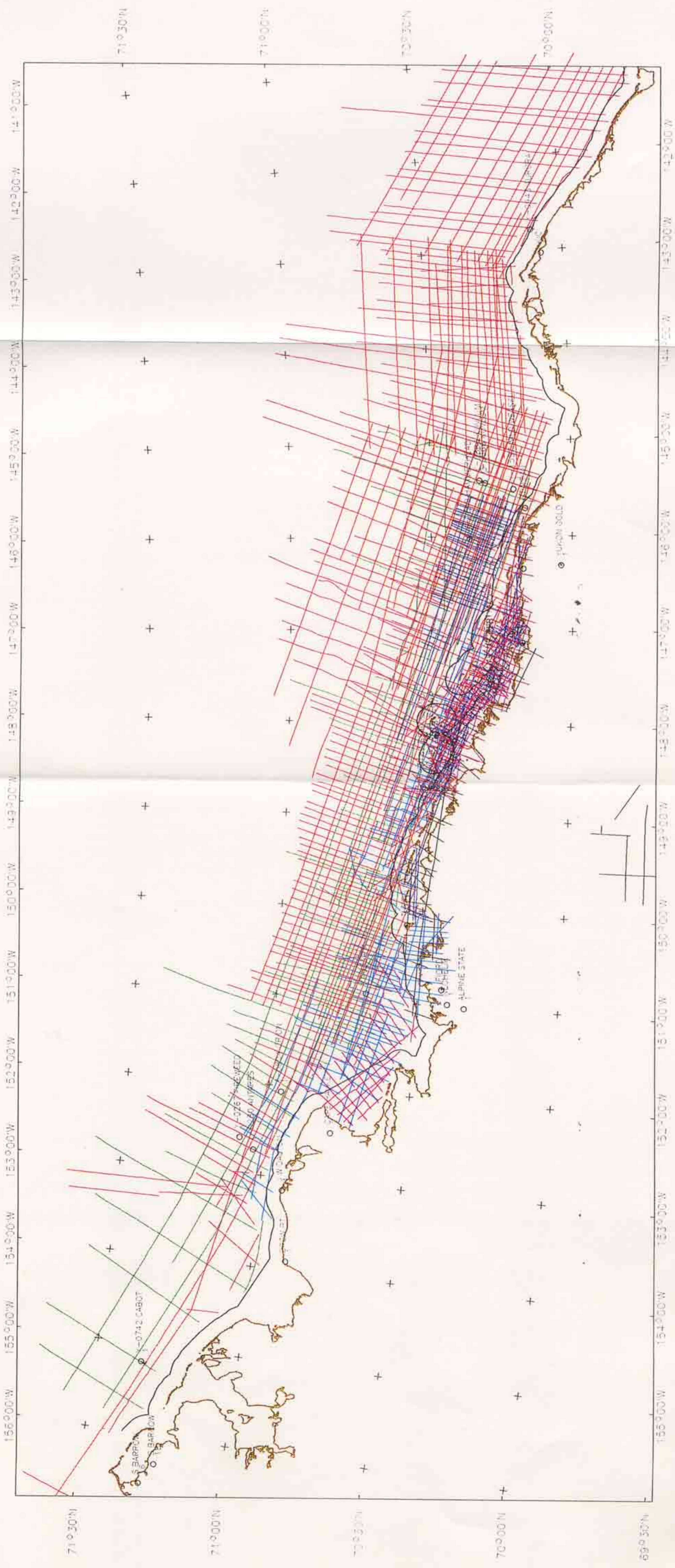


Figure 1. OCS Seismic Acquisition for the Years 1970-1979 - Beaufort Sea. MMS 1997.

LEGEND	
1970 - BLACK	1977 - RED
1973 - GREEN	1978 - BLUE
1975 - VIOLET	1979 - MAGENTA
1976 - CYAN	

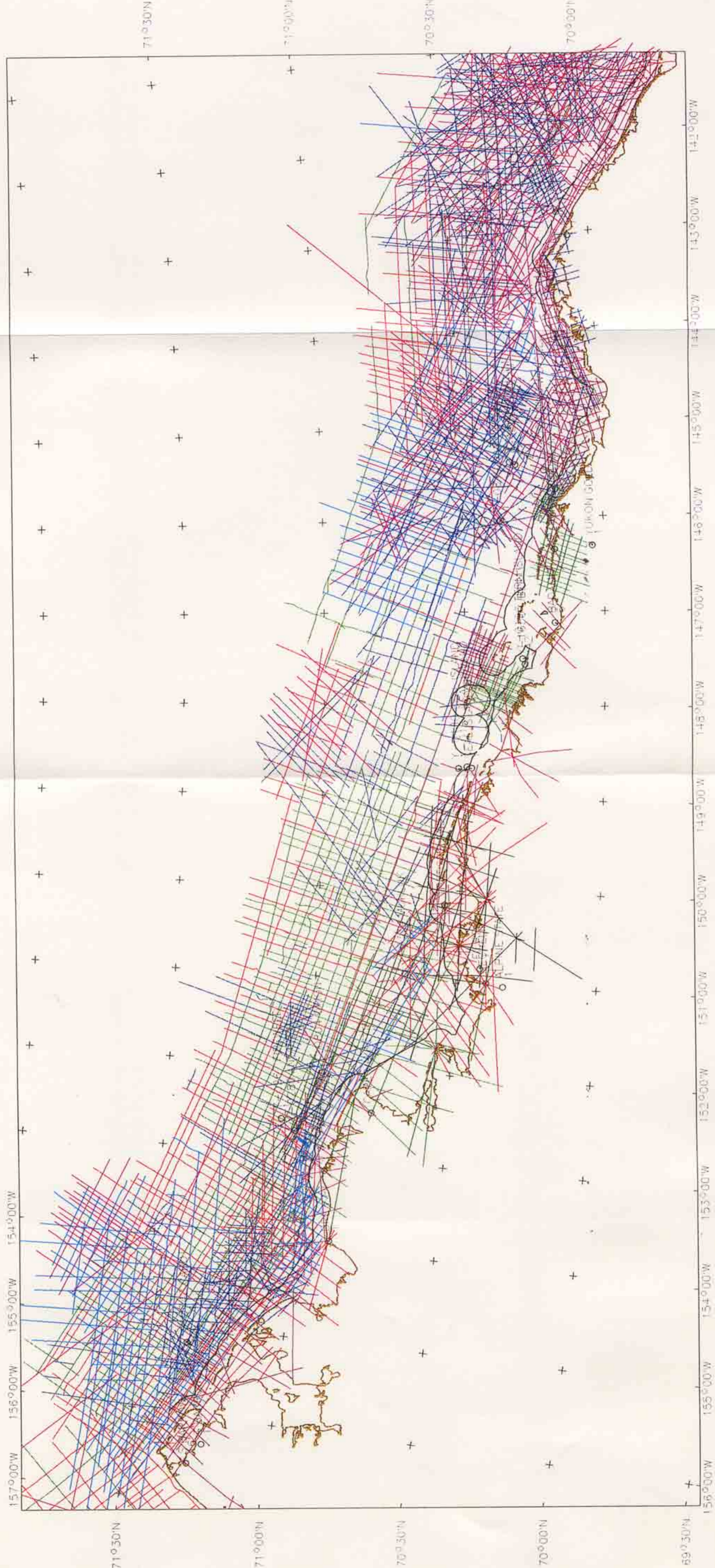


Figure 2. OCS Seismic Acquisition for the Years 1980-1986 - Beaufort Sea. MMS 1997.

LEGEND	
1980 - BLACK	1984 - CYAN
1981 - GREEN	1985 - BLUE
1982 - RED	1986 - MAGENTA
1983 - VIOLET	

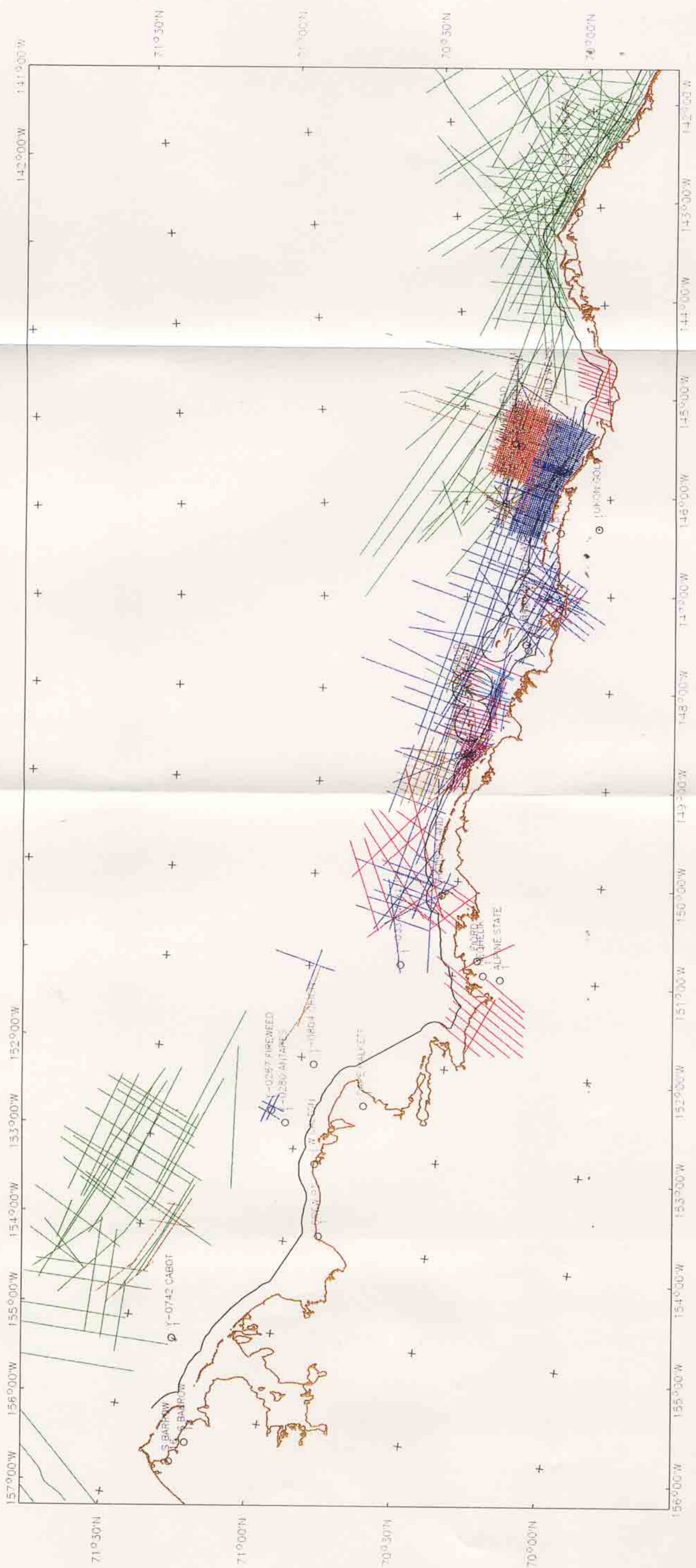


Figure 3. OCS Seismic Acquisition for the Years 1987-1994 - Beaufort Sea. MMS 1997.

LEGEND	
1987 - GREEN	1991 - VIOLET
1988 - BLACK	1992 - CYAN
1989 - BROWN	1993 - RED
1990 - BLUE	1994 - MAGENTA

remember is that much of the data showing nearshore was shot in the winter. The map showing seismic surveys shot from 1987 through 1994 clearly illustrates the change from the big regional shoots of the 1980s to the small, focused seismic shoots of the 1990s.

With the G&G permit, there is a national permitting process where a company applies. Companies have to provide us with information on the systems, the timing of the operation, and what their operation is going to entail, how deep they're going to tow their systems, what their power of the systems is, the firing rates, etc. Also they have to ensure that, and file with us, their opinion on whether or not there's going to be any effect on the environment, any pollution caused, or whether it's going to create a hazardous condition. This also covers coring programs because that would be the geological part. But mainly we're dealing with the geophysical today, unless you have questions about the geological part. They also have to ensure that their survey wouldn't unreasonably interfere or cause harm to other uses of the area.

In recent years, due to some problems that have arisen and have been brought up here, we started placing a monitoring program for whales and also in the latest Sale 144 stipulations, which I'll talk about a little bit in regard to the post-lease phase. We have adopted that as well in our pre-lease G&G permits.

Those are the mitigating measures such as the Stipulation No. 1, which is the protection of biological resources which would take into account whale migration times, and Stipulation No. 4, which is the site-specific bowhead whale monitoring program. So these are now part of our G&G permit process as well as the post-lease operations.

Post-lease seismic operations are called preliminary activities. That's when someone has bought a lease and they are allowed to do certain things on that lease before they drill. One of the things that we require them to do is conduct a geophysical high resolution survey in order to clear the site for geologic hazards and archaeological resources. That could be prehistoric resources or it could be sunken ships, historical resources, etc. If the company wants to do delineation seismic work to see how their prospect plays out within that lease, then they can also conduct 3-D seismic on their lease under this program.

Copies of these Stipulations and Information to Lessees are available on the back table and please take a copy (See Attachment E). They are pretty extensive but they were in the EIS and also in the Notice of Sale 144. And probably many of you know more about it than I do.

So I think the main point, and I'll keep this very brief and then we can talk about it in the workshops, is that both the G&G and the post-lease seismic activities now incorporate consultation with subsistence whalers and a method for resolving conflicts. In other words, the Field Operations supervisor can convene a group with representatives from the seismic company, the lease operator, the affected subsistence communities, the Alaska Eskimo Whaling Commission and the North Slope Borough, and National Marine Fisheries Service, to attempt to resolve any conflicts that might arise or that don't get resolved in the early part of the system.

Basically, that's all I'm going to have to say about that right now. But like I said, we can talk in much more detail about this in the working groups or if you have any questions about it right now, I'll field them.

QUESTIONS AND DISCUSSION:

John Richardson: Can you comment on the way in which the stipulations in the MMS permits relate to what happens if there is a National Marine Fisheries Service Incidental Harassment

Authorization (IHA) that also was issued? And what the possible differences between what's required under the two processes?

Dennis Thurston: I believe, in the post-lease phase, that the IHA supersedes the stipulation that we have. So, in other words, if they have received an IHA, then that supersedes our stipulation which says:

"in the event the lessee is seeking a Letter of Authorization or Incidental Harassment Authorization for incidental take from the National Marine Fisheries monitoring program and review process required under the LOA, the IHA may satisfy the requirements of the stipulation."

So basically it would supersede it. Does that answer your question?

In the pre-lease phase, I'm not absolutely sure but I believe that we are now following just as in the post-lease. So it would probably also supersede that stipulation.

Chris Clark: It sounds as though sometimes, at least in the past, seismic surveys have been conducted which are under a contract to a specific company. For example, ARCO hires Western Geophysical to do a survey. But sometimes seismic surveys have been conducted simply by the geophysical companies. Is there a difference in the process? Or has there been a difference in the process in the past?

Dennis Thurston: No, there's no difference. The difference has been more an evolution. But as far as a speculative survey or what we call a "spec shoot," or the survey that's done exclusive, the requirements are the same. And also, nowadays, even for scientific surveys, we require the same, exact stipulations or the same G&G permit. It used to be that the U.S. Geologic Survey or a university could go out and collect data without a permit. That's no longer the case.

Chris Clark: The same thing would hold, Ken, that they would need to get whatever letter of cooperation or--?

Ken Hollingshead: (Inaudible response, not at microphone.)

Chris Clark: So now essentially it's identical. It doesn't make any difference who you are if you're going to go out there and do it.

Ken Hollingshead: Right.

Chris Clark: And that changed when?

Dennis Thurston: Well, I'm going to say post-1989, but I'm not positive exactly when.

Steve Treacy: One thing I did want to point out about the mitigating measures. The mitigating measures for Sale 144 were worked out last year and are not the focus here. Mitigating measures, in general, are part of what we're doing here, but we're also looking for other avenues of improving the situation as far as communications between the whalers and ideas for new studies and these kinds of things.

**DIVISION OF OIL AND GAS
DEPARTMENT OF NATURAL RESOURCES
STATE OF ALASKA**

BRIAN HAVELOCK AND TOM BUCCERI

Thank you. My name is Brian Havelock. I am a technical writer with the Division of Oil and Gas Leasing section. I want to say it is an honor to be here. This is my first time up in Point Barrow. But having spent some time out in the Bering Sea and at the ice edge in some rough water, I have deep respect for anyone that goes out there and really challenges death.

First, I'd like to generally describe how we put together our mitigation measures for oil and gas lease sales and then I'll briefly talk about seismic and permitting of seismic. Tom Bucceri and I work with the lease sales section. We don't work with permitting. And I apologize that no one from the Permitting Section is here to answer technical questions, but we'll do our best.

The process initially starts where we'll take a look at the geography of the proposed sale area. Historically, state lease sales have been mixed onshore and offshore. So we'll look at whether the proposed sale area contains submerged lands or uplands. We'll also ask other questions so that we can think about cumulative impacts: is it coastal or inland; what communities are in the sale area; what's the pattern of subsistence harvest, and what level of development has occurred in the proposed sale area?

Secondly, we'll look at new information that may come in, like field reports, any environmental information such as updates on effluent guidelines or updates to the endangered species list. We'll also look at any new findings of life cycle or environmental monitoring studies that have been published.

Then we then look at comments and information that were received from local governments and organizations and any citizens or individuals as a result of our calls for comments which we issue. We have about three calls for comments up to two or three years before the preliminary finding is issued.

In the case for Sale 86, we looked at comments made by the North Slope Borough, city of Kaktovik, city of Nuiqsut, government agencies, industry, and others. We also reviewed comments on recent state Sales 80 and 86A, as well as comments on the OCS 144 documents and the 1997 to 2002 federal leasing program. And we carefully looked at the comments by Dr. Albert on what he liked and disliked about the Sale 144 stipulations.

Next, we look at mitigation measures from the most recent North Slope lease sale. In this case, it was 86A. Because this was a mixed sale, we also looked at measures from Sale 80, which was an onshore sale that preceded 86A. These two sales represented the most recent consensus on mitigation measures for oil and gas lease sales. This consensus was reached through the Alaska Coastal Management Plan (ACMP) consistency review process and Tom is going to briefly talk about that.

Good morning. My name is Tom Bucceri, and I am one of the Best Interest Finding writers for the Division of Oil and Gas.

When we prepare a Best Interest Finding, we develop mitigation measures, but concurrent with that, there's another process called the Alaska Coastal Management Program

(ACMP). A proposed lease sale has to be consistent with the ACMP and the North Slope Borough Coastal Management Program (NSBCMP), which is incorporated.

A lease sale in itself doesn't authorize any exploration or development. Any future operations will have to undergo a separate consistency analysis. But when we prepare a lease sale, we review the ACMP and the NSBCMP standards and examine how the sale mitigation measures address the policies.

There is a 60-day review period. During that time, local governments, other state agencies, and the public can comment on whether they think the mitigation measures are adequate. And if they find that they are not adequate, they can request that we amend the measures. That usually begins a process of negotiation and we try to resolve any outstanding issues, but sometimes, we're not able to reach an agreement. In that case, one of the state resource agencies, which are the Departments of Natural Resources, Fish and Game, Environmental Conservation, and Division of Governmental Coordination, and the local district government; in this case, it would be the North Slope Borough. Any one of those entities can request an elevation.

During an elevation, representatives of each the agencies will come together and each party will have one vote. The Division of Governmental Coordination, which is within the Office of the Governor, is in a position to cast the deciding vote in the event of a tie. Most of the time, as I said, it never comes to that. We try to work with the other agencies and work with the Borough to resolve any outstanding issues and avoid going through the elevation process.

Brian Havelock: The Division is working to align as much as possible our stipulations and permit process, at least the leasing aspect of it, with the OCS. For example, our Subsistence Protection Measure (#15) is an adaptation of what the OCS 144 has adopted and includes a consultation requirement. Our Lessee Advisory 9 is identical to the Information to Lessee M, which identifies certain sensitive areas in the sale area. And also, our Lessee Advisory 4 cautions that additional measures, such as time and area restrictions, may be imposed on geophysical activities; activities which are known to disrupt whaling or marine mammal migration. Lessee advisory 4 is similar to Information to Lessee J.

Other OCS measures were not adopted. State lease measures differ from OCS stipulations primarily due to geography and oceanography. I apologize for not photocopying our proposed mitigation measures for this sale, but if anyone is interested in it, I can certainly get a copy of those to you.

Seismic operations are regulated under 11 AAC 96. Geophysical exploration must follow general stipulations of 11 AAC 96.140. Winter seismic operations must follow the stipulations of the North Slope General Concurrence (GC-25) in order to be consistent with the Alaska Coastal Management Program. Open-water seismic operations must follow standard requirements attached to the permit.

Open-water seismic permit applications must undergo an ACMP review that has a public comment period. Out of that process additional stipulations may be applied as necessary. For example, these stipulations were applied to last year's open water seismic program for the Northstar development. This is a state permit for operations in both state waters and the OCS. The requirement says that open seismic in the Beaufort Sea will be suspended September 1 in waters east of Prudhoe Bay, and September 15 in waters west of Prudhoe Bay.

"Operations beyond the September dates will be considered on a case by case basis if the director of Division of Oil and Gas, in consultation with NMFS,

determines that a suitable whale monitoring program is conducted or if the village of Nuiqsut has completed its whale hunting for 1996, or NMFS has issued an Incidental Harassment Authorization for this activity."

Of the eighty-six North Slope exploration permits that were issued between 1990 and 1997, only six were open-water programs using airguns; there were two permitted in 1990, one in 1991, two in 1993, and then one last year. All operations for those permits were completed between May 29 and August 26.

To conclude, I think the most important mechanism for putting together these mitigation measures is feedback and input from people that are directly affected by them. We hope that these measures get better with each successive sale, but it depends a lot on feedback in order to tailor them the way they should be.

The next lease sale on the North Slope is an area-wide sale, which covers all state acreage available for leasing between the Staines and Colville Rivers. This sale will be completely onshore. From now on, all our lease sales will be either completely onshore or completely offshore.

As far as sale 86 is concerned, we are between the preliminary and the final finding. The comment period is April 1st, and we encourage everyone to submit comments on this proposed sale. And I can get you copies of our Best Interest Finding, or perhaps more appropriately, the mitigation measures within it.

I can't emphasize more how important written comments really are in our process. They are taken very seriously and I understand that historically the tradition has been more of a spoken tradition and not written down, and so the more written material the better; like the materials the whalers provided on the table back there, I consider that very powerful.

QUESTIONS AND DISCUSSION:

Jon Dunham: I'm the Permitting and Zoning Manager for the North Slope Borough. I noticed you were talking about our Alaska Coastal Management Program. Has the Department made any kind of contingency plans? There's a bill in the State Legislature right now to repeal the Coastal Management Program. If the Department has made plans, in case this thing is repealed, what kind of voice will the North Slope Borough have? Right now, we have a very powerful voice with the Coastal Management Program.

Brian Havelock: I listened to some testimony when that bill was first heard and I don't know if you heard that, but there was some discussion about one role of the coastal program was to protect resources, and the other one was a coordinating function that the DGC has. I mentioned to our Permitting Section about this and they said that the coordinating function is not going to go away if the coastal program goes away; that those aspects should be maintained. I think that the agency officials involved are heavily dependent on that system of approval.

Jon Dunham: It looks to me like you'd have to amend more than just the Coastal Management Program laws. You had references to the Alaska Coastal Management Program in your regulation of seismic programs? Probably in all lease sale information. I guess what I'm saying is that right now, we have an equal voice, we are sitting there at the table with the other state agencies. Is that anticipated to be maintained under any change?

Brian Havelock: I couldn't really comment on that. I'm not sure at my level. I would hope so.

Brad Smith: Other than vibroseis and airguns, are there any technologies that would be different for operating in the nearshore transition zone within state waters for seismic other than what we've heard today and yesterday? I'm thinking about would there be any need for anything like dynamite or any of the more (inaudible) in those areas? I guess another question might be what is meant by open-water seismic?

Brian Havelock: One of our general stipulations prohibits the use of explosives in marine waters, period. I think one of our lease measures says that it cannot produce a rise in the water body of 2.5 pounds per square inch, or something like that, which is a very small charge.

The technical aspect of your question is a little bit beyond my experience. Perhaps someone from Western Geophysical could comment on the nearshore technology.

Brad Smith: The only reason I asked is, as I recall, we did have a situation like that in the Cook Inlet for that real shallow water area. They claimed that was the only way to get a clear shot, but then vibroseis might not have been available to them there. So it might be a need that simply doesn't exist up here.

Mike Burwell: It's not clear from my reading of this what your stance is on monitoring. It looks like if there's an IHA, then I don't know. There are a lot of big "or's" there. Could you explain when monitoring would kick in here or what the state's situation is on that?

Brian Havelock: Well, again, this is a little bit beyond my league here. As far as I know, these seismic stipulations came out of discussions with state and federal agencies, because the seismic program straddled state and federal water, and--

Mike Burwell: Well, if you look at #3, "seismic activities shall avoid or minimize interference with traditional food gathering and access."

So that's left up to the seismic industry and the villages to figure out? In other words, you said that the new stipulations were basically structured after ours, which have a conflict resolution process.

Brian Havelock: At the lease phase. These stipulations apply to the permit phase.

Mike Burwell: At the lease phase. Okay, Thanks.

Brian Havelock: Thank you.

Thomas Napageak: I have a one concern here that needs to be voiced. I believe it is item #4 where you are saying three- or four-wheel All Terrain Vehicles (ATVs) are not approved for ground contact for summer travel in vegetated areas. I come from an area where barrier islands are the nesting grounds for hundreds of thousands of eiders, oldsquaws, and seabirds. I don't rightly approve because your operations would be during the nesting season, June and July and part of August. We try to keep the four-wheelers away from our islands. Although we would like to have them out there. I think those islands need to be protected a little bit more.

Brian Havelock: That is a good point. I believe in the application they requested that they could take ATVs and run cables across the islands; that is not acceptable, not in summertime.

Chris Clark: I have a comment on what I see happening here. We see words like "mitigation" and "monitoring." But there is nothing in here that I see that is actually to the benefit, in this case, of the bowhead whale in that monitoring is not science. Monitoring is simply trying to determine

whether or not there is some localized effect. If I read your first paragraph—and again I am not directing this at you, I am using you as an example—you have a series of "or" statements. It says basically, once the hunt is completed, there could be whales moving en masse—and we know the population is in the range of 7000-8000—through an area which is being surveyed. There is nothing in there to say that they should be allowed to move freely through an area of traditional migration without being impacted. We have no way of documenting, right now, in all of this process that there really is an accumulated effect on these animals, whether they are all slightly going deaf, etc. It seems like that has all been lost in this process whereby we have forms, words, applications. We have everything else, but where is the science? Where are we actually gaining knowledge about the potential damage to the environment? Tom just mentioned about the birds, has anyone done any work on the nesting success or hatching success in relation to seismic activity? Long term, cumulative effects. We all know the environment up here is really very fragile. That is one concern.

I would also like to point out that it seems like this is all "Incidental Harassment Authorization." As I know the folks from NMFS are perfectly aware, there is an unlevel playing field or a difference between a scientific research permit and an Incidental Harassment Authorization. It can be as extreme as in the case of you are driving a boat and you are making a lot of noise in the water and you are fisherman or whatever, your noise could be causing some change in patterns of whale behavior or whatever, but you don't need a permit to do that. But if I as a scientist want to answer the question, "What is the potential impact of noise on those whales?"; I have to get a scientific research permit. It is a lot more rigid in my opinion to try to get a scientific research permit to get some answers that might actually help the animals because that is one of the stipulations of the scientific research permit. It has to be for the benefit of the animals.

I am just going on record here that I don't see anything in this process right now that is actually benefiting the animals directly. It is all paper work, that says we are going to sign and if we come to agreement on this or that, but where is there anything directly accumulating knowledge to the benefit of the natural environment as we know it?

Brian Havelock: These stipulations and this permit represent the limits of our state authority. Any operator is subject to the provisions of the Marine Mammal Protection Act and the Endangered Species Act. The National Marine Fisheries Service is in charge of the whales and we defer to them as the authority.

I recognize the other point. Who is to stop a tour boat from plying the waters during the migration? How would that affect subsistence? It hasn't happened yet as far as I know but that is potential problem in the future.

Thomas Napageak: I agree with Dr. Clark this morning on the monitoring program. My own son has been on a seismic ship for two seasons; the last one and one a couple of years back. But as a Native monitor, he is put on a seismic ship and he sits there. He doesn't see whales although we are getting them just east of him. He feels that it is just a waste of time for Natives to sit on the seismic ships when there are others like Dr. Greene who said they got off the ship itself; then you were monitoring the distance where bowhead whales were being disturbed. Some of them have to have some Natives involved in there to make sure that monitoring is properly conducted. Why should we Natives, hunters to start with, be more or less placed on a barge where bang, bang is all we listen to. He calls me and says, "Dad I want to go whaling." I tell him, "Son, you have a job to take care of." That is what I tell him. I figured that he was doing us a favor but then he said it is just a big waste of time. But a proper monitoring program has got to be developed.

RECOMMENDATIONS FROM THE WORKING GROUP SESSIONS

The participants in each of the working groups are listed in Figure 1.

Figure 1. Participants In each of the Working Groups.

WORKING GROUP I Zone of Influence of Seismic Vessels All attendees participated in this working group		
WORKING GROUP II Communications among Subsistence Whalers, Industry, and Agencies; Communication Options for Conflict Resolution	WORKING GROUP III Possible Technological Methods of Reducing Effects	WORKING GROUP IV Potential Research and Monitoring Projects, including Co-managed or Cooperative Projects
Archie Ahkiviana Charles M. Brower Mike Burwell Jon Dunham Brian Havelock Ben Itta Joseph Kaleak James Killbear James Lampe, Sr. Roxy Oyagak, Jr. Edward Rexford, Sr. Brad Smith Dennis Thurston	Sue Banet Tom Bucceri John Davis Charles Greene Jeff Mayville Christine Mire	Gordon Brower Chris Clark Charles Greene Ken Hollingshead Fred S. Kanayurak Marchie Nageak Thomas Napageak Eli Nukapigak Mark Pierson Burton Rexford John Richardson Steve Treacy Frank Wendling

WORKING GROUP I - ZONE OF INFLUENCE OF SEISMIC VESSELS

RECOMMENDATIONS

The following is synopsis of the Whaling Captains' first-hand experiences with the interactions of subsistence whaling operations and activities associated with oil and gas exploration and production. Whenever possible, observers were asked by the discussion group for quantification of distances, numbers of whales, etc. to supplement their personal observations. In some cases, it was possible to locate the positions of the observers and seismic operations on maps that were supplied by the Whaling Captains, Western Geophysical, or MMS. The session began with the observations of interactions by individual whalers, the exchange of and discussion of effects, and finally a synthesis of the Whaling Captains' observations into a consensus testimonial.

OBSERVATIONS AND DISCUSSION:

James Lampe, Sr., speaking in Iñupiat and translated by Maggie Ahmaogak, talked about a whale hunt during the mid-1980s. On the hunt, Mr. Brower was taking his whaling crew through an area where seismic operations were being conducted and they were watching the process.

There were two boats involved in the geophysical operation: the seismic vessel and a small boat that would move to a different location after each shot. There were three instances where the smaller boat moved toward the West Beach after the shot. There was a good deal of open water. The visibility was good and you could see small ice floes to the east. The whalers travelled eastward from the seismic operations, finally reaching the ice floes, and saw no whales. They went to great lengths and distance to locate whales but none were seen. It is estimated that they travelled 20 to 30 mi.

Arnold Brower, Jr. explained that the distance of 60 or 70 mi he mentioned earlier was not from the Point. If the whale was migrating westward, he meant from the noise source. Mr. Brower could see the whales far out, not where they were supposed to be. He did not mean to imply that from the Point one had to go 70 mi east to go find whales. Mr. Brower stated that Thomas Napageak, and the other whalers, gave a good description of how far east of the whaling group a geophysical operation can be to have a negative effect.

Steve Treacy stated that Arnold Brower, Jr. was saying that the important thing was how far off they would have diverted. But what we were trying to determine at this point in the meeting was what people thought was the distance from the activity that the whales would start to divert. Mr. Treacy mentioned Dr. Albert's comment earlier in the meeting regarding diversion. Diversion, of course, was something that is certainly of interest to the whalers and probably more so than breathing rates.

Mr. Jeff Mayville presented maps assembled by Western Geophysical in 1990 showing the shot-lines of seismic surveys along the Arctic coast between 1979 and 1989. On the same map, MMS whale survey sightings were reported for the same period. Also plotted were whales reported by on-board observers for Western Geophysical seismic vessels. It was suggested that the information demonstrated that working geophysical vessels and whales occupied the same area and that no pattern of displacement was evident in these plots. This was largely discounted by the discussion group since the data were consolidated for whole seasons and any temporal sequence or correlation was lost in the consolidation process.

Steve Treacy stated that the goal of this session was to get the whalers' ideas, their perceptions, observations in the field when whales were moving toward a seismic operation, a moving seismic boat, and where and when the whales might have diverted. Although good information had been presented, more was needed.

An unidentified speaker mentioned that in 1991 they went out 26 mi from Barrow when Archie Ahkiviana and his crew harvested a whale. That was quite a distance for Archie and his crew.

Steve Treacy then denoted a separate category of "how far whales moved offshore." Two examples had been presented: 21 and 26 mi.

Burton Rexford commented that the best mathematics can shrink the impact zone as illustrated on a map, and that was what the group was doing at that point.

Another person stated that at the height of seismic activity, there was also exploratory drilling at Kuvlum. The displacement of whales was a product of the drilling operation noise and the helicopters coming back and forth with the crew.

Steve Treacy asked if that was the oil operation that Thomas Napageak was referring to when he had stated they had drilling and seismic at the same time. Thomas Napageak confirmed that it was the same operation. He added that it was one of the situations on which he failed to report. Mr. Napageak mentioned that during the hearings regarding Kuvlum, the federal agencies indicated that the operational plan would be that the helicopters would be airborne from Deadhorse, follow the mainland until they were south of Kuvlum and then fly directly offshore to Kuvlum. But evidently, they took off and followed the barrier islands. That was another factor of disturbance because they were offshore, and flying from island to island, rather than along the coastline.

Steve Treacy agreed that the year Mr. Napageak was talking about where the disturbance occurred here was that same year there was drilling and there were helicopters. Mr. Treacy added that there were five icebreakers out there. Thomas Napageak stated that the icebreakers were on Hammerhead. Steve Treacy mentioned that Kuvlum did have some icebreakers for a couple of years. Thomas Napageak stated that in one year they did have an icebreaker but it wasn't very active. It was pretty much idle most of the time, because he was up there himself. Steve Treacy added that perhaps they were talking about different years.

Harry Brower, Jr. related his observations of the noise that he heard when he went out with his Uncle Tom's whaling crew from Barrow. The year was 1989, when the survey vessel *Arctic Rose* was working between Barrow and the Cape Simpson area. They had been looking for whales off the end of Tapkaluk Island and near Cooper Island, 3-4 mi offshore the barrier islands. Traditionally, it is an area where whalers wait for the whales to come. Mr. Brower, Jr.'s Uncle always told him that the whales naturally come there every year.

After searching the whole morning, they had finally landed at Plover Point. From that location they could hear this boom from a seismic ship, although they couldn't see it; the weather was clear so it was assumed the vessel was over the horizon. They decided to return to Barrow because with the noise, they were not going to find any whales. There were other whaling boats that were out searching for whales that day as well. Even when they couldn't even see the seismic ship, they could hear the noise.

There was some group discussion as to the source of the noise. It could have been the *Arctic Rose* or possibly the Cabot Prospect. It was estimated that the sound source would have had to be at least 20 mi distant to be beyond the horizon.

Dennis Thurston commented that the discussion had overlooked "site clearance surveys." These high resolution surveys are typically conducted with sounds of much higher frequencies and therefore the effect on the whales should be considered. Investigators tend to focus on the lower frequencies, but there are indications that higher frequencies are having an effect as well. The *Arctic Rose* is a high resolution survey vessel.

Arnold Brower, Jr. related his experiences during the period when the Cabot Prospect structure was in place and they were hunting whales, just east of Cooper Island.

He and his crew and several other crews were 5 to 6 mi off the point, in an area where they normally saw and pursued whales. Seeing none, they then headed eastward to try to intercept an oncoming westward migrating whale. They cruised until they reached the Cabot

structure, then passed the structure and searched both shoreward and farther out to sea, scouting for whales. They did not see a single blow, not see a single whale.

It got to the point where even if they had found a whale, they would not have enough fuel to tow it back. Mr. Brower was concerned that with the distance, he would only have enough fuel left to go back home. They traveled about 10 mi farther east of Cabot so that they could at least alert other whaling crews to any oncoming whales but they never sighted one.

This scenario was repeated for several days that season. They didn't encounter whales for a long while because of the noise. The noise would occasionally stop for one or two days.

On another occasion they were hunting caribou in the Dease Inlet area, between the Alaktak and Ikpikpuk Rivers, and they could hear the noise of drilling activity at Cabot. Cabot is about 15 mi from the shore, and they were another 10 mi inland, a total of 25 mi from the sound source.

Mr. Brower mentioned that Van Edwardsen had made similar observations. But he did hear it himself and it was a significant noise. And if he could hear the noise at that distance, the whales should be able to hear it at that distance as well.

After some discussion among the Whaling Captains, Burton Rexford indicated that while he agreed with the distances that were being reported by the Captains, he pointed out, however, if these reported distances were very large, they would be perceived as exaggerated and no one would believe them. He suggested that a consensus distance of diversion be 15 to 20 mi.

Thomas Napageak stated that the magnitude of the diversion from seismic activity should be left for MMS to determine. But the whalers already know they are diverted from their regular migratory route. It was recognized that drilling rigs, support vessels, helicopters, etc., all had impacts on whale movement but the blasting of the seismic vessel was the most significant and the main concern for himself and the village of Nuiqsut.

There was considerable discussion about the Whaling Captains' cooperative agreement with British Petroleum Exploration (Alaska), Inc. (BPXA) regarding seismic operations in the Northstar Prospect, and later the area near Pingo Island. Nuiqsut is between the two locations. This was about 50 mi from where hunters harvested two whales.

Burton Rexford stated that the cutoff date for seismic activity by BPXA last year was August 15 and then they moved to the west of Cross Island. By the time the migration started, it was a normal migration. The whales weren't diverted and it worked out very well. Seismic activity was not allowed to the east of Cross Island.

There was considerable discussion as to the effects of water depth, topography, and sub-bottom material, such as permafrost, on the attenuation of sound underwater.

It was stated that if a sound were broadcast in an area of uniform depth and water characteristics, the sound would propagate equally in all directions. However, the Beaufort Sea is not uniform in its characteristics nor shape. It would be expected, therefore, that sound would be attenuated the most travelling inshore into shallower waters and the least travelling offshore into deeper water where the whales' traditional migration route is located. Subsurface sediment type and areas of permafrost could also affect the transmission of the sound.

Tom Albert commented that the whalers have made several comments about hearing the seismic boats and not seeing them, or hearing the Cabot Drilling Platform from a location inland

about 20 mi. People realize that the travel of sound in the water is different than it is in the air. But what they were trying to convey was that they never had any idea that the airborne sound from these activities would travel so far. The public was never given any indication that the sound would travel as far as demonstrated. They were generally told that "it won't go very far; and in the water, the sound might go a couple of miles." In real life, they can hear these drilling platform activities 15 or 20 mi away. These people question what they have been told, and what has been written in the EISs and EIRs. They have observed that the sound travels much farther in the air than they were told, and they wonder about the distances in the water. Dr. Albert questioned if the information they have been given true. He said since the information regarding sound in the air was not true; therefore, maybe the underwater sound transmission information was not so correct.

People have told Dr. Albert that they could hear seismic boats when they couldn't see them. That is, they were over the horizon, maybe 10 mi away—which was really impressive. This happened many times. Dr. Albert questioned people very carefully. "Was it foggy? Did you have your head underwater?" The response was generally: "I was just standing in my boat and I could hear this thing. It was clear day, and I couldn't see it." They recognize that there are different kinds of seismic operations. Sometimes seismic activity is a massive sound maker and sometimes it's a smaller sound maker.

Dr. Albert mentioned that in previous years, 1979 and 1980 for example, the years that Burton Rexford referred to were the most noisy. These years had massive operations, lots of noise but no sources visible. No boats could be seen and no whales. Dr. Albert stated that the whalers struggle with attempting to attach mileages to the observations. Their job is to tell you that there is something wrong. They don't believe the 7 km reported in the EIS. It can be written in all the EISs you want but there is not a soul up here that believes it today. He certainly doesn't.

Dr. Albert stated that MMS has some of the needed data contained in reports that have been completed in the past. For example, the SWEPI Report published in 1987. He mentioned that Dr. Charles Greene and Dr. John Richardson reported that at a distance of 75 mi a seismic ship could be heard at 112 to 127 dB received levels. A distance of 75 mi!

Another observation that could perhaps help attach some distances was that after a seismic vessel, 65 mi away, ceased operations there was an increase in call rates of bowhead whales. At 65 mi!. It wasn't known whether the whales were jumping out of the water or turning around, but the sonobuoys did detect a change in the call rate. Similar data have been shown regarding changes in call rates with Northstar.

In the process of assembling quantitative information it was apparent that there was some confusion about what the group was describing. It was recognized that there were basically three "distances" or elements of avoidance in the whales:

1. **Detection Distance:** The distance at which whales detected the sound of seismic operations, including support vessels. Detection was demonstrated by a behavioral change in an individual whale such as swimming speed, calling rate, breathing rate, etc. but did not change the general direction of their progress.
2. **Deviation Distance:** The distance at which whales reacted to the sounds, by diverting from their original or expected heading or path.
3. **Displacement Distance:** The distance at which the reacting whales were displaced from their original heading or path.

The consensus of the observers was that the pattern of movement of whales passing a sound source was "teardrop" shaped. The whales were said to be able to detect the sound some distance (100 mi) from the source but made no deviation from their heading until they were about 40 mi. At this distance the whales begin to deviate from their original heading and prepare to pass or go around the sound source. Eventually the whales pass the source and the distance from the whales to the source was about 10 mi. After passing the source the whales returned to the original heading, and sometimes path, and this was done at some distance less than the approach deviation distance.

After considerable discussion, the group focused on the creation of a consensus statement as to the effect of seismic operations on whale movements and migration that could be endorsed by the Whaling Captains and the group as a whole.

The process began with a statement extracted from the MMS Notice to Operators, and the EIS for Lease Sale 144:

"Scientific studies and individual experiences related by subsistence hunters indicate that, depending on the type of operations, individual whales may demonstrate avoidance behavior at distances up to 24 km (15 mi)."

After the discussion of specific observations of both scientists and whalers the consensus statement was as follows:

"Factual experience of subsistence whalers testify that pods of migrating bowhead whales will begin to divert from their migratory path at distances of 35 mi from an active seismic operation and are displaced from their normal migratory path by as much as 30 mi."

At the completion of this session the discussion was summarized in the consensus statement above that was attested too and signed by all of the Whaling Captains present. (Attachment C).

WORKING GROUP II - COMMUNICATIONS AMONG SUBSISTENCE WHALERS, INDUSTRY, AND AGENCIES; COMMUNICATION OPTIONS FOR CONFLICT RESOLUTION

RECOMMENDATIONS

1. Cooperative agreement (Plan of Cooperation) between operator and subsistence community.
 - a. Memorandum of Understanding with U.S.: AEWC and NOAA for operations requiring IHA or Letter of Authorization.
 - b. Memorandum of Agreement (MOA) said industry would help with towing whales and in emergencies.
But when help was needed they didn't assist. The MOA had to be clarified.
2. Observer Requirement
 - a. An Iñupiat observer should be on-board flight as part of the Site Monitoring Plan.
 - b. Iñupiat observers on-board seismic boat has limited use, and should be on smaller vessels associated with the seismic operation.
 - c. Designate North Slope Borough Department of Wildlife Management to put a specialist or AEWC representative on-board.

3. Future Whaler Observations:
 - a. Radio to shore when spookiness or other behavior observed
 - b. GPS waypoints
4. Control of information of Canadian operations
 - a. Conflict every summer
 - b. Information from customs to mariners
 - c. Need cooperative agreements on communications with ships
5. The North Slope Borough should notify AEWG of other permits issued by the NSB, i.e., other traffic from DEW line clean up, etc.
6. Native participation in scientific research associated with seismic operations
 - a. Aerial surveys
 - b. Observer/communicator should be independent of ship, drilling rig, or other vessel duties, e.g., CANMAR.
7. Annual review of Point of Contact
 - a. Industry, AEWG, NSB, NMFS, MMS, State of Alaska, whaling association participation
 - b. After post-season review
 - c. Before agreement on upcoming season's operations.
8. Discuss measure limiting size or number of airguns that would result in increasing the radius of deflection distance.

WORKING GROUP III - POSSIBLE TECHNOLOGICAL METHODS OF REDUCING EFFECTS

RECOMMENDATIONS

1. Use minimum sound source level to meet survey requirements.
2. Industry should pursue developing sources that minimize lateral transmission of sound.
3. Investigate the use of bubble screens to limit lateral transmission of sound.
4. Consider active noise cancellation for horizontal noise.

Future activities are expected to be:

- 1) in shallower water, closer to shore with smaller sources;
- 2) fewer surveys conducted in a season; and
- 3) will affect much smaller areas.

**WORKING GROUP IV - POTENTIAL RESEARCH AND MONITORING PROJECTS,
INCLUDING CO-MANAGED OR COOPERATIVE PROJECTS**

RECOMMENDATIONS

HIGH PRIORITIES

1. Resolving differences between the scientific and the whalers' knowledge bases concerning radius of influence of seismic on bowhead whales.
2. Ensure that a well-designed, effective monitoring study is done when a marine seismic program occurs during the autumn migration season for bowheads. This should extend east beyond the maximum distance where the seismic sounds are detectable underwater within the bowhead migration corridor, and north far enough to include most of the migration corridor even in the presence of seismic activity. Days without seismic activity as well as days with seismic should be monitored to provide "control" information. The sound field should be documented, including empirical measurements of received levels of seismic sounds at locations of whales.
3. Develop a reference atlas in GIS format documenting locations and types of offshore industrial activity in the Alaskan Beaufort Sea (e.g. seismic, drilling, construction) by year, extending back as many years as possible.

MODERATE PRIORITY

1. Determine behavioral reactions of autumn-migrating bowheads to open-water seismic exploration, including deflection effects and "spooked" behavior. Might begin by compiling results from the various autumn monitoring studies done since 1980, which have never been drawn together.
2. Determine the distribution of subsea relic permafrost, which is believed to affect sound propagation; take account of existing permafrost map and any relevant information that can be obtained from geophysical surveys.
3. Through cooperation with whalers, evaluate the anatomy of bowhead "ears" to assess their likely sensitivity to different sound frequencies.
4. Develop an acoustic exposure model for migrating bowheads and seismic, with the objective of determining the proportions of the migrating population exposed to various sound "dosages."
5. Map bowhead hunting areas more precisely, documenting areas searched as well as locations where whales are struck, using GPS data loggers.
6. Determine the effects of exposure to seismic pulses on bowhead acoustic communication, including effects on the types and numbers of bowhead calls.

LOWER PRIORITY "WISH LIST"

1. Consider studying the different effects between 2-D, 3-D, and high-resolution seismic.
2. Radio tag bowheads in the Canadian Beaufort Sea during summer, without damage to the whales, and monitor their movements as they migrate past seismic operation(s) in the

Alaskan Beaufort Sea. Satellite tags would probably be needed, and about 20 individuals might be an appropriate sample size.

3. Limit seismic exploration and associated monitoring until after whalers from the nearby villages have completed their whale harvest.
4. Conduct a partially-controlled study of seismic effects on migrating bowheads by adjusting the timing of seismic operations to obtain alternating replicate "seismic" and "no seismic" periods; monitor and compare whale movements and behavior during these periods.
5. Use hydrophone arrays to localize and track calling bowheads as they migrate close to and farther from a seismic operation and/or past the Pt. Barrow region. Cooperate with whalers to install and retrieve equipment.
6. Determine effects of seismic sounds on bowhead prey (copepods and euphausiids).
7. Determine low frequency hearing thresholds of bowhead whales.

***ATTACHMENT A
BACKGROUND MATERIAL
Submitted by:
Whaling Captains and Crew Members***

Barrow Whaling Captains Association

General Delivery
Barrow, Alaska 99723

**Comments by Barrow hunters regarding hearing working seismic boats
that are over the horizon and therefore can not be seen.**

We know that seismic boats make a lot of noise. We have even experienced instances of hearing the "BOOMS" of a seismic boat, but not seeing the boat because it was over the horizon.

Harry Brower Jr. March 4, 1997
Harry Brower Jr.

Burton Rexford 3/4/97
Burton Rexford

Van Edwards 3/4/97
Van Edwardsen

Jacob Adams 3/4/97
Jacob Adams

Fred Kanayurak 3-4-97
Fred Kanayurak

Ben Itta 3/4/97
Ben Itta

Marchie Nageak 3/4/97
Marchie Nageak

Arnold Brower Jr. 3/4/97
Arnold Brower Jr.

Barrow Whaling Captains Association

General Delivery
Barrow, Alaska 99723

SEISMIC BOAT INTERFERENCE WITH BOWHEAD WHALES OFF PT. BARROW DURING FALL 1989

In the fall of 1989, hunters went out from Barrow on many occasions over at least a three week period. During this time, the traditional hunting area to the north and northeast of Pt. Barrow was repeatedly searched and no whales were seen. Unfortunately during this time hunters would see a seismic ship operating (probably Arctic Rose). After much frustration, hunters went further and further and finally one hunter (Lawrence "Savik" Ahmaogak) took a whale just off Cape Simpson, about 45 miles from Pt. Barrow. Four whales were taken in this area (whale 89B04 by Jacob Adams; 89B05 by Ben Itta; 89B06 by Joash Tukle; 89B07 by Lawrence Ahmaogak). Due to the long time it took to tow the whales back to Barrow (such as 22 hours for Jacob Adams, and 26 hours for Ben Itta) the inside of the whale was ruined for food (a stinker). Only the muktuk was able to be used for food.

The distance was so great that fuel had to be hauled 2 times for the boats towing Ben Itta's whale (89B05). Fuel also had to be hauled to boats towing the other whales. Under normal conditions (no displacement of whales) the whales are taken within a few miles of Pt. Barrow and towing to shore only takes 2 to 5 hours. When there is no disturbance most hunting occurs offshore of the coast between Pt. Barrow and Tapkaluk Island (about 12 -15 miles) extending offshore about 3-5 miles. This is the area in which most whales are seen and then chased in the hunt when there is no industrial disturbance. This is the most important part of our general hunting area off Pt. Barrow.

We are firmly convinced that the reason that we had to go so far from our traditional hunting area was due to whales being displaced by noise from the seismic ship.

Signed this 4th day of March, 1997.

Jacob Adams 3/4/97
Jacob Adams, ASRC President & BWCA Secretary
WHALING CAPTAIN

Harry Brower Jr. March 4, 1997
Harry Brower, Jr., WHALING CAPTAIN
NSB Subsistence Research Specialist

Burton Rexford, AEWG Chairman
WHALING CAPTAIN

Burton Rexford 3/4/97

Van Edwardsen, BWCA Vice President
WHALING CAPTAIN

Fred Kanayurak 3-4-97
Fred Kanayurak, BWCA President
WHALING CAPTAIN

Ben Itta 3/4/97
Ben Itta, WHALING CAPTAIN

Arnold Brower, Jr. 3/4/97
Arnold Brower, Jr., WHALING CAPTAIN

Barrow Whaling Captains Association

General Delivery
Barrow, Alaska 99723

Interference with fall hunting of bowhead whales in 1991 off Barrow due to noise from seismic vessels

In the fall of 1991 our hunting was interfered with by noise from the Cabot drilling platform located to the northeast of Point Barrow. After many searches we could not find whales where we traditionally find them (offshore of the coast from Pt. Barrow to Tapkalak Island). We could only find whales offshore from the drilling platform. As can be seen from the map prepared by Harry Brower Jr., 4 whales were taken. Two of the whales (91B11 and 91B12) were far to the east and northwest.

The noise from the Cabot drillship was impressive. One of us (Van Edwardsen) heard it at Norman Leavitt's camp, about 35 miles away from the drill site. One of us (Van Edwardsen) could clearly hear the drilling platform at the site where his whale (91B12) was taken (26 miles from Pt. Barrow) and this was about 5 miles from drilling platform.

We are firmly convinced that noise from the Cabot drilling platform displaced whales from our traditional hunting area. This resulted in us having to go further offshore to find whales.

Jacob Adams 3/4/97
Jacob Adams

Burton Rexford 3/4/97
Burton Rexford

Fred Kanayurak 3-4-97
Fred Kanayurak

Van Edwardsen 3/21/97
Van Edwardsen

**STATEMENT
OF
ARCHIE AHKIVIANA**

My name is Archie Ahkiviana. I am the Alternate AEWK Commissioner for the village of Nuiqsut, Alaska. This testimony is from my actual experience as a subsistence hunter and a whaling crew member.

I am one of the registered whaling captains of the Nuiqsut Whaling Captains' Association which has 11 whaling captains registered with the Alaska Eskimo Whaling Commission (AEWC) with over forty plus crew members.

The NWCA has a five man Board of Directors, who meet on a regular basis and discuss issues that impact our subsistence whaling activities. The NWCA is a member of the AEWK, of which the NWCA elects its own Commissioner to serve on the AEWK.

The NWCA has gone on record opposing the ARCO Operations , the Kuvlum Prospect in Camden Bay. Our opposition is based on our experience of what happened in the fall of 1989 in Cross Island

The area that Kuvlum was working on was three miles wide by six miles long or 18 square miles. The work was done so a bottom founded drilling platform could be set in place.

In 1989, two whales were taken 20-35 miles North of Cross Island. Both whales were lost due to distance and adverse weather.

Our crew had to travel approximately 35 miles, one way between the finding and taking of the two whale for the village. However, they were lost.

It is very important to remember that the Kuvlum activity has had two major "noise makers" going on at the same time. These are : 1) drilling and associated activities (icebreakers, resupply ships, tugs, helicopters; and 2) the noise of the seismic exploration device and the noise of the seismic vessel.

Based on the industrial activity , there is an unmitigable adverse impact on the village of Nuiqsut on subsistence whaling. i.e. 1) by causing the whales to abandon the hunting area, and 2) directly displacing the subsistence whalers, and 3) placing physical barriers between the subsistence whalers and marine mammals, including altering the normal bowhead whale migration route.

One very important reminder to MMS is that seismic activities displaces the whales from their normal migration route and this to us is an unmitigable impact.

I would like to see a better improved site monitoring plan.


The subsistence bowhead whaling communities of Nuiqsut and the AEWK have tried to work with the industry to reduce the injuries to our whalers and to our whale hunt from the industry operations. In past years, we have had the Fall Conflict Avoidance and Communications Agreement (Plan of Cooperation). But this has not kept the industry from driving our whales away from their normal migration route.

Our elders have begun to question the wisdom of these types of agreements. They tell us that we are entering agreements with those who drive the whales away from their migration path and their food. They tell us that we are entering agreements with people who do not care about the whales.

Our elders and our traditional religious leaders tells us that the whales know what we do. If we enter into agreements with agencies who do not honor the whales, the whales will know this and they will stop coming to us.

These types of agreements have not helped us and has driven the whales away from us. We must and have to listen to our elders and to our traditional religious leaders. We cannot have agreement with agencies who drive the whales from the path where they migrate and find their food!

SIGNED this 4th day of March, 1997.


**Archie Ahkiviana, Alternate AEWK Commissioner
and a Nuiqsut Whaling Captain**

My name is am Arnold Brower Jr. A life long resident of Barrow for 49 years. I am a Whaler, subsistence hunter, and a Tribal council member and President of the Native Village of Barrow Tribal Council President. I have represented the Whaling community at the International Whaling Commission as a US delegate and worked with AEWC as past Chairman. I have been involved with Whaling research with noise acoustics, noise disturbances off of Barrow during spring whaling, and whale census with acoustics.

In my earlier whaling participation, I have observed whaling near Pt Barrow in the fall with small motor boats. Elders whalers like my grandpa Alfred Hopson Sr ., Richard Tukle, Tom Brower Sr., Bruce Nukapigak, Vincent Nageak Sr, and my father Arnold Brower Sr. who have actually been my mentors, have disciplined me to observe these events each time we set out on a boat for whaling.

I remember clearly that whales (sometimes pods of them) all were nearly within visible distance three to six miles from the barrier islands just off of Pt Barrow during the 1960's and the 1970's. This was evident mostly off of Tapqaluk Island west of Cooper Island to the Cooper Island. Uncle Tom Brower has told me numerous times that the vicinity of the Pt Barrow area seem to be a feeding area for migrating whales. Whales are often found in pods or large schools approximately two to five miles off of these Barrier Islands.

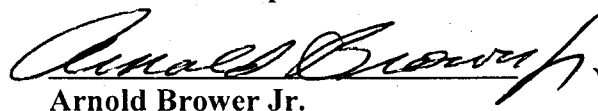
Lately, since the 1980's and 1990's Barrow whalers have had to combat with the offshore seismic activities and off shore drill rigs that have displaced bowhead whales from their usual gathering areas where whales are usually either feeding or milling around during the early morning hours each day. When the off shore drill rig called CID's structures were present , they have been detrimental to whalers and their harvest of whales.

A whale harvested can feed the community for a whole day. However, when the harvested whale is caught far offshore, it will take up to 10 hours to tow it back to the butcher site. The whale's meat decomposes after the 12th hour. We have had much meat wasted during the seismic and drilling activity seasons off of Pt Barrow since the advent of offshore Oil & Gas activities. Other adverse incidents have occurred related to the safety and welfare of the Barrow Whalers. During towing of harvested whales far off shore, we have had to assist other whaler's boats due to bad weather conditions encountered due to such long distance necessary to tow the whales to shore for flensing.

Aboriginal whaling is the livelihood of Inupiaq people protected by the federal government within their trust responsibility to the Aboriginal Inupiat people of Alaska. In view of the adverse conditions imposed by the offshore Oil & Gas activites related to seismic and drilling, I want the MMS to know that they should bare any cost related to adverse impacts associated with their offshore ventures during whale migration and whaling. Offshore activity positively has an adverse impact on whalers and bowhead whale migration in the Arctic Ocean during the fall.

This is a true statement made by me, Arnold Brower Jr regarding seismic activitiies and offshore drilling in the migration route of bowhead whales and Inupiat whalers from Barrow.

Wednesday, March 05, 1997


Arnold Brower Jr.

AFFIDAVIT

OF

FRANK LONG, JR.

A. My name is Frank Long, Jr. I live in the Village of Nuiqsut, Alaska, on the Colville River sixteen (16) miles south of the Beaufort Sea.

2. I am one of the ten (10) whaling captains of Nuiqsut, registered with the Alaska Eskimo Whaling Commission ("AEWC").

3. I am the Commissioner to the AEWC for the Village of Nuiqsut.

4. I have hunted the bowhead whale as a member of a subsistence whaling crew for forty-one (41) years. I have been the captain of my own crew for seven and one-half (7 1/2) years.

5. This testimony is from my actual experience as a subsistence hunter and a whaling captain.

6. For my people, the status of whaling captain is the highest honor we know. Not only is it a great privilege in the eyes of my people for a person to attain the status of whaling captain, it also is a great responsibility. The entire community -- the village and all of the extended family outside of the village -- look to the whaling captain to feed them.

7. If we whaling captains do not find the bowhead whales to bring home, it will cause great hardship to our community. There will be a shortage of food since we will have missed one of our key subsistence resources for the year and since the people of our village do not have a lot of money to buy food.

8. A year without bowhead whales also is a year of great sadness since the bowhead is the most important part of our annual celebrations -- at Thanksgiving, at Christmas, and during our local holiday celebrations -- the bowhead is what we look to share.

9. Because of the International Whaling Commission quotas imposed on my people since 1977, my village is now allowed only three (3) strikes of the bowhead whale. If a whale is struck and not landed, for any reason, then we have lost the opportunity to bring home one-third of our annual quota of bowhead whales.

10. It takes many years of experience and great skill to become a successful captain of a bowhead whaling crew. There is much to learn and one of the most important lessons that we are taught from the time that we are children and first go out to assist the crews is that noise will disturb the whales. We must be very careful about the noises we make. Some, such as scratching on the ice, will not bother the whales because they will think that it is seals scratching. But other sounds, like tapping on the ice or on the side of the boat will scare the whales away.

11. Since our Village of Nuiqsut is inland, on the Colville River, we travel by boat to the barrier islands in the Beaufort Sea to hunt the bowhead whale.

12. My fellow whaling captains and I have seen many changes in the migration of the bowhead whale when oil industry exploration activity has been going on in our hunting areas or when a drilling rig or seismic vessel has been working in the area where my fellow whaling captains and I go hunting for bowhead whales.

13. In the days before the oil industry came to Prudhoe Bay, we traveled to Pingo Island in the Jones Island area West of Prudhoe Bay to make our whaling camps. From there, we could take the bowhead whales in the waters near the islands. (See attached map.)

14. When the oil development came to Prudhoe Bay, our crews were forced to abandon Pingo Island and to travel farther east, to Cross Island, because all of the activity around Prudhoe was scaring the whales away.

15. Over by Cross Island we could find the whales again. When the Village of Kaktovik, to our east sees the whales, they call us.

16. Every fall, within three (3) to four (4) days after Kaktovik reported seeing bowheads, we would begin to see them. The bowheads would move through Camden Bay, feeding as they went, and then begin to move through the barrier islands, both on the shoreward and seaward side of the islands, again feeding as they migrated.

17. The Kaktovik hunters take their bowheads directly off the shore or within a few miles of the shore of Barter Island, where their village is located, and in the days before oil exploration activity came to the Camden Bay area, the Nuiqsut hunters would take their bowheads from the shores of the barrier islands. Then, our normal hunting route was from one (1) to five (5) or six (6) miles offshore from the islands.

18. It is very important for our hunters to be able to hunt nearshore, since our boats are very small -- average of about eighteen (18) feet with some twenty (20) feet -- and the waters of the Beaufort Sea are very rough and heavily covered in ice and very dangerous.

19. Not only is it extremely dangerous for our crews to be far from shore in those waters, if we strike a bowhead, we must be able to tow it to shore quickly for butchering, since the meat of the bowhead will begin to spoil within as few as eight (8) hours if we do not get it to shore and butcher it.

20. Since the 1970's, oil exploration, including drilling and seismic work has been going on in the Camden Bay area.

21. With the industrial activity in Camden Bay, we now see fewer and fewer bowhead whales. It is now very rare to see a bowhead swimming through the waters of the barrier islands. Where do these whales feed now?

22. Every year we tell the industry operators that they are driving the whales away and that they must stop the seismic and ice breaker operations long enough to let the whales pass. We tell this also to the U.S. National Marine Fisheries Service ("NMFS"). But no one listens.

23. The industry says that the ice drives the whales away. but we hunters know that the bowhead whale travels through ice. Before the industry, we saw whales every year -- in ice years and in open water years. With seismic and drilling WE DO NOT SEE WHALES -- in ice years or in open water years.

24. The U.S. National Marine Fisheries Service in Washington does not care about our people. According to the lawyers, they are supposed to protect us and our subsistence animals. But they say that as long as we can find animals to hunt then that means that we are not impacted.

25. THEY DO NOT CARE about our people being forty (40) miles from the shore in the Arctic Ocean just to see a whale. THEY DO NOT CARE that our whales turn into stinkers before we can tow them to shore. THEY DO NOT CARE that we lose our boats and that it can cost a captain more than a year's income to replace a boat. Will they care WHEN WE LOSE PEOPLE? I for one do not think so.

26. IN THE 1992 FALL WHALE HUNTING SEASON, the Nuiqsut whalers started heading out to Cross Island in MID-AUGUST. We would go out when the weather was decent enough to go on our small boats. This season we went NNW, North and NNE of Cross Island and out to three open leads through three icepack floes.

27. We used up our three strikes allocated to Nuiqsut by landing two whales and losing one. This 1992 fall season, the whales were going around far North of the Kuvlum Project and headed for land after they got past the Kuvlum Project area.

28. I KNOW FOR A FACT that the whales do this to avoid the tremendous noise that the Ice Breakers and the Drilling Rig made during their operation. I'm saying this because WHEN KAKTOVIK SPOT OR SIGHT abundance amount of whales, they let us know that the whales are heading our way.

29. The whalers that are based at Cross Island DID NOT get to SEE WHALES AT ALL except for a few that swam toward the land, or when we went to the North at a distance ranging from ten (10) to twenty five (25) miles and beyond.

30. In 1992, the FIRST WHALE was sighted twenty six (26) miles NNE of Cross Island on September 13, 1992. The first whale struck and landed by Roxy Oyagak, Jr. was seven (7) miles NNE of Cross Island.

31. During that time, it seems that the whales were coming towards land from the North or Northeast and they were not following their migratory path of East to West pattern as they normally do, when they are not in a DISTURBED MODE.

32. At the time the whales were sighted, they were coming toward land after they went around the Kuvlum Project site and into open water.

33. The SECOND WHALE struck was located twenty-one (21) miles NNE of Cross Island. That whale was lost in the second lead icepack with a float attached. This whale was counted as Struck and Lost for the Village of Nuiqsut.

34. THE THIRD WHALE struck was eleven (11) miles North of Cross Island. Due to strong current and drifting fresh ice forming, the current took us out fifteen (15) miles while trying to get attached to the flipper of the whale for towing.

35. After towing the whale for six (6) miles, due to fresh ice forming fast, the whale was turned over for towing by VRCA Barge, belonging to our Native Corporation, which had delivered our motor gas for our outboards. The barge also had problems going around the East side of Cross Island due to the fresh ice forming while towing.

36. The VRCA Barge took about fourteen (14) hours to go around the East side of the Island where our pulling winch is located on the South side of Cross Island. The whale's belly lost most of its muktuk from being towed all night in freshly formed ice, and because of the amount of time towing, the whale became a stinker, and all the good meat had to be thrown away. Therefore, IN 1992, WE WERE ABLE TO GET MEAT FROM ONLY ONE OF THE THREE (3) BOWHEAD WHALES ALLOCATED TO US UNDER THE IWC QUOTA.

37. This shows why it is not safe for our crews or for the whales when we must hunt very far from the shore.

38. In the 1991 fall whaling season, during the first week of September, we went out to Cross Island, and the sea had heavy ice conditions East of Cross Island. During that fall, we had to go out to the North and NNW due to heavy icepack to the East.

39. DURING THE SEASON there was drilling activity going on to the East of Cross Island which was the Hammerhead Project. We could not get near the drilling operation due to heavy pack ice in that area. When we passed Alaska Island, forty (40) miles to the east of Cross Island, we could hear the humming of the drilling rig although we could not see the rig.

40. DUE TO THAT OPERATION, we had to go out to the third open lead in the ocean to sight any whales. At that time, that was where we would locate the whales at thirty five (35) to forty (40) miles NNW of Cross Island, and due North just to sight any whales.

41. Every day that we went out to search for bowhead whales, we had to go a long ways out to the North. During this season, we went straight out as far as our maps can take us to sight the bowhead whales. We had to pass the 71 degree line on the map that we use on our GPS Sat-Nav unit.

a. The first whale was struck by Patsy Tukle's crew about fifteen (15) miles NNW of Cross Island. During the process we encountered problems with Nukapigak's crew and Tukle's crew. At that time Tukle's crew were all at the bow of their boat which was already in the water sinking. We got to the sinking boat and loaded all crew members of Nukapigak's boat. As we backed off the sinking boat about fifteen (15) feet, it sank. I took them over to where we had pulled Patsy Tukle out of the water to repair the damage on their boat.

42. We got to the ice floe where Patsy Tukle's boat was pulled up, and a few minutes after we got back to the ice floe, the other four boats arrived to the area where we pulled the damaged boat up. These four crews came around about twenty (20) minutes after we took Nukapigak's crew to the ice where the damaged boat was. At that time, all eight crews were on the ice floe exchanging words of what had happened, why Patsy's boat is damaged and how we lost one boat.

43. After repair was done on Patsy Tukle's boat, we all started out again toward the wounded whale, which, at this time was heading toward the East as located on the beeper which was attached to the float on the whale. There was a lot of ice and that's where we lost contact with the beeper. The fresh forming ice had thickened for small craft boats and it was getting late with darkness setting in. We went after the wounded whale until the locator could not locate the beeper anymore.

44. Near the shore, the ice floes were moving fast, cutting and blocking our path to the next open water. We all got to Cross Island after dark and had to use spot lights to dock for the night. The next day, we went out again but could not locate the beeper. During the night, there was strong winds.

45. A FEW DAYS LATER, we went out again after observing the direction that we all wanted to go. We went out in groups of two or three boats, going the same direction from the North to the East and Northeast, as we were heading out searching for whales beyond the second ice floe ranging from a half a mile to at least mile and a half wide ice floes that are floating on the current edge of open water.

46. At that time, the other crews that were ahead of us (Kavicikluk's and Ahkiviana's crew) indicated that they had spotted a whale.

47. SUDDENLY, we saw their boat FAR OUT to the NORTH, NORTHWEST chasing after a whale, 32 TO 33 MILES OUT. Oyagak's crew finally got close enough to harpoon the whale. The harpooned whale did not go far, as we had surrounded it so we would not lose it. It took us eight hours to tow the whale back to Cross Island. THE REASON WHY WE HAVE TO GO FAR OUT TO THE NORTH is because of drilling activity taking place at Camden Bay area.

48. EVERY TIME that there is SEISMIC AND DRILLING activity going on, our WHALE HUNTS ranges from TWENTY (20) TO THIRTY (30) MILES AND BEYOND TO THE NORTH to spot or sight any whales. HARVESTING WHALES GETS HARDER as industrial activity goes on during our hunt and not only that, the industrial activities are ALWAYS on the migratory path of our whales.

49. As the butchering of the whale went on for three days, five boats went out again to finish the final strike of the season. We went out to the NNE this time.

50. As we went out, a whale was sighted among the ice floes that are scattered all around but could be travelled on with a boat. At that time, we were about TWENTY (20) MILES NORTH NORTHEAST OF CROSS ISLAND. On the second blow of the whale, it was harpooned by Ahkiviana's crew with a float and line attached.

51. As we headed for Cross Island, the wind picked up, and the water was getting rougher as we towed the whale from twenty-five (25) miles out. At the same time, it was getting dark, the wind and waves were getting worse as we travelled with the whale.

52. As we were towing, we radioed to our Base Station for help and to have Billy Oyagak and Roxy Oyagak to come out and help us tow the whale back to Cross Island. It took them about an hour and a half to get to where we were. About half an hour after the two extra boats arrived and tied onto our towline our towline snapped in front of my boat and Donald Tukle's boat.

53. Two boats ahead of us were now loose. We held the line tight for a while but the water was getting very rough as we were trying to fix up our towline and the swells were getting larger and deeper. When we couldn't fix our towline we untied our tie string from the towline due to rough water.

54. The other boats did the same because of the rough waves, we were getting all tangled up. At that time, they decided to let the whale go, due to bad weather and rough seas. Although at the time, the other boats were trying to secure the whale with empty drums and extra floats.

55. Patsy Tukle's boat started filling up with water from the high waves. The other crew boats were nearby to help Patsy and his crew onto their boats. Patsy Tukle's boat sank after filling up with water to about a foot off the top. We were about twelve and a half (12 1/2) miles from Cross Island where we lost the whale, and help was called in to our Base Station to see if we can get a larger boat to come out and help us tow the whale.

56. We were told, at the time, that the industry boats nearby could not help tow the whale, but could help us to Cross Island. As we headed for Cross Island, WE RODE OUR SMALL BOATS ALONGSIDE THE BIG SHIP which was big enough to tow at least three to four whales at one time, and would have no problem if it had towed Ahkiviana's whale. THIS IS THE MOST SELFISH THING that I have heard from the oil industry as an excuse to come out to give a lending hand to a call of distress to Native subsistence whale hunters.

57. WHEN WE MET WITH ARCO, before we went out to go subsistence whale hunting, they talked and assured us that they would be eager to give us whalers a helping hand if we had any problems.

58. Before we met up with the ship that came to help us get to Cross Island, we had looked for an ice floe big enough to stop on to wait out the storm and rough seas. At the time, there wasn't any ice anywhere to stop on. The swells were about four to six feet deep, which we boat drivers avoid, to keep the water from getting into our boats. We would have been in a world of hurt, and have the biggest problem with the storm and the rough waters.

59. It took about six hours to get to Cross Island tagging along side this extra large boat. It took us through the East end of Cross Island and it was early morning by the time we finally got to our cabins and rested. After contacting our Base Station, we reported how and why we had to leave Ahkiviana's whale and how far out and what had happened to Patsy Tukle's sunken boat. We also reported our situation to the Alaska Eskimo Whaling Commission office in Barrow.

60. IT IS VERY HARD to get any help from the Oil Industry in any kind of whaler's distress.

61. SINCE THE OIL INDUSTRY started in our land, I for one am not satisfied with how we are being treated as subsistence whale hunters in the Beaufort Sea. The Industry does not understand the importance of our lifestyle in this harsh environment that WE, AS NATIVES must hunt to survive in order to keep on living.

62. It took us four days searching for Ahkiviana's whale, and due to lots of fresh forming ice and weather conditions we were not able to locate the dead whale. The North Slope Borough Search and Rescue with their Helicopter attempted to locate the whale with no results.

63. We should have easily located or seen it because on the whale, there was two empty 55 gallon drums, two red buoy and a 26 foot white boat that belongs to Patsy Tukle. Captain Ahkiviana took only the flippers of the whale home as a caught whale.

64. A FEW DAYS LATER, we all headed for home to Nuiqsut after our quota was exhausted. I will state again that the whales were farther out at sea although to the East and West had tremendous amounts of ice and drilling activity was taking place in the Camden Bay area during our fall whale hunt.

65. SINCE I've been going out whaling as a Captain, these are the only two seasons that our village landed whales during the seismic and exploratory drilling taking place in 1992, 1991, 1990, 1989, 1988 and 1987.

66. 1990, 1989, and 1987, it was almost impossible to get close enough to even strike any whale because they were ALWAYS ALREADY DISTURBED from the noise and sound of the activity.

67. The last whales that were caught by our crews were taken at great risk to our people and we were fortunate to catch these whales with the help of nature and not the industry or any other source.

68. I for one cannot understand why ARCO issues us SAT-NAVS and VHF radios when THEY WILL NOT HELP US WHEN WE ARE IN DISTRESS and in an EMERGENCY! All I know is that it looks good from their viewpoint. I also know that in existence is the "Fall Communications and Avoidance Procedures for the Arctic and Beaufort Sea OCS-1992" to help the subsistence whale hunter if there is an emergency and the

grant that ARCO committed the Nuiqsut and Kaktovik whaler hunters to use as emergency funds. Even still with this agreement, we have the HARDEST TIME OF GETTING HELP when we are in any emergency or in distress.

69. 1990 FALL WHALE ACTIVITY was one of the worst seasons of our whale hunting. We had open ice free waters.

70. We went out to Cross Island the FIRST WEEK OF SEPTEMBER for our subsistence whaling. During that time, the industry was doing the GALAHAD Exploratory Project, and again, oil drilling and seismic were taking place East of Cross Island.

71. Due to weather conditions, we went out four (4) or five (5) days depending on how rough the water was for our small boats. On one of the days that we went out, we sighted whales near Pole Island about a mile or two of the islands, and at the same day, whales were sighted farther out North of the islands. My crew could not get close enough to strike any whale because when they came up for air, they would blow only once or twice, and this is NOT NORMAL. The whales were already spooked as we went toward any whale.

72. When we sighted them, we would go after them to strike and as we got near the whale, they would dive and come up for air heading due North. I FOR ONE KNOW that these whales were already disturbed, and we have to do a fast chase to catch up with the whale in order to strike.

73. OF THE 1989, 1988 AND 1987 WHALE ACTIVITY, no whales were taken in 1988 and in 1987 only one whale was caught. During 1988, 1989 and 1990 there was a tremendous amount of seismic and drilling activity going on during our fall whale subsistence hunt, and these were open water seasons with very little ice around. We will go as far as we can to sight whales, and during the open water season, we stay out at least 12 to 16 hours, and sight no whales at all. And guess why this happens? And why we could not sight any whales at all?

74. Every year, Kaktovik is telling us that there are a lot of whales passing through, and most of the time, we could not see the whales at all, no matter how far East and North we went.

75. NOWADAYS, it is surprising to sight whales near the islands. Before the industry went out in the ocean to do

exploratory drilling and seismic, the whales follow their migratory path from East to the West. BUT NOT NOW!!!

76. The Oil Industry keeps continuing, the whales are getting farther out to the sea to head back where they winter.

Most of the time when Kaktovik sights a whale, they would let us know at Cross Island, and alot of times, we do not see even one whale go by.

77. IT IS VERY HARD to try and subsist as Oil Industry activity goes on.

78. The seismic ship that the Industry uses is a very loud machine, you can hear the boom although the ship is out of sight, and the tremor can be felt from the island while you are sitting around. We are the ones who can feel this because we live with it.

79. THIS CONCLUDES my statement of fall Whaling activity and the Oil Industry.

I DECLARE UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT.

EXECUTED THIS _____ day of August, 1993.

FRANK LONG, JR., NUIQSUT WHALING CAPTAIN
AND AEWK COMMISSIONER FOR NUIQSUT

The AEWK is submitted these comments on behalf of Frank Long Jr. The original was signed and submitted in 1993 as court documents. Dated this 5th day of March, 1997.

Maggie Ahmaogak, Executive Director
Alaska Eskimo Whaling Commission

**STATEMENT OF THOMAS NAPAGEAK
WHALING CAPTAIN FOR NUIQSUT**

My name is Thomas Napageak, a whaling captain from the village of Nuiqsut, Alaska. I am the Commissioner to the Alaska Eskimo Whaling Commission for Nuiqsut. I am testifying to actual experiences and incidents related to Nuiqsut whaling during the Kuvlum Project. Whenever kuvlum Project is mentioned, it relates to seismic activities that interfered with Nuiqsut whaling off of Cross Island.

During the Kuvlum project and seismic activities during Nuiqsut fall whaling, the whales we pursued were already spooked from other disturbances than whaling boats. They were as far as third ice floes, some thirty miles from Cross Island that were seen that year. In other words, all whales pursued seemed already spooked. Spooked whales were surfacing just with their blowholes (noses). Ice floes were in three parts. The first ice floe was approximately 17 miles, and no whales were sighted. We passed this ice floe, and then into the next ice floe, and no major ice pack was present or visible.

During the good sea condition, near the third ice floe approximately 30 miles offshore, Archie Ahkiviana, a whaling captain from Nuiqsut caught a whale near the third ice floe approximately 30 to 35 miles North of Cross Island.

Within about three hours, adverse weather conditions endangered all whaling boats that were towing the whale. Patsy Tukle's boat sank during this incident. Roxy Oyagak's boat rescued Patsy Tukle's crew from their sinking boat. This was a near fatal incident for the Nuiqsut whalers. After Patsy Tukle's boat sank, and emergency assistance was called for and requested through their communications system from the Kuvlum project. Request was recognized by the industry and assisted the whalers to return safely to Cross Island with help of industrial ship or barge although adverse weather persisted in the night.

The whale was abandoned and lost due to distance and adverse weather condition. Prior to Kuvlum project and other offshore seismic and drilling activity's interference of migrating whales, whales normally were seen and caught near Cross Island.

This incident is descriptive to pursuing spooked whales. The spooked whales are attested to seismic activities during the evenings as seen from Cross Island by whalers. These whales were still swimming way out to sea Northward when encountered by Nuiqsut whalers that season.

Traditionally and historically, whalers were normally disciplined not to pursue spooked whales. However, during hard times, and at least one whale was sought by Nuiqsut whalers during this pursuit. Taking a chance or risk was taken due to Kuvlum project and seismic work being conducted during subsistence whaling. This industrial interference is detrimental to safety and nutritional needs of the Nuiqsut community.

The following whalers are witnesses to this particular incident. Roxy Oyagak, Jr., Eli Nukapigak, Archie Ahkiviana, Thomas Napageak, Taalak's crew, Patsy Tukle's crew, and Frank Long Jr.'s crew.

Signed this 4th day of March, 1997.

Thomas Napageak
Thomas Napageak

Attested By:

Archie Ahkiviana
Archie Ahkiviana

George Taalak
George Taalak

Eli Nukapigak
Eli Nukapigak

Roxy Oyagak, Jr.
Roxy Oyagak, Jr.

**STATEMENT
OF
THOMAS NAPAGEAK**

My name is Thomas Napageak. I am the AEWK Commissioner for the village of Nuiqsut, Alaska. This testimony is from my actual experience as a subsistence hunter and a whaling crew member.

I am one of the registered whaling captains of the Nuiqsut Whaling Captains' Association which has 11 whaling captains registered with the Alaska Eskimo Whaling Commission (AEWC) with over forty plus crew members.

The NWCA has a five man Board of Directors, who meet on a regular basis and discuss issues that impact our subsistence whaling activities. The NWCA is a member of the AEWK, of which the NWCA elects its own Commissioner to serve on the AEWK.

The NWCA has gone on record opposing the ARCO Operations , the Kuvlum Prospect in Camden Bay. Our opposition is based on our experience of what happened in the fall of 1989 in Cross Island

The area that Kuvlum was working on was three miles wide by six miles long or 18 square miles. The work was done so a bottom founded drilling platform could be set in place.

In 1989, two whales were taken 20-35 miles North of Cross Island. Both whales were lost due to distance and adverse weather.

Our crew had to travel approximately 35 miles, one way between the finding and taking of the two whale for the village. However, they were lost.

It is very important to remember that the Kuvlum activity has had two major "noise makers" going on at the same time. These are : 1) drilling and associated activities (icebreakers, resupply ships, tugs, helicopters; and 2) the noise of the seismic exploration device and the noise of the seismic vessel.

Based on the industrial activity , there is an unmitigable adverse impact on the village of Nuiqsut on subsistence whaling. i.e. 1) by causing the whales to abandon the hunting area, and 2) directly displacing the subsistence whalers, and 3) placing physical barriers between the subsistence whalers and marine mammals, including altering the normal bowhead whale migration route.

One very important reminder to MMS is that seismic activities displaces the whales from their normal migration route and this to us is an unmitigable impact.

I would like to see a better improved site monitoring plan.

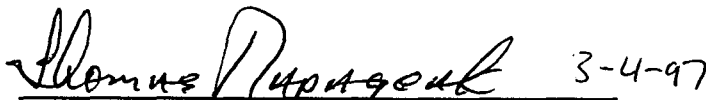
The subsistence bowhead whaling communities of Nuiqsut and the AEWK have tried to work with the industry to reduce the injuries to our whalers and to our whale hunt from the industry operations. In past years, we have had the Fall Conflict Avoidance and Communications Agreement (Plan of Cooperation). But this has not kept the industry from driving our whales away from their normal migration route.

Our elders have begun to question the wisdom of these types of agreements. They tell us that we are entering agreements with those who drive the whales away from their migration path and their food. They tell us that we are entering agreements with people who do not care about the whales.

Our elders and our traditional religious leaders tells us that the whales know what we do. If we enter into agreements with agencies who do not honor the whales, the whales will know this and they will stop coming to us.

These types of agreements have not helped us and has driven the whales away from us. We must and have to listen to our elders and to our traditional religious leaders. We cannot have agreement with agencies who drive the whales from the path where they migrate and find their food!

SIGNED this 4th day of March, 1997.


**Thomas Napageak, AEWK Commissioner
and a Nuiqsut Whaling Captain**

**STATEMENT
OF
ELI NUKAPIGAK**

My name is Eli Nukapigak. I am a whaling crew member for the Nukapigak Crew from the village of Nuiqsut, Alaska. This testimony is from my actual experience as a subsistence hunter and a whaling crew member.

I am a crew member to one of the registered whaling captains of the Nuiqsut Whaling Captains' Association which has 11 whaling captains registered with the Alaska Eskimo Whaling Commission (AEWC) with over forty plus crew members.

The NWCA has a five man Board of Directors, who meet on a regular basis and discuss issues that impact our subsistence whaling activities. The NWCA is a member of the AEWC, of which the NWCA elects its own Commissioner to serve on the AEWC.

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In 1989, two whales were taken 20-35 miles North of Cross Island. Both whales were lost due to distance and adverse weather.

Our crew had to travel approximately 35 miles, one way between the finding and taking of the two whale for the village. However, they were lost.

It is very important to remember that the Kuvlum activity has had two major "noise makers" going on at the same time. These are : 1) drilling and associated activities (icebreakers, resupply ships, tugs, helicopters; and 2) the noise of the seismic exploration device and the noise of the seismic vessel.

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I would like to see a better improved site monitoring plan.

The subsistence bowhead whaling communities of Nuiqsut and the AEWC have tried to work with the industry to reduce the injuries to our whalers and to our whale hunt from the industry operations. In past years, we have had the Fall Conflict Avoidance and Communications Agreement (Plan of Cooperation). But this has not kept the industry from driving our whales away from their normal migration route.

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SIGNED this 4th day of March, 1997.

***Eli nukapigak* 3-4-97**
Eli Nukapigak, a Nuiqsut Whaling Crew Member
NUKAPIGAK CREW

**STATEMENT
OF
ROXY OYAGAK, JR.**

My name is Roxy Oyagak, Jr. I am a whaling captain from the village of Nuiqsut, Alaska. This testimony is from my actual experience as a subsistence hunter and a whaling crew member.

I am one of the registered whaling captains of the Nuiqsut Whaling Captains' Association which has 11 whaling captains registered with the Alaska Eskimo Whaling Commission (AEWC) with over forty plus crew members.

The NWCA has a five man Board of Directors, who meet on a regular basis and discuss issues that impact our subsistence whaling activities. The NWCA is a member of the AEWC, of which the NWCA elects its own Commissioner to serve on the AEWC.

The NWCA has gone on record opposing the ARCO Operations , the Kuvlum Prospect in Camden Bay. Our opposition is based on our experience of what happened in the fall of 1989 in Cross Island

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The subsistence bowhead whaling communities of Nuiqsut and the AEWC have tried to work with the industry to reduce the injuries to our whalers and to our whale hunt from the industry operations. In past years, we have had the Fall Conflict Avoidance and Communications Agreement (Plan of Cooperation). But this has not kept the industry from driving our whales away from their normal migration route.

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These types of agreements have not helped us and has driven the whales away from us. We must and have to listen to our elders and to our traditional religious leaders. We cannot have agreement with agencies who drive the whales from the path where they migrate and find their food!

SIGNED this 4th day of March, 1997.



Roxy Oyagak, Jr. , a Nuiqsut Whaling Captain

Barrow Whaling Captains Association

General Delivery
Barrow, Alaska 99723

SEISMIC BOAT INTERFERENCE WITH BOWHEAD WHALES OFF POINT BARROW DURING FALL OF 1979, 1980, AND 1981

During the fall of 1979, 1980 and 1981 at least 3 hunting boats were actively searching for bowhead whales north and northeast of Point Barrow. Unfortunately we saw no bowhead whales. Our searches were frequent enough so that we should have encountered many whales if the conditions were normal. Unfortunately the conditions were not normal, there was seismic exploration going on. During our searches we repeatedly saw and heard seismic boats. There were also times when we could hear the "booms" of the boats but could not see them because they were over the horizon.

We were very discouraged. We were firmly convinced that the reason we did not see whales, where we should have seen whales, was because the noise from the seismic boat displaced the whales.

The boats from Barrow active during the searches were those of Burton Rexford, Raymond Kalayuak, and Joash Tukle. Crew members during this time included: Ben Itta, Nathaniel Napageak, Ralph Ahkivgak, George S. Leavitt, Frank Lampe, Julius Rexford, Clarence Tukle, Alfred Tukle, Clifford Daniels, Fred Nukapigak, Eli Tukle, George Ahkiviana, Joseph Savgak, Edward Ahyakak, James Ahyakak, Jimmy Sikvayugak, Frank Segevan and David Kippi.

I attest that the above statement is true to the best of my recollection.

Burton Rexford *3/4/97*

Burton Rexford

TESTIMONY OF BURTON "ATQAAN" REXFORD

My name is Burton "Atqaan" Rexford. I was born in 1930 at Pt. Barrow "Nuvuk", Alaska. Unlike other boys of the village of Barrow, my observation of sea mammals began at an early age of 6 years old. My grandparents (David Ergayak and Salomi Kounularuak) were the last residents of Pt. Barrow "Nuvuk", Alaska. My aunt (Mary Saganna) and I would hunt daily for food such as snipes along the beach shore line of Pt. Barrow "Nuvuk", Alaska. Often we would observe the fall migration of belugas and bowhead whales about twenty five yards from the beach shore line. I was ten years of age when my father introduced me to the spring migration whale hunt at Barrow, Alaska. We did not have dog teams to assist us in transporting our whaling equipment, and necessary supplies. The results are very clear. Manual horse power (Eskimo labor) was used in pulling the 30-foot Boston Whaler boat "wooden hull" over the ice pressure ridges.

Since 1940, I have been an active whaling crew member and captain. Like many other Eskimo whaling captains, it is with great discretionary measures that I submit my factual findings from actual experiences. Throughout my 53 years of whaling in villages ranging from Pt. Hope, Barrow and Pt. Barrow "Nuvuk", I have personally, like many other whalers, observed the impact of industrial noise interference on bowhead whales.

In 1943, I was one of the crew members to whaling captain, Anthony Kipuqaurak Webber of Pt. Hope, Alaska during the spring migration bowhead whale hunt.

During the years 1943 thru 1948, while resident of Kotzebue, Alaska, during each summer after winter ice break-up, I would observe beluga whales localize ten to fifteen yards from beach shoreline. Direct migration contact with beluga and bowhead whales has been a continual behavior observed by me.

In 1948, I returned to Barrow, Alaska. I did not waste valuable time. I made crew member to whaling captain, Mr. William Enugruak Leavitt, Sr., the son of the yankee whaling ship captain, Mr. George Leavitt, Sr.

Since 1950, I have been an active participant in the fall migration hunt of the bowhead whale. Since time immemorial, Pt. Barrow "Nuvuk", Alaska has always been both a staging area and strategic location for Eskimo's fall bowhead whale hunt. The migration routes are unpredictable due to nature's conditions. However, the Eskimo elder bowhead whalers have clearly identified these

Testimony of Burton "Atqaan" Rexford

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localization of the bowhead whales' natural habitat and are described as follows:

Pt. Barrow "Nuvuk"
Eluitquak Island
Taupkaluk Island
Cooper Island
Martin Island, and East beyond Martin Island

SEISMIC BOAT ACTIVITY ENVIRONMENTAL IMPACT VS. BOWHEAD WHALE FALL MIGRATION LOCALIZE HABITAT AREAS:

Over the recent years, Oil Industry seismic activity came into our hunting grounds of the bowhead whale. The vast amount of Beaufort Sea waters, where the seismic boat work area parameters are clearly identified as approximately 20-30 miles NNE off Cape Simpson "Tulimanik" and approximately 20-30 miles North off Pt. Barrow "Nuvuk", Alaska through the bowhead whale migration routes in the Beaufort Sea waters and through the bowhead whale natural habitat areas, Migration Route.

In 1979, 1980 and 1981, the Barrow whaling captains experienced far greater magnitude from geophysical seismic activity ranging from Pt. Barrow "Nuvuk" to east of Cape Simpson. In 1979 thru 1980 fall whaling season, there was no bowhead whales sighted, neither was there any gray whales, beluga whales and bearded seals. In 1981 fall whaling season, there were no bowhead whales, beluga whales, gray whales and bearded seals sighted. Prior to October 6, 1981, east of Pt. Barrow "Nuvuk", the ice flow grounded and caused the thin ice to form, making scouting for whales impossible, and therefore resulting in a third whaling captain to retreat for the season. Whaling captains Raymond Kalayuak and Burton Rexford sighted whales on October 6, 1981 in the late afternoon, and none thereafter. During 1981, we attempted to spot whales with a twin otter aircraft, and in doing so, spotted a single whale north of "Nuvuk" 38 miles and another single whale 42 miles north of "Nuvuk". The whalers attesting to these events are the following: Captains Raymond Kalayuak, Joash Tukle and Burton Rexford. Whaling crew members for the 3-year duration: Ben Itta, Nathaniel Napageak, Ralph Ahkivgak, George S. Leavitt, Frank Lampe, Julius Rexford, Clarence Tukle, Alfred Tukle, Clifford Daniels, Fred Nukapigak, Eli Tukle, George Ahkiviana, Joseph Savgak, Edward Ahyakak, James Ahyakak, Jimmy Sikvayugak, Frank Segevan and David Kippi.

Testimony of Burton "Atqaan" Rexford

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In one of these years, I, along with my two colleagues, and their crew members have completely exhausted these locations and beyond. For one entire month of September, we exhausted our attempts to locate the bowhead whale migration, and ended with the results being zero, not only the bowhead whale was zero, also the beluga whale and gray whale activity was zero. While we searched for bowhead whales, we could hear the seismic boat, but we could not see the boat because it was over the horizon. We knew it was a seismic boat because we could hear the loud blasts of the airguns. All during the time we heard the seismic blasts, we did not see any whales. Then the seismic boat stopped running the airguns and pretty soon after that, we started to see some whales.

My same two colleagues and our crew members repeated this process in other years with offshore activity and came up with the same results. One of my two colleagues and our crew members there, after going through the same process, again the end results were the same. In any event, my colleagues and crew members clearly experienced the lowest morale character of their lifetime in whaling activities. After a thorough coverage of what used to be our whale hunting grounds, my colleagues and the crew members attempted to go beyond the parameters of the seismic work area. In spite of the endangerment of human life, these attempts were repeatedly executed, and the end results stayed the same. I am privileged to share the honor, dignity, and humiliation of my colleagues and crew members who inherited these events from those seismic boat activities.

In 1993, THE ARCO PROPOSED GEOPHYSICAL (SEISMIC) PROGRAM is located 35 miles west of Barter Island, and 70 miles east of Cross Island. Best mathematics can shrink the impact zone as illustrated on map. This work commences July-October 1993. The geophysical seismic activity can only be done in ideal weather conditions, the same conditions whalers look forward to. The oil industry will allude to the following measurements, that seismic activity will not occur 10% of the whole duration. This factor does not give us enough allowances for bowhead whales to resume their normal migration route. The seismic vessel will exercise intervals every 10-12 seconds of discharging airgun. This magnitude of geophysical seismic program is largest of its kind in Outer-Continental Shelf history in the Beaufort Sea.

My honor and dignity as a Whaling Captain are of the utmost importance to my peers and colleagues in the Barrow Whaling Captains Association and the Alaska Eskimo Whaling Commission.

Testimony of Burton "Atqaan" Rexford

PAGE 4

Without honor and dignity, a whaling captain loses face with the whaling community and loses respect and prestige one attains through many years of involvement as a member of the whaling community.

SIGNED this 4th day of March, 1997

Burton Rexford, Chairman of AEWC
and a Barrow Whaling Captain

AFFIDAVIT

OF

BURTON "ATQAAN" REXFORD

- A. My name is Burton "Atqaan" Rexford. I was born in 1930 at Pt. Barrow "Nuvuk", Alaska and now reside in Barrow, Alaska.
2. I am a whaling captain and the Chairman of the Alaska Eskimo Whaling Commission ("AEWC"), which is made up of ten (10) subsistence villages: Gambell, Little Diomedede, Wales, Savoonga, Kivalina, Point Hope, Wainwright, Barrow, Nuiqsut and Kaktovik.
3. This testimony is from my actual experience as a subsistence hunter and a whaling captain.
4. As a whaling captain, I am responsible for feeding my community and for the safety of my crew. For my people, the greatest honor is to be a whaling captain, but it is also the greatest responsibility. You must consider many things to become a whaling captain because once you do, the community will depend on you and you cannot let your family and your community down.
5. As a Commissioner to the AEWC and the Chairman of the AEWC, I am responsible for making sure that ten (10) villages are fed and that 150 to 160 crews are able to hunt as safely as possible. This is a very great honor and responsibility. All of our villages look to the AEWC to protect the bowhead and our subsistence hunt.
6. My honor and dignity as a Whaling Captain are of the utmost importance to my peers and colleagues in the Barrow Whaling Captains Association and the Alaska Eskimo Whaling Commission.
7. Without honor and dignity, a whaling captain loses face with the whaling community and loses respect and prestige one attains through many years of involvement as a member of the whaling community.
8. Like many other Eskimo whaling captains, it is with great care and much thought that I submit my factual findings from actual experiences. Throughout my 53 years of whaling in villages ranging from Pt. Hope, Barrow and Pt. Barrow "Nuvuk", I have personally, like many other whalers, observed the impact of noise interference on bowhead whales.
9. In the spring, when we hunt in the ice leads, we must use the umiaq, made of bearded seal skin. The umiaq is

light to carry when you travel to the ice edge and it is
silent in the water. You cannot use an aluminum boat in
the ice leads because the sound of the water on the side of
the boat will scare the bowhead whale.

10. You must paddle silently in the water because the sound of the paddle in the water will scare the bowhead.
11. You must wear white parkas on the ice because if you don't, the whales will see you when they surface.
12. These are only some of the things that a whaler must know. There are many other things, but the most important is to respect the whale and its home.
13. The bowhead has been called the "ice whale" because it travels through the ice. The Eskimo have been called "the people of the ice whale" because without the bowhead we would not exist.
14. The bowhead is our brother. Our elders tell us that the whales present themselves to us so that we may continue to live. If we dishonor our brother or disturb his home, he will not come to us anymore.
15. The bowhead hunt is very dangerous. We must use our small boats in very rough and icy waters. In order to strike the whale you must be very close. You must be right on top of the whale because we use the hand-held harpoon with the darting gun attached.
16. I have attached a brochure to this affidavit. It shows our umiags used in the spring hunt and our harpoons. It also tells how important the bowhead is to our people.
17. In the fall, the water is too rough for the umiags and we do not have the ice leads like in the spring, so we hunt from small boats with outboard motors. Most of our boats are eighteen (18) footers. There are some twenty (20) footers and a few twenty-four (24) footers. Most of these are open boats. Some of the larger ones have canopies and a few of the large ones have a cabin.
18. The average crew size is three (3) people. A lot of the smaller boats can use only two (2) crew members.

19. The smaller boats are easier to maneuver in the ice and very few people can afford to buy a big boat. So most crews use what's called a modified eighteen footer. We use plywood to build up the sides of the boat about twelve (12) inches to help keep the boat from being swamped in the big swells.

20. Once you get very far offshore, the swells can get to be pretty big -- three (3) to six (6) feet or more feet. This can swamp a small boat.

21. In the fall, the weather is very unpredictable and you can't get local weather forecasts. The forecasts usually come in from Fairbanks.

22. The winds also are very unpredictable. We don't go out if the wind is over fifteen (15) knots. The west wind can come up suddenly and the crews get caught if they are very far from shore. If the wind does not get over twenty (20) knots, we can still navigate, but more than twenty (20) knots we can't navigate.

and 23. We have to hunt near shore because of the heavy seas, the wind. If you go too far out, you have much less chance of getting your catch home. The ocean offshore of Cross Island is a much more difficult hunting area than where the Barrow whalers hunt. The area of water they hunt in is less salt-free, and therefore, the young ice (slush ice) forms overnight when the temperatures are below freezing. They have to go through this young ice to get to the open water to hunt for the bowhead whale. The crews have to navigate through drifting icebergs also, which moves along with the current. During fall whaling, there is about 12 hours of daylight to do hunting. Usually whaling crews head out at about 6:00 am and continue hunting until dusk, which is about 7:00 pm. When you are towing a whale and it gets dark, you have to rely on a compass to find your way to the shore for harvesting the whale. Towing a whale that measures between 35-50 feet long takes about 10 hours to tow the whale a distance of 25 miles. The meat starts to spoil anywhere between 12-24 hours after the whale is caught, depending on the size of the whale. It takes about 12 hours to travel 30 miles north of Cross Island, where the Nuiqsut whalers have had to go to scout for whales and tow the whale back to shore, where the meat begins to spoil. The winds can change rapidly where you are out hunting and/or towing a whale when high winds can gust up to 25 knots, increasing the swells of the waves making it extremely dangerous for swamping boats. The pack ice can move in unexpectedly closing the waters.

24. Like many boys of the village of Barrow, my observation of sea mammals began at an early age of 6 years old.
25. My grandparents (David Ergayak and Salomi Kounularuak) were the last residents of Pt. Barrow "Nuvuk", Alaska. My aunt (Mary Saganna) and I would hunt daily for food such as snipes along the beach shore line of Pt. Barrow "Nuvuk", Alaska.
26. Often we would observe the fall migration of belugas and bowhead whales about twenty five yards from the beach shore line.
27. Since 1940, I have been an active whaling crew member and captain.
28. I was ten years of age when my father introduced me to the spring migration whale hunt at Barrow, Alaska. We did not have dog teams to assist us in transporting our whaling equipment, and necessary supplies. The results are very clear. Manual horse power (Eskimo labor) was used in pulling our equipment over the ice pressure ridges.
29. Since 1950, I have been an active participant in the fall migration hunt of the bowhead whale.
30. In 1943, I was one of the crew members to whaling captain, Anthony Kipuqaurak Webber of Pt. Hope, Alaska during the spring migration bowhead whale hunt.
31. During the years 1943 thru 1948, while resident of Kotzebue, Alaska, during each summer after winter ice break-up, I would observe beluga whales localize ten to fifteen yards from beach shoreline. Direct migration contact with beluga and bowhead whales has been a continual behavior observed by me.
32. In 1948, I returned to Barrow, Alaska. I did not waste valuable time. I made crew member to whaling captain, Mr. William Enugruak Leavitt, Sr., the son of the yankee whaling ship captain, Mr. George Leavitt, Sr.
33. Since time immemorial, Pt. Barrow "Nuvuk", Alaska has always been both a staging area and strategic location for Eskimos' fall bowhead whale hunt. The Eskimo elder bowhead whalers have clearly identified these localization of the bowhead whales' natural habitat and feeding areas and are described as follows:

Pt. Barrow "Nuvuk"
Eluitquak Island
Taupkaluk Island
Cooper Island
Martin Island, and East beyond Martin Island.

34. These are the barrier islands where the Barrow whalers
go in the fall to look for the bowhead whale. From one (1)
to ten (10) miles offshore of these barrier islands the
bowheads mill and feed. You always see a lot of bowheads
here as long as there is no industry.

35. Over the recent years, Oil Industry seismic activity
came into our hunting grounds of the bowhead whale. The vast
amount of Beaufort Sea waters, where the seismic boat
work area parameters are clearly identified as
approximately 20-30 miles NNE off Cape Simpson
"Tulimanik" and approximately 20-30 miles North off Pt.
Barrow "Nuvuk", Alaska through the bowhead whale
migration routes in the Beaufort Sea waters and through
the bowhead whale natural habitat areas.

36. In 1979, 1980 and 1981, the Barrow whaling captains
experienced far greater magnitude from geophysical
seismic activity ranging from Pt. Barrow "Nuvuk" to east
of Cape Simpson.

37. In 1979 thru 1980 fall whaling season, there was no
bowhead whales sighted, neither was there any gray
whales, beluga whales and bearded seals.

38. In 1981 fall whaling season, there were no bowhead
whales, beluga whales, gray whales and bearded seals
sighted. Prior to October 6, 1981, east of Pt. Barrow
"Nuvuk", the ice flow grounded and caused the thin ice to
form, making scouting for whales impossible, and
therefore resulting in a third whaling captain to retreat
for the season.

39. Whaling captains Raymond Kalayuak and Burton Rexford
sighted whales on October 6, 1981 in the late afternoon,
and none thereafter. During 1981, we attempted to spot
whales with a twin otter aircraft, and in doing so,
spotted a single whale north of "Nuvuk" 38 miles and
another single whale 42 miles north of "Nuvuk".

40. The whalers attesting to these events are the following:
Captains Raymond Kalayuak, Joash Tukle and Burton
Rexford. Whaling crew members for the 3-year duration:
Ben Itta, Nathaniel Napageak, Ralph Ahkivgak, George S.
Leavitt, Frank Lampe, Julius Rexford, Clarence Tukle,

Alfred Tukle, Clifford Daniels, Fred Nukapigak, Eli Tukle, George Ahkiviana, Joseph Savgak, Edward Ahyakak, James Ahyakak, Jimmy Sikvayugak, Frank Segevan and David Kippi.

41. In one of these years, I, along with my two colleagues, and their crew members have completely exhausted these locations and beyond. For one entire month of September, we exhausted our attempts to locate the bowhead whale migration, and ended with the results being zero, not only the bowhead whale was zero, also the beluga whale and gray whale activity was zero.

42. While we searched for bowhead whales, we could hear the seismic boat, but we could not see the boat because it was over the horizon. We knew it was a seismic boat because we could hear the loud blasts of the airguns.

43. All during the time we heard the seismic blasts, we did not see any whales. Then the seismic boat stopped running the airguns and pretty soon after that, we started to see some whales.

44. My same two colleagues and our crew members repeated this process in other years with offshore activity and came up with the same results. One of my two colleagues and our crew members there, after going through the same process, again the end results were the same.

45. In any event, my colleagues and crew members clearly experienced the lowest morale of their lifetime in whaling activities. After a thorough coverage of what used to be our whale hunting grounds, my colleagues and the crew members attempted to go beyond the parameters of the seismic work area.

46. In spite of the endangerment of human life, these attempts were repeatedly executed, and the end results stayed the same. I am privileged to share the honor, dignity, and humiliation of my colleagues and crew members who inherited these events from those seismic boat activities.

47. In 1993, THE ARCO PROPOSED GEOPHYSICAL (SEISMIC) PROGRAM is located 35 miles west of Barter Island, and 70 miles east of Cross Island. This work planned for July-October 1993. The geophysical seismic activity can only be done in ideal weather conditions, the same conditions whalers look forward to.

48. The oil industry will allude to the following measurements, that seismic activity will not occur 10% of the whole duration. This factor does not give us enough allowances for bowhead whales to resume their normal migration route.

49. Doug Bremner for ARCO announced at a meeting held in Seattle on February 24 and 25, 1993, attended by AEWC, North Slope Borough, NMFS, MMS and ARCO, to review ARCO's 1992 monitoring results, that in 1993 the seismic vessel will exercise intervals every 10-12 seconds of discharging airgun 24 hours a day. This magnitude of geophysical seismic program is the largest of its kind in Outer-Continental Shelf history in the Beaufort Sea.

50. With this much activity, they should stop when the bowheads start to migrate through. Kaktovik is on the eastern end of Camden Bay. Once the whales start to migrate past Kaktovik, that is when the noise in the Camden Bay area should be shut down in order to keep the migration from going offshore.

51. We cannot say for certain when the migration will start. In some years Kaktovik will see bowheads in mid-July. In 1992, Barrow, about 300 miles west of Kaktovik, struck its first whale on August 31.

52. In most years, Kaktovik will start to see the whales sometime around the end of August and the hunt for Kaktovik and Nuiqsut will go through early to mid October, depending on the weather, ice and the amount of industrial activity.

53. When there is a lot of industrial activity in a year, sometimes the crews will stay out longer, trying to find the whales or waiting for the seismic boats to shut down to see if the whales come back.

54. We have met with the National Marine Fisheries Service many times over the years and we have commented on all of their notices in the Federal Register. But this does no good.

55. They say that we cannot prove that the whales are driven away even though our people tell them that the whales are not here.

56. They say that if we can find whales then we are not impacted, but some years our crews must go thirty (30), forty (40) or even fifty (50) miles to find whales that used to be right offshore, and then maybe they lose the whale or it turns into a stinker before they get it to

shore or they lose their boat.

57. Our people have lived here since time immemorial. We have hunted the bowhead and the other animals of the Arctic for thousands of years.

58. If they can take the oil from the offshore waters without driving the bowhead whales and our other resources away, our people do not oppose them. But if the AEWC and the whaling captains allow the industry and the Federal Government to drive the bowhead whales away, our subsistence whaling culture will die and we will have nothing to give our children.

59. We have approached the agency many times over the years to try to get better monitoring so that we can have scientific evidence of the impacts of the OCS activity on the bowhead whales. And we ask the agency over and over for mitigation of impacts to the whales and to our subsistence hunt. Always, the agency tells us that they will consider our requests but can only do as much as the operator is willing to do.

I DECLARE UNDER PENALTY OF PERJURY THAT THE
FOREGOING IS TRUE AND CORRECT.

EXECUTED THIS _____ day of August, 1993.

Burton Rexford, Chairman of AEWC
also a Barrow Whaling Captain

**STATEMENT
OF
GEORGE TAALAK**

My name is George Taalak. I am the son of the late Sam Taalak, one of the registered whaling captains of the village of Nuiqsut, Alaska. I am attesting to my father's statement and submitting to Minerals Management Service as my testimony. COPY OF SAM TAALAK'S STATEMENT ATTACHED.

Sam Taalak's original statement was one of the documents submitted for court in the Kuvlum litigation in 1993, and is herewith submitted as my testimony.

Signed this 4th day of March, 1997.



George Taalak, Whaling Crew Member
SAM TAALAK'S CREW

SAM TALAAK'S STATEMENT

A My name is Sam Talaak. I live in the Village of Nuiqsut, Alaska.

2. I am one of the ten (10) whaling captains of Nuiqsut, registered with the Alaska Eskimo Whaling Commission.

3. I have hunted the bowhead whale as a member of a subsistence whaling crew for over 55 years. I have been the captain of my own crew for over 35 years.

4. This testimony is from my actual experience as a subsistence hunter and a whaling captain.

5. In the days before oil exploration activity came to the our subsistence whale hunting area of Camden Bay, we Nuiqsut hunters would take our bowheads from the shores of the barrier islands. Our normal hunting area was from one (1) to five (5) or six (6) miles offshore from the islands.

6. The Kaktovik hunters to our East tell us every year when they see the whales and they take their bowheads directly off the shore or within a few miles of the shore of Barter Island, where their village is located.

7. Before the oil industry, the bowheads would pass Barter Island and move into Camden Bay, milling around and feeding. Three (3) or four (4) days after we hear that Barter Island sees whales, we would see the bowheads around the shores of the barrier islands.

8. But now, the whales pass Barter Island but they do not come the same direction through Camden Bay into the waters around our barrier islands. There is so much noise and so much traffic that the bowheads disappear and in some years our crews in our small boats almost get run over by the big industry boats.

9. Our arctic environment is treacherous, but we know how to survive. With the oil industry it is more treacherous and they take away our resources that allow us to survive.

10. With terrible fall storms, snows, rough waters and ice, when we finally can hunt, we find ourselves in direct

competition with the transport system of the oil exploration along our historical bowhead whale hunting routes.

11. When the drill rigs are in the area and the seismic and vessel traffic, the bowhead whales definitely change their regular routes. Time and time again we make trips all the way to Flaxman Island following the historical fall migration routes and produced NOTHING! NOTHING! NOTHING!

12. When the drilling or seismic is present, our crews must travel anywhere from eleven (11) to thirty (30) miles or more north of the barrier islands even to spot bowhead whales.

13. In addition, helicopters are an everyday curse to the whalers. It is not unusual to have helicopters fly over while looking for whales just a few miles offshore. Supply vessels also utilize the same routes the bowhead whale uses.

14. It is not unusual to travel along side of barges and other industry vessels while hunting. Alternate routes can be used by oil industry without hardship. Land routes can be utilized by helicopters heading to Kuvlum sites instead of island hopping.

15. In all of my 55 plus years as a subsistence hunter, I have never seen as much disturbance and difficulty hunting as I see in the past few years.

16. I have never seen crews traveling so far from the land to find the whales that we must have to survive.

17. The industry is robbing us of our bowhead whales and I know that our other subsistence resources are being impacted to. You cannot even travel on the ice around our villages in the winter because there are so many seismic lines that you have to always stop not to get caught in them. The seals and polar bears will get caught in these lines too as the ice melts. But no one except the Eskimo is here to protect these wildlife.

18. I know that our lives are threatened. If our

subsistence whale hunters continue to go farther out to find the whales, one year we will lose a crew. In the last two years we have lost two boats because the crews were so far from shore in very rough seas. Maybe the next time we will lose the crew and the boat.

19. But we must hunt. It is how our people survive our harsh arctic environment. If we do not hunt, we will starve and we will not be Eskimos anymore. The oil industry is driving our bowhead whales away. But without the bowhead, we cannot be Eskimo.

20. I say this in written words so that the world will know. The oil industry has invaded our Beaufort Sea waters and they are holding a gun to the head of my Native people.

I DECLARE UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT.

EXECUTED THIS _____ day of August, 1993.

Signed on Original document submitted for courts.
Sam Taalak is now deceased and his statement is being attested by his son George Taalak and submitted with George Taalak's statement.

SAM TALAAK, NUIQSUT WHALING CAPTAIN

**FOR IMMEDIATE DISTRIBUTION
PRESS RELEASE
AEWC AND NORTH SLOPE BOROUGH FILE LAWSUIT
IN KUVLUM PROJECT DISPUTE**

(THIS PRESS RELEASE CONTAINS 1: UPDATED INFORMATION ON THE LAWSUIT FILED BY THE ALASKA ESKIMO WHALING COMMISSION (AEWC) AND THE NORTH SLOPE BOROUGH (NSB) 2: BACKGROUND INFORMATION ON THE STEPS THAT LED TO THE FILING OF THE LAWSUITS STARTING WITH THE PUBLIC HEARINGS HELD IN BARROW ON JUNE 4 AND 5 3: ATTACHMENTS, INCLUDING SUPPORTING LETTERS AND LETTERS FROM. GEORGE TAGAROOK OF KAKTOVIK.

NORTH SLOPE BOROUGH MAYOR JESLIE KALEAK AND CHAIRMAN BURTON REXFORD OF THE AEWK ANNOUNCED TODAY THAT THE AEWK AND THE NORTH SLOPE BOROUGH, JOINED BY THE WHALING CAPTAINS ASSOCIATION OF THE VILLAGES OF BARROW, NUIQSUT AND KAKTOVIK HAVE FILED SUIT AGAINST DR. NANCY FOSTER OF NATIONAL MARINE FISHERIES SERVICE, DR. JAMES BAKER, OF NOAA AND U.S. SECRETARY OF COMMERCE, RON BROWN. ACCORDING TO CHAIRMAN REXFORD, THE PURPOSE OF THIS LAWSUIT IS TO INVALIDATE THE LETTER OF AUTHORIZATION ISSUED TO ARCO ALASKA, INC. BY NMFS AND TO INVALIDATE THE NMFS'S REGULATION UNDER WHICH THE LOA IS ISSUED.

"WE DEEPLY REGRET THE NEED FOR THIS ACTION, STATED MAYOR KALEAK. "OUR COMMUNITY HAS SOUGHT THIS YEAR, AS IN EVERY YEAR PAST, TO WORK COOPERATIVELY WITH THE OIL INDUSTRY AND THE FEDERAL GOVERNMENT. HOWEVER, THE ACTIONS OF ARCO AND NMFS THIS YEAR HAVE LEFT US NO CHOICE BUT TO UNDERTAKE THESE DRASTIC MEASURES FOR THE PROTECTION OF THE BOWHEAD WHALE, AND OUR SUBSISTENCE CULTURE.

"THE COMMUNITY OFFERED YESTERDAY TO WITHHOLD LEGAL ACTION AND TO ENGAGE IN FURTHER NEGOTIATIONS WITH ARCO AND NMFS, IF NMFS WOULD SUSPEND ARCO'S LOA AND INSTRUCT ARCO TO

WITHDRAW ALL VESSELS EXCEPT FOR THOSE NECESSARY TO MAINTAIN THE SAFETY OF ARCO'S EQUIPMENT AND PERSONNEL. UNFORTUNATELY, NMFS CHOSE NOT TO HONOR OUR REQUEST." STATED CHAIRMAN REXFORD WHO IS RETURNING WITH FRANK LONG, JR., AEWG COMMISSIONER FOR THE VILLAGE OF NUIQSUT, FROM A WEEK OF MEETING WITH REPRESENTATIVES OF NMFS, NOAA, MARINE MAMMAL COMMISSION, AND THE DEPARTMENT OF THE INTERIOR IN WASHINGTON, DC.

"FOR MANY YEARS OUR PEOPLE HAVE BEEN ABLE TO WORK WITH INDUSTRY OPERATORS, " SAID FRANK LONG JR. "HOWEVER, NMFS AND ARCO HAVE NOT SHOWN UN THAT THE DISCOVERY OF OIL IN OUR OFFSHORE WATERS MEANS THAT OUR PEOPLE AND OUR WILDLIFE RESOURCES AND OUR SUBSISTENCE CULTURE WILL BE SACRIFICED TO THE PROFIT INTEREST OF BIG OIL. PRESIDENT CLINTON AND VICE PRESIDENT GORE, WE NEVER EXPECTED TO BE TREATED THIS WAY BY YOUR ADMINISTRATION."

EUGENE BROWER, HEAD OF THE BARROW WHALERS, STATED, "WE FEEL AS THOUGH ARCO HAS 'PEARL HARBORED' US. WHILE WE WERE STILL AT THE NEGOTIATING TABLE, THEY WERE SENDING THEIR LAWYERS BEHIND OUR BACKS TO GET THE LOA WITH LITTLE TO NO REGARD FOR THE SERIOUS CONCERNS WE WERE EXPRESSING."

BOROUGH MAYOR JESLIE KALEAK, SR., SUPPORTING THE STAND OF THE WHALERS ON THIS, SAID, "THE PEOPLE OF THE NORTH SLOPE ARE VERY AWARE THAT THE PRESENCE OF OIL COMPANIES HERE HAS HELPED US FUND MANY IMPROVEMENTS TO OUR LIVES. WE ARE NOT AGAINST ALL OIL DEVELOPMENT. WE HAVE SAID AGAIN AND AGAIN THAT IF YOU WANT TO DRILL FOR OIL HERE, DO IT ON THE LAND WHERE THERE IS AT LEAST A CHANCE OF CONTAINING DAMAGE IF A SPILL OCCURS AND WHERE OUR WILDLIFE IS NOT AS GREATLY DISTURBED. THE SEA IS OUR GARDEN AND IT IS FRAGILE. THIS KIND OF ACTIVITY IN OUR SEAS DAMAGES ONE OF OUR GREATEST SUBSISTENCE AND CULTURAL RESOURCES - THE BOWHEAD WHALE. IT LEADS TO

INCREASED DANGER TO OUR WHALERS AS THEY MUST TRAVEL FURTHER AND FURTHER FROM SHORE TO FEED THEIR FAMILIES."

EUGENE BROWER ADDED, "WE REALIZE THAT TESTING AND DRILLING CANNOT BE STOPPED IN OUR SEAS RIGHT NOW. WE ARE NOT TRYING TO DO THAT. WE ARE TRYING TO ENSURE THE SAFETY OF OUR WHALES AND WHALERS BY STOPPING THE TESTING UNTIL OUR VILLAGES HAVE MET THEIR QUOTAS AND THE WHALES HAVE HAD A CHANCE AT A REGULAR MIGRATION."

WHALERS FROM KAKTOVIK WHO WERE HUNTING IN THE CAMDEN BAY AREA WEST OF KAKTOVIK HAVE STATED THAT THEY COULD HEAR THE NOISE FROM THE ACTIVITY FROM THEIR CAMP ON SHORE. (SEE ATTACHMENT FROM GEORGE TAGAROOK). THIS LEVEL OF NOISE WILL GREATLY DISTURB THE MIGRATION PATTERN OF THE BOWHEAD AND SEND THE WHALES INTO DEEPER WATERS THUS CAUSING THE FALL SUBSISTENCE HUNT TO BECOME EXTREMELY DANGEROUS AS THE SMALL BOATS MUST TOW UP TO FORTY TONS OF WHALE BACK TO A SHORE LINE THAT CAN BE OVER 35 MILES AWAY. BETWEEN WEATHER CHANGES AND WAVE ACTION, THIS CAN CREATE HAZARDOUS CONDITIONS AS WELL AS LEAD TO POTENTIAL SPOILAGE OF THE MEAT.

BACKGROUND INFORMATION:

ON JUNE 4 AND 5, 1993, A PUBLIC HEARING WAS HELD IN BARROW SPONSORED BY THE NORTH SLOPE BOROUGH AND THE ALASKA ESKIMO WHALING COMMISSION. PRESENT WERE REPRESENTATIVES FROM ARCO, THE NATIONAL MARINE FISHERIES SERVICE (NMFS), AND ALL OF THE WHALING CAPTAINS OF KAKTOVIK, NUIQSUT AND BARROW. THE CAPTAINS ALL GAVE TESTIMONY CONCERNING THE PROPOSED 1993 ARCO KUVLUM OPERATIONS IN CAMDEN BAY WHICH THE NMFS SAID THEY WOULD CONSIDER BEFORE ISSUING AN LOA. THE GIST OF THAT TESTIMONY WAS THAT THE WHALERS ARE NOT SIGHTING WHALES WHERE THEY NORMALLY HARVESTED THE BOWHEADS AND ARE FINDING THAT THEY MUST TRAVEL FARTHER AND FARTHER AWAY IN ORDER TO HARVEST THE BOWHEAD WHEN INDUSTRIAL ACTIVITY IS PRESENT IN THE WATERS.

AFTER THE PUBLIC HEARING, THE NEGOTIATION PROCESS BETWEEN AEW, THE NSB DEPARTMENT OF WILDLIFE MANAGEMENT, NMFS AND ARCO RESUMED. A MEETING WAS HELD IN SEATTLE BY ALL PARTIES TO ASSIST NMFS IN MAKING RECOMMENDATIONS FOR IMPROVEMENT TO THE JUNE 22 VERSION OF ARCO'S PROPOSED PLAN FOR MONITORING MARINE MAMMAL IMPACTS DUE TO PROPOSED ACTIVITIES AT THE KUVLUM SITE. A SITE SPECIFIC MONITORING PLAN MUST BE APPROVED BY THE NMFS BEFORE IT CAN ISSUE A LOA.

INPUT PROVIDED BY AEW'S AND NSB'S CONSULTING SCIENTISTS (DR. JOHN KELLEY, DR. CLARK, DR. ELLISON, GEOFF GIVENS) WAS HELPFUL IN POINTING OUT TO THE NMFS THE MAJOR FLAWS IN THE ARCO MONITORING PROPOSAL. IF THE MONITORING PLAN IS CHANGED TO MEET THE RECOMMENDATIONS MADE BY THE SCIENTISTS, AEW CAN BE ASSURED OF OBTAINING THE DATA NEEDED TO ASSESS IMPACTS TO THE BOWHEAD WHALE AND OTHER MARINE MAMMALS IN THE KUVLUM PROJECT.

AT THE TIME OF THE ISSUANCE OF THE LOA TO ARCO DURING THE WEEK OF JULY 26, THE AEW AND THE NSB WERE UNDER THE IMPRESSION THAT THEY WERE STILL NEGOTIATING MANY OF THESE POINTS WITH ARCO AND THAT NO AGREEMENT HAD BEEN REACHED. MOST SPECIFICALLY, THE WHALERS WERE EXTREMELY CONCERNED ABOUT THE SEVERE NOISE DISTURBANCE THAT WOULD DRIVE THE BOWHEAD FROM IT REGULAR MIGRATION ROUTE AND OUT INTO THE DEEPER WATERS AND AWAY FROM THEIR NORMAL FEEDING GROUNDS. THE NOISE ALSO SERIOUSLY JEOPARDIZES THE ABILITY OF OUR SUBSISTENCE COMMUNITIES TO PROVIDE FOR THEIR FAMILIES AND ENDANGERS HUMAN LIVES AS OUR HUNTERS MUST TRAVEL FARTHER AND FARTHER FROM SHORE IN THEIR SMALL BOATS TO FIND THE WHALES.

AEW CHAIRMAN BURTON REXFORD STATED THAT WHALERS HAVE OBSERVED BOWHEAD WHALES ABANDONING THEIR HISTORIC MIGRATORY ROUTES IN RECENT YEARS AS OCS DEVELOPMENT HAS BEEN CARRIED OUT UP HERE. AEW HAS TOLD ARCO AND NMFS THAT IF THIS ACTIVITY IS NOT CARRIED OUT WITH GREAT CARE, IT WILL SERIOUSLY ENDANGER THE BOWHEAD WHALE. BOWHEADS MUST BE ABLE TO COME NEAR SHORE TO FEED AS THEY MIGRATE. THE

PROPOSED DEVELOPMENT IS RIGHT IN THE AREAS WHERE THEY WOULD NORMALLY FEED.

MAYOR KALEAK AND CHAIRMAN REXFORD HAVE ISSUED A JOINT STATEMENT AS FOLLOWS, "THE INUPIAT SUBSISTENCE COMMUNITY IS OF ONE MIND ON THIS MATTER. WE WILL DO EVERYTHING IN OUR POWER TO PROTECT THE BOWHEAD HABITAT, THE MIGRATION ROUTE AND THE BEAUFORT SEA ENVIRONMENT. WE HAVE RECEIVED NOTICE OF SUPPORT FROM OTHER ARCTIC REGIONS OF ALASKA, FROM THE INUIT CIRCUMPOLAR CONFERENCE, AND FROM REPRESENTATIVES OF THE ENVIRONMENTAL COMMUNITIES."

THE FOLLOWING FOUR POINTS REPRESENT THE RESPONSE OF THE AEWG TO THE AUGUST 2 LETTER FROM ARCO TO BURTON REXFORD:

1. ARCO SHALL HALT ALL SEISMIC AND ICE MANAGEMENT ACTIVITIES WHEN THE FIRST BOWHEAD WHALE IS SPOTTED AT KAKTOVIK, AND SHALL NOT RESUME SUCH ACTIVITIES UNTIL THE VILLAGES OF NUIQSUT AND KAKTOVIK HAVE FULFILLED THEIR QUOTAS AND THE NMFS FIELD OFFICE IN ANCHORAGE AGREES THAT RESUMPTION WILL NOT HARM THE BOWHEAD WHALES.

2. ARCO SHALL EXECUTE, IN FULL, THE MONITORING PLAN AS REVISED ACCORDING TO THE RECOMMENDATIONS CONTAINED IN THE JULY 14, 1993, MEMORANDUM FROM DR. DOUG DEMASTER TO RON MORRIS OF NMFS.

3. ARCO SHALL PLACE AN OBSERVER, SELECTED BY THE COMMUNITY, ON ALL FLIGHTS OF THE MONITORING PLANE THAT IS ASSIGNED TO FLY TRANSECT FOR ANY GIVEN FLIGHT DAY.

4. ARCO SHALL OBTAIN AGREEMENT FROM THE NMFS TO THE FOLLOWING LOA LANGUAGE TO STAND IN PLACE OF PARAGRAPH 8 OF THE JULY 19, 1993 LOA: ARCO IS SUBJECT TO THE DRILLING RESTRICTIONS SET FORTH IN THE JUNE 24, 1991, MINERALS MANAGEMENT SERVICES WAIVER OF LEASE STIPULATION #4. ARCO SHALL COOPERATE WITH THE NMFS FIELD OFFICE IN ANCHORAGE TO ENSURE STRICT COMPLIANCE WITH EACH OF THOSE RESTRICTIONS.

Aug. 05, 1993

Elise Putkotak

I when on a camping trip to Canning River with Tom Gordon and his family on July 24th by boat. Spent a nite at Camden Bay the first nite, and Kaganevik Point the second nite, and third nite at Canning river. That day and nite we heard like a boat going in Canning river but didn't show up. Tom and I when up to a high spot to look and saw a drill rig and a ship close by the shore about 8 miles going west. The next morning about 5 AM we got up to leave the wind had died down for safe travel home. The noise was even louder. Maybe a generator running on the drill rig. I was with Herman Aishanng & Family, Mickey Agiak Norman Aishanng, Tom and his wife and two kids with me. Herman & Mickey when west and I headed home July 27th.

W. J. Tegarook

ATTACHMENT B
Attachment to Whalers' Comments

**ATTACHMENT TO MARCH 5 1:30 PM AGENDA ITEM
"COMMENTS BY SUBSISTENCE HUNTERS..."**

1. It is important to recognize that there are two widely divergent views as to the impact of seismic noise on fall migrating whales. One view is based upon the limited experimental data available. These data tend to show that major impacts (such as moving away) occur at distances of about 3-5 miles. The other view is based upon the experiences of subsistence hunters in Kaktovik, Nuiqsut and Barrow who believe that the fall migrating whales are displaced seaward as they approach operating seismic vessels. The hunters feel that the migrating whales are displaced seaward 5-15 miles by seismic noise. Some of these hunters also believe that the impacted whales are made more wary ("spooky") and therefore more difficult to hunt.

2. Listed below are the major reasons that individual hunters and personnel from the Alaska Eskimo Whaling Commission (AEWC) and the North Slope Borough (NSB) do not accept the view that major seismic impacts do not occur until the seismic ship is 3-5 miles from bowhead whales.
 - a) The experimental data are based upon a few (3 or 4) small studies involving few observations on few whales.
 - b) A significant portion of the experimental data can be criticized for either a lack of or too few control data.
 - c) The experimental data largely depend upon observations on dedicated seismic vessels approaching whales who are not actively migrating at the time of the interference.
 - d) Unfortunately the existing experimental data do not focus primarily upon actively migrating whales, who are approaching a distant operating seismic ship, where observations (behavior and distribution) are begun 15-30 miles from the ship and continue until the whales are well past the ship.
 - e) Documents produced by the Minerals Management Service (MMS) and the oil industry, when considering seismic noise impacts to bowhead whales and the subsistence hunt, are characterized by:
 - 1) usually focusing upon the limited experimental data without mentioning their short comings, and
 - 2) seldom recognizing the views of hunters, the AEWC, and the NSB which are markedly different from views held by MMS and industry personnel.

3. In order for individual hunters, the AEWC, and the NSB to have confidence in experimental data, regarding seismic noise impacts to fall migrating bowhead whales, future studies must do the following.
 - a) Give due consideration to the relevant experiences of subsistence hunters.
 - b) Give due consideration to earlier studies and to their deficiencies.
 - c) Focus upon a more realistic situation, namely the behavior and distribution of fall migrating bowhead whales as they approach a distant (15-30 miles) operating seismic ship and then pass by the ship.
 - d) There should be a more balanced interpretation of earlier studies of bowhead whales passing drilling platforms where displacements have been documented.

ATTACHMENT C
Signed Statement by Whalers in Working Group I

Factual experience of subsistence whalers testify that pods of migrating bowhead whales will begin to divert from their migratory path at distances of 35 miles from an active seismic operation and are displaced from their normal migratory path by as much as 30 miles.

Fred Kanayurak Fred Kanayurak Burton Rexford Burton Rexford

Van Edwardsen Van Edwardsen 3/6/97 Harry Brower Jr. Harry Brower Jr. 3/6/97

Marchie Nageak Marchie Nageak Ben Itta Ben A Itta 3/6/97

Oliver Leavitt Oliver Leavitt Joseph Kaleak Joseph Kaleak

Jim Allen Killbear Jim Allen Killbear James Lampe James Lampe Sr.

Eddie Rexford Eddie Rexford Sr. Charlie Brower Charlie Brower

Thomas Napageak Thomas Napageak Archie Ahkivianna Archie Ahkivianna

George Taalak George Taalak Eli Nukapigak Eli Nukapigak

Roxy Oyagak Jr. Roxy Oyagak Jr.

Passed by vote of the Whaling Captains present.

Dated: March 6, 1997

ATTACHMENT D
Harry Brower, Jr.
GPS Locations of Bowhead Whale Strikes

**OBSERVATIONS ON LOCATIONS AT WHICH BOWHEAD WHALES
HAVE BEEN TAKEN DURING THE FALL SUBSISTENCE HUNT
(1988 THROUGH 1995) BY ESKIMO HUNTERS
BASED IN BARROW, ALASKA¹**

**HARRY BROWER, JR.
DEPARTMENT OF WILDLIFE MANAGEMENT
NORTH SLOPE BOROUGH
BARROW, AK**

The Department of Wildlife Management has for several years been attempting to better define the areas most important to Barrow-based hunters during the fall subsistence hunt of the bowhead whale. The areas utilized by our subsistence hunters is very large and its boundaries vary from year to year, depending upon whale movements which in turn are influenced by ice conditions and industrial activity. While the movements of individual hunting boats are difficult to document, the locations at which bowhead whales are harvested are more readily documented.

The purpose of this brief report is to present the harvest location data gathered over the years for fall bowhead whale hunts 1988 through 1995. The locations (latitude and longitude), with some additional data, are presented in Table 1. The locations themselves are displayed on a map included here as Figure 1.

Locations at which bowhead whales were harvested by Barrow-based hunters were determined in three ways as mentioned below.

1. Some locations were determined by myself, using a Global Positioning System device (GPS)². In these instances, my hunting boat was positioned along side the harvested whale at the time it was declared dead by the successful hunter. Using my GPS, the location was noted. These locations are designated as "1" in the Table 1 column "How harvest site location determined".
2. Some locations were determined by the successful hunter using a GPS, and he then provided the location data to personnel at the Barrow Volunteer Search and Rescue (BVSr) base of operations. These locations were obtained from the BVSr personnel and are designated as "2" in the Table 1 column "How harvest site location determined".
3. Some locations are actually estimates, with the harvest location determined as best as could be done through an interview with the successful hunter. These are obviously "non-GPS" locations. In these instances, I spoke in detail with the successful hunter and asked him to mark on a map where the whale was harvested. While these locations are less precise, they are reasonable since the hunters utilize much information to estimate their

¹Report prepared for Department of Wildlife Management, North Slope Borough, Box 69, Barrow, AK 99723. Report initially prepared April 15, 1996 but revised November 19, 1996. The revision is to provide updated information regarding whale 95B16 (see updated data in Table 1 and Figure 1).

²A Trimble GPS Pathfinder Basic was used for 1991-1992. Trimble Navigation Limited, 645 North Mary Avenue, Sunnyvale, CA 94086. Magellan model #NAV 5000D was used for 1993-1995. Magellan System Corporation, 960 Overland Court, San Dimas, CA 92773.

position (compass, distance from shore, location of barrier islands, etc.). These locations are designated as "3" in the Table 1 column "How harvest site locations determined".

Location information is briefly presented below for the fall hunts 1988 through 1995.

- In 1988, there were three bowhead whales harvested during the fall hunt; of the three, only one harvest location was determined. The location was determined through interview.
- In 1989, there were seven bowhead whales harvested during the fall hunt, and of the seven, four harvest locations were determined. The locations were determined through interview.
- In 1990, there were five bowhead whales harvested during the fall hunt. Unfortunately, we do not have suitable locations for any of these.
- In 1991, there were four bowhead whales harvested during the fall hunt, and of the four, two harvest locations were determined by GPS, and two were determined by interviews.
- In 1992, there were twenty bowhead whales harvested during the fall hunt, and of the twenty, nine harvest locations were determined by GPS, five determined by interview, and for the last six, we did not have suitable locations.
- In 1993, there were seven bowhead whales harvested during the fall hunt, and of the seven, six harvest locations were determined by GPS, and one by interview.
- In 1994, there was one bowhead whale harvested during the all hunt. The harvest location was determined by GPS.
- In 1995, there were eleven bowhead whales harvested during the fall hunt. All the harvest locations were determined by GPS.

As mentioned above, it is important to remember that the information presented here only concerns harvest locations. The area of the "dots" (dot, square, triangle) on Figure 1 (map) must not be interpreted to be the size of the fall bowhead whale hunting area utilized by Barrow subsistence hunters. Barrow-based bowhead whale hunters know full well that the actual area searched (the true hunting area) is much larger than the area represented by the harvest locations.

Let me also take this opportunity to acknowledge the assistance of the Geographic Information System personnel (particularly Dax Jolly and Allison Graves) of the Borough's Planning Department in the preparation of the map (Figure 1) included here. Additional information regarding the subsistence hunt of the bowhead whale by Alaskan Eskimo for these years can be found in the reports of the International Whaling Commission starting with Volume 40.

Table 1. Location in the Beaufort Sea at which bowhead whales have been harvested during the fall subsistence hunt by Barrow-based subsistence hunters (selected data from 1988 - 1995).

WHALE ID#	DATE WHALE HARVESTED	LOCATION OF THE HARVEST SITE		HOW HARVEST SITE LOCATION DETERMINED*	WHALING CAPTAIN
88B11	9/17/88	156° 25.55W	71° 23.33N	3	Simeon Patkotak
89B4	10/2/89	154° 28.45W	71° 06.30N	3	Jake Adams
89B7	10/2/89	154° 21.58W	71° 02.02N	3	Savik Ahmaogak
89B5	10/2/89	154° 29.41W	71° 01.22N	3	Ben Itta
89B6	10/2/89	154° 25.30W	71° 03.89N	3	Joash Tukle
91B9	9/27/91	156° 11.47W	71° 27.07N	3	Lloyd Panigeo
91B10	9/27/91	155° 56.09W	71° 30.42N	3	Arnold Brower, Jr.
91B11	10/2/91	154° 50.00W	71° 36.00N	1	Clifford Okpeaha
91B12	10/4/91	155° 08.00W	71° 26.00N	1	Norman Leavitt
92B03	8/31/92	156° 08.04W	71° 25.20N	1	George Ahmaogak
92B04	9/1/92	156° 07.08W	71° 21.55N	1	Jacob Adams
92B05	9/2/92	156° 01.04W	71° 24.92N	1	Simeon Patkotak
92B06	9/2/92	156° 04.01W	71° 23.50N	3	Edward Itta
92B07	9/2/92	156° 10.11W	71° 33.03N	3	George Adams
92B08	9/3/92	156° 09.33W	71° 24.05N	3	Carl Brower
92B10	9/12/92	155° 49.05W	71° 25.00N	1	Arnold Brower, Sr.
92B11	9/12/92	156° 15.26W	71° 27.57N	3	Jonathan Aiken
92B12	9/19/92	155° 03.22W	71° 24.91N	1	Donald Long
92B13	9/23/92	155° 49.00W	71° 28.00N	1	Simeon Patkotak
92B14	9/24/92	155° 35.00W	71° 34.00N	1	Tony Edwardsen
92B15	9/26/92	156° 04.00W	71° 27.00N	1	Eugene Brower
92B16	9/26/92	155° 32.40W	71° 35.30N	3	George Ahmaogak
92B17	10/8/92	155° 56.12W	71° 20.45N	1	Norman Leavitt
93B17	10/5/93	156° 01.00W	71° 27.00N	1	Alfred Tukle, Sr.
93B18	10/7/93	155° 55.40W	71° 26.79N	1	Don Nungasak
93B19	10/13/93	155° 53.70W	71° 26.53N	1	Norman Leavitt
93B21	10/18/93	155° 58.00W	71° 19.00N	1	Tony Edwardsen
92B22	10/19/93	155° 50.30W	71° 23.38N	1	Arnold Brower, Jr.
93B23	10/20/93	155° 57.00W	71° 20.00N	1	Jonathan Aiken
93B20	10/13/93	155° 57.05W	71° 28.50N	3	Savik Ahmaogak
94	10/1/94	155° 41.68W	71° 30.42N	1	George Ahmaogak
95B9	9/5/95	156° 04.98W	71° 25.13N	1	Clifford Okpeaha
95B10	9/6/95	156° 03.08W	71° 23.23N	2	Van Edwardsen
95B11	9/11/95	156° 06.00W	71° 23.00N	2	Thomas Brower III
95B12	9/16/95	155° 33.98W	71° 22.39N	1	Jonathan Aiken
95B13	9/16/95	155° 35.69W	71° 24.58N	2	Raymond Kalayauk
95B14	9/18/95	156° 12.17W	71° 30.05N	1	Jeslie Kaleak
95B15	9/20/95	156° 07.26W	71° 40.37N	2	Simeon Patkotak
95B16	9/20/95	155° 25W	71° 40N	2	Leslie Itta
95B17	10/16/95	156° 17.69W	71° 30.32N	2	Ben Itta
95B18	10/17/95	156° 16.05W	71° 36.36N	2	Simeon Patkotak
95B19	10/17/95	156° 18.08W	71° 30.01N	2	Johnny Leavitt

*1 = GPS by H. Brower, Jr.; 2 = GPS by hunter; 3 = Interviews with hunter.

Fall Bowhead Whale Harvests: Barrow, 1988-1995

Legend:

- GPS via Harry Brower Jr.
 - ▲ GPS via Barrow Volunteer Search and Rescue
 - Interview with Captain
- Barrow area
- land mass
 - water

Whale harvest locations were compiled by the Department of Wildlife Management, North Slope Borough. Base features are derived from U.S. Geological Survey and NSB sources.

Map Prepared by:
NSB Planning Department/GIS
Box 69
Barrow, AK. 99723
(907)852-0333

Dated 11/19/1996
Scale: 1:150,000
Albers Equal Area Conic Projection

For more information contact:
Harry Brower, Jr.
Subsistence Research Specialist
North Slope Borough
Box 69
Barrow, AK. 99723
(907)852-0350

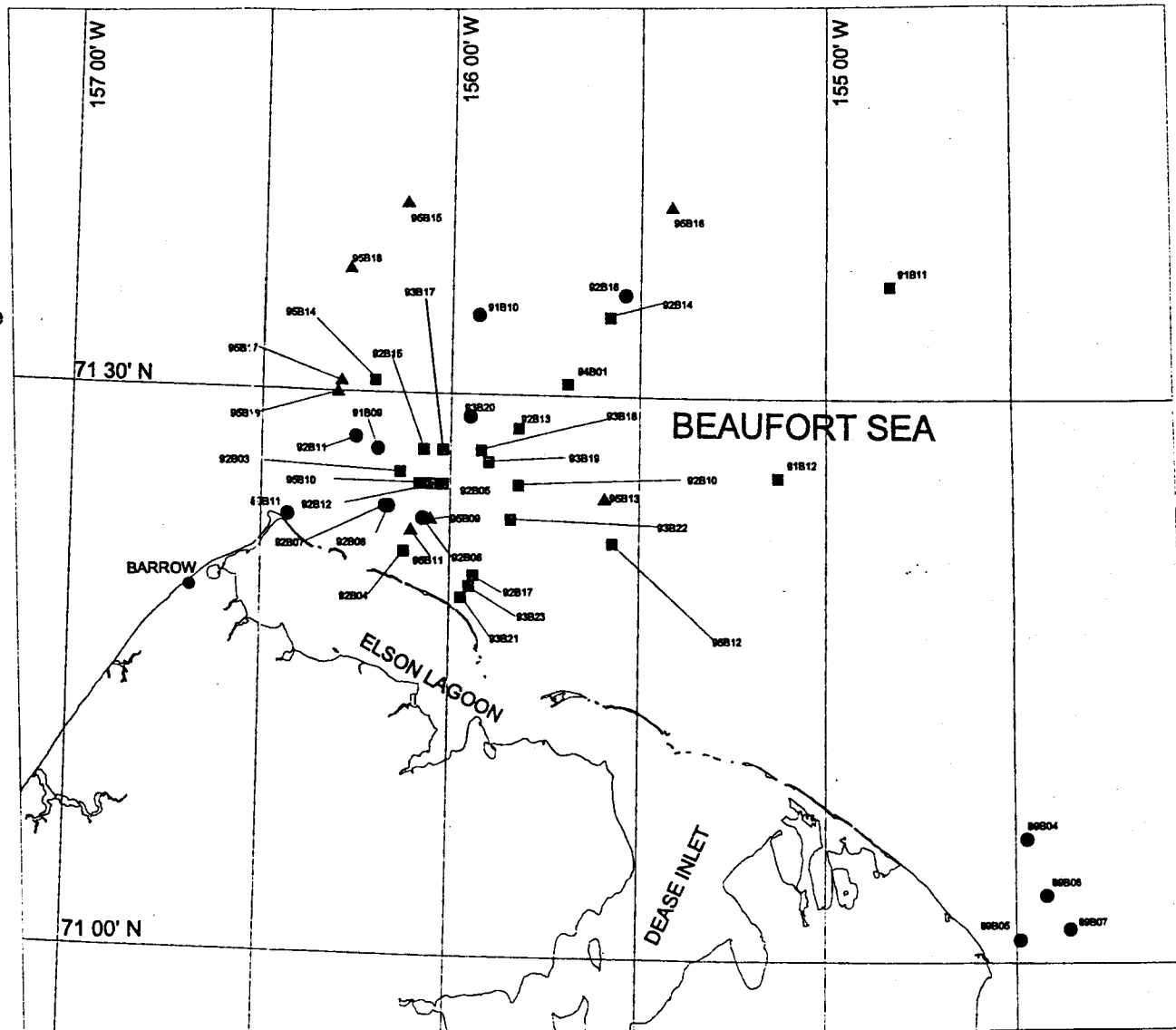


Figure 1. Fall bowhead whale harvests: Barrow, 1988-1995.

ATTACHMENT E
BACKGROUND MATERIAL
MMS-Information to Lessee Clauses for Oil and Gas
Lease Sale 144, OCS, Beaufort Sea, Alaska and
Stipulations for Oil and Gas Lease Sale 144, OCS,
Beaufort Sea, Alaska

UNITED STATES
DEPARTMENT OF THE INTERIOR
MINERALS MANAGEMENT SERVICE

Information to Lessee Clauses for Oil and Gas Lease Sale 144
Outer Continental Shelf
Beaufort Sea
Alaska

(a) Information on Community Participation in Operations Planning. Lessees are encouraged to bring one or more residents of communities in the area of operations into their planning process. Local communities often have the best understanding of how oil and gas activities can be safely conducted in and around their area without harming the environment or interfering with community activities. Involving local community residents in the earliest stages of the planning process for proposed oil and gas activities can be beneficial to the industry and the community. Community representation on management teams developing plans of operation, oil spill contingency plans, and other permit applications can help communities understand permitting obligations and help the industry to understand community values and expectations for oil and gas operations being conducted in and around their area.

(b) Information on Kaktovikmiut Guide - "In This Place." The people of Kaktovik, the Kaktovikmiut, have compiled "A Guide for Those Wishing to Work in The Country of the Katovikmiut." The guide's intent, in part, is to provide information that may promote a better understanding of their concerns. Lessees are encouraged to obtain copies of the guide and to incorporate it into their Orientation Program to assist in fostering sensitivity and understanding of personnel to community values, customs, and lifestyles in areas in which they will be operating.

(c) Information on Nuiqsutmiut Paper. The people of Nuiqsut, the Nuiqsutmiut, have compiled a paper for people working in their country. The paper provides information that may promote a better understanding of their concerns. Lessees are encouraged to obtain copies of the paper and to incorporate it into their Orientation Program to assist in fostering sensitivity and understanding of personnel to community values, customs, and lifestyles in areas in which they will be operating.

(d) Information on the Arctic Biological Task Force . Lessees are advised that in the enforcement of the Protection of Biological Resources stipulation, the Regional Supervisor, Field Operations (RS/FO), will consider recommendations from the Arctic Biological Task Force (BTF) composed of designated representatives of the MMS, Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), and Environmental Protection Agency (EPA). Personnel from the State of Alaska and local communities are invited and encouraged to participate in the proceedings of the BTF. The RS/FO will consult with the Arctic BTF on the conduct of biological surveys by lessees and the appropriate course of action after surveys have been conducted.

(e) Information on Bird and Marine Mammal Protection. Lessees are advised that during the conduct of all activities related to leases issued as a result of this sale, the lessee and its agents, contractors, and subcontractors will be subject to the provisions of the Marine Mammal Protection Act (MMPA) of 1972, as amended (16 U.S.C. 1361 et seq.); the Endangered Species Act (ESA), as amended (16 U.S.C. 1531 et seq.); and applicable International Treaties.

Lessees and their contractors should be aware that disturbance of wildlife could be determined to constitute harm or harassment and thereby be in violation of existing laws and treaties. With respect to endangered species and marine mammals, disturbance could be determined to constitute a "taking" situation. Under the ESA, the term "take" is defined to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Under the MMPA, "take" means "harass, hunt, capture, or kill or attempt to harass, hunt, capture, or kill any marine mammal." These Acts and applicable Treaties require violations be reported to the NMFS or the FWS, as appropriate.

Incidental taking of marine mammals and endangered and threatened species is allowed only when the statutory

requirements of the MMPA and/or the ESA are met. Section 101(a)(5) of the MMPA (16 U.S.C. 1371(a)(5)) allows for the taking of small numbers of marine mammals incidental to a specified activity within a specified geographical area. Section 7(b)(4) of the ESA (16 U.S.C. 1536(b)(4)) allows for the incidental taking of endangered and threatened species under certain circumstances. If a marine mammal species is listed as endangered or threatened under the ESA, the requirements of both the MMPA and the ESA must be met before the incidental take can be allowed.

Under the MMPA and ESA, the NMFS is responsible for species of the order Cetacea (whales and dolphins) and the suborder Pinnipedia (seals and sea lions) except walrus; the FWS is responsible for polar bears, sea otters, walrus, and birds. Procedural regulations implementing the provisions of the MMPA are found at 50 CFR Part 18.27 for FWS, and at 50 CFR Part 228 for NMFS.

Lessees are advised that specific regulations must be applied for and in place and that a Letter of Authorization (LOA) or Incidental Harassment Authorization (IHA) must be obtained by those proposing the activity to allow the incidental take of marine mammals whether or not they are endangered or threatened. The regulatory process may require one year or longer.

Of particular concern is disturbance at major wildlife concentration areas, including bird colonies, marine mammal haulout and breeding areas, and wildlife refuges and parks. Maps depicting major wildlife concentration areas in the lease area are available from the RS/FO. Lessees are also encouraged to confer with the FWS and NMFS in planning transportation routes between support bases and leaseholdings.

Lessees should exercise particular caution when operating in the vicinity of species whose populations are known or thought to be declining and which are not protected under the ESA; specifically, Steller's eider and Pacific walrus. The FWS issued incidental take regulations for walrus in the Beaufort Sea and adjacent northern coast of Alaska that were in effect for an 18-month period beginning December 16, 1993 (50 CFR 18.121 et seq.). These regulations have been extended until December 15, 1998. Incidental take regulations are promulgated only upon request and the FWS must be in receipt of a petition prior to initiating the regulatory process. Incidental, but not intentional, taking is authorized only by U.S. citizens holding an LOA issued pursuant to these regulations. An LOA or IHA must be requested annually.

Behavioral disturbance of most birds and mammals found in or near the lease area would be unlikely if aircraft and vessels maintain at least a 1-mile horizontal distance and aircraft maintain at least a 1,500-foot vertical distance above known or observed wildlife concentration areas, such as bird colonies and marine mammal haulout and breeding areas.

For the protection of endangered whales and marine mammals throughout the lease area, it is recommended that all aircraft operators maintain a minimum 1,500-foot altitude when in transit between support bases and exploration sites. Lessees and their contractors are encouraged to minimize or reroute trips to and from the leasehold by aircraft and vessels when endangered whales are likely to be in the area.

Human safety should take precedence at all times over these recommendations.

(f) Information on River Deltas. Lessees are advised that certain river deltas of the Beaufort Sea coastal plain (such as the Kongakut, Canning, and Colville) have been identified by the FWS as special habitats for bird nesting and fish overwintering areas, as well as other forms of wildlife. Shore-based facilities in these river deltas may be prohibited by the permitting agency.

(g) Information on Endangered Whales and MMS Monitoring Program. Lessees are advised that the MMS intends to continue its areawide endangered bowhead whale monitoring program in the Beaufort Sea during exploration activities. The program will gather information on whale distribution patterns which will be used by MMS and others to assess impacts on bowhead whales.

The MMS will perform an environmental review for each proposed exploration plan and development and production plan, including an assessment of cumulative effects of noise on endangered whales. Should the review conclude that activities described in the plan will be a threat of serious, irreparable, or immediate harm to the species, the RS/FO will require that activities be modified, or otherwise mitigated before such activities would be approved.

Lessees are further advised that the RS/FO has the authority and intends to limit or suspend any operations, including preliminary activities, as defined under 30 CFR 250.31, on a lease whenever bowhead whales are subject to a threat of serious, irreparable, or immediate harm to the species. Should the information obtained from MMS or lessees' monitoring programs indicate that there is a threat of serious, irreparable, or immediate harm to the species, the RS/FO will require the lessee to suspend operations causing such effects, in accordance with 30 CFR 250.10. Any such suspensions may be terminated when the RS/FO determines that circumstances which justified the ordering of suspension no longer exist. Notice to Lessees No. 86-2 specifies performance standards for preliminary activities.

Incidental taking of marine mammals and endangered and threatened species is allowed only when the statutory requirements of the MMPA and/or the ESA are met. Section 101(a)(5) of the MMPA (16 U.S.C. 1371(a)(5)) allows for the taking of small numbers of marine mammals incidental to a specified activity within a specified geographical area. Section 7(b)(4) of the ESA (16 U.S.C. 1536(b)(4)) allows for the incidental taking of endangered and threatened species under certain circumstances. If a marine mammal species is listed as endangered or threatened under the ESA, the requirements of both the MMPA and the ESA must be met before the incidental take can be allowed.

Information regarding endangered whales will be reviewed periodically by the MMS in consultation with the NMFS, the State of Alaska, the North Slope Borough (NSB), and the Alaska Eskimo Whaling Commission (AEWC). The sources of information include: the MMS monitoring program; the industry site-specific monitoring program; pertinent results of the MMS environmental studies; observations of subsistence hunters utilizing the area and other applicable information. The purpose of the review will be to determine whether existing mitigating measures adequately protect the endangered whales. Should the review indicate the threat of serious, irreparable, or immediate harm to the species, the MMS will take action to protect the species, including the possible imposition of a seasonal drilling restriction, or other restrictions if appropriate.

(h) Information on the Availability of Bowhead Whales for Subsistence Hunting Activities. Lessees are advised that the NMFS issues regulations for incidental take of marine mammals, including bowhead whales. Incidental take regulations are promulgated only upon request and the NMFS must be in receipt of a petition prior to initiating the regulatory process. Incidental takes of bowhead whales are allowed only if an LOA or an IHA is obtained from the NMFS pursuant to the regulations in effect at the time. An LOA or an IHA must be requested annually. In issuing an LOA or an IHA, the NMFS must determine that proposed activities will not have an unmitigable adverse effect on the availability of the bowhead whale to meet subsistence needs by causing whales to abandon or avoid hunting areas, directly displacing subsistence users, or placing physical barriers between whales and subsistence users.

Lessees are also advised that, in reviewing proposed exploration plans which propose activities during the bowhead whale migration, the MMS will conduct an environmental review of the potential effects of the activities, including cumulative effects of multiple or simultaneous operations, on the availability of the bowhead whale for subsistence use. The MMS may limit or require operations be modified if they could result in significant effects on the availability of the bowhead whale for subsistence use.

The MMS and the NMFS will establish procedures to coordinate results from site-specific surveys required by Sale 144 Stipulation No. 4 and NMFS LOA's or IHA's to determine if further modification to lease operations are necessary.

(i) Information on Consultation with NMFS to Protect Bowhead Whales in the Spring-Lead System. The MMS has been advised by the NMFS that, based on currently available information and technology, NMFS believes that development and production activities in the spring lead systems used by bowhead whales along the Chukchi Sea coast and extending to the northeast of Point Barrow would likely jeopardize the continued existence of the bowhead whale population. The NMFS has advised that they will reconsider this conclusion when new information, technology, and/or measures become available or are proposed that would effectively eliminate or otherwise mitigate this potential jeopardy situation. In addition, NMFS biological opinions are based on the assumption that there will not be any exploration within the spring-lead system. Therefore, the lessees are advised that MMS and NMFS will review exploration plans to ascertain if endangered species consultation will be required for activities planned during the spring (April 1 to June 15). Lessees are advised that specific options, alternatives, and/or mitigating measures may be developed for exploration, production, and development activities during MMS consultation with NMFS as new information or technology is developed for specific development plans, but that the possibility exists that exploration, development, and production on leases in this area may be constrained or precluded.

(j) Information on Geological and Geophysical Survey Activity. Lessees are advised of the potential effect of geological and geophysical (G&G) activity to bowhead whales and subsistence hunting activities. High resolution G&G surveys are distinguished from 2-D and 3-D geophysical surveys by the magnitude of the energy source used in the survey, the size of the survey area, the number and length of arrays used, and duration of the survey period. High resolution G&G surveys are typically conducted after a lease sale in association with a specific exploration or development program or in anticipation of future lease sale activity. The 2-D and 3-D geophysical surveys are typically conducted prior to lease sales.

Lessees are advised that all G&G survey activity conducted in the Beaufort Sea Planning Area, either under the pre-lease permitting regulations at 30 CFR 251, or as part of an approved exploration or development and production plan at 30 CFR 250, is subject to environmental and regulatory review by the MMS. It is the intention of MMS to treat pre-lease G&G activities in a manner similar to the post-lease G&G activities. The MMS has standard mitigating measures which are applied to these activities, and lessees are encouraged to review these measures before developing their applications for G&G permits. Copies of the non-proprietary portions of all G&G permit applications will be provided by MMS to the NSB, the AEWC, and potentially affected subsistence communities for comment. The MMS may impose restrictions (including the timing of operations relative to open water) and other requirements (such as having a locally approved coordinator on board) on G&G surveys to minimize unreasonable conflicts between the G&G survey and subsistence whaling activities.

Lessees and applicants are advised that MMS will require any proposed G&G activity to be coordinated with potentially affected subsistence communities, the NSB, and the AEWC to identify potential conflicts and develop plans to avoid these conflicts. Copies of the results of any required monitoring plans will be provided by MMS to the potentially affected subsistence communities, the NSB, and the AEWC for comment. In the event of no agreement a similar conflict resolution process as described in Stipulation No. 5 - *Subsistence Whaling and Other Subsistence Activities* will be implemented.

(k) Information on Polar Bear Interaction. Lessees are advised that polar bears may be present in the area of operations, particularly during the solid-ice period. Lessees should conduct their activities in a manner which will limit potential encounters and interaction between lease operations and polar bears. The FWS is responsible for the protection of polar bears under the provisions of the MMPA of 1972, as amended. Lessees are advised to contact the FWS regarding proposed operations and actions which might be taken to minimize interaction with polar bears. OCS Study MMS 93-0008 contains guidelines for oil and gas operations in polar bear habitats.

Lessees are advised that the FWS issued final regulations for incidental take of polar bears in the Beaufort Sea and adjacent northern coast of Alaska effective December 16, 1993 (50 CFR 18.111, et seq.). These regulations were in effect for an 18-month period and have been extended for an additional 40 months through December 15, 1998. The FWS must be in receipt of a petition for incidental take prior to initiating the regulatory process. Incidental takes of polar bears are allowed only if an LOA or an IHA is obtained from the FWS pursuant to the regulations in effect at the time. An LOA or an IHA must be requested annually.

Lessees are reminded of the provisions of the 30 CFR 250.40 regulations which prohibit discharges of pollutants into offshore waters. Trash, waste, or other debris which might attract polar bears or be harmful to polar bears should be properly stored and disposed of to minimize attraction of, or encounters with, polar bears.

The lessees are advised to read and be familiar with the Guidelines for Oil and Gas Operations in Polar Bear Habitats, OCS Study MMS 93-0008. Copies of these guidelines are available for the lessees from the MMS Alaska Regional office.

(l) Information on the Spectacled Eider and Steller's Eider. Lessees are advised that in 1993 the spectacled eider (*Somateria fischeri*) was listed as threatened by the FWS and is protected by the ESA of 1973, as amended (16 U.S.C. 1531 et seq.). Lessees are further advised that the Steller's eider (*Polysticta stelleri*) is being considered by the FWS for listing as an endangered species under the ESA.

Lessees are advised that exploration and development and production plans submitted to MMS will be reviewed by the FWS to ensure spectacled eider's and their habitats are protected. If the Steller's eider is listed as endangered under the ESA, it will be afforded similar protection.

(m) Information on Sensitive Areas To Be Considered in the Oil-Spill Contingency Plans (OSCP). Lessees are advised that certain areas are especially valuable for their concentrations of marine birds, marine mammals, fishes, or other biological resources or cultural resources and should be considered when developing OSCP's. Identified areas and time periods of special biological and cultural sensitivity include:

- (1) the lead system off Point Barrow, April-June;
- (2) the salt marshes from Kogru Inlet to Smith Bay, June-September;
- (3) the Plover Islands, June-September;
- (4) the Boulder Patch in Stefansson Sound, June-October;
- (5) the Camden Bay area (especially the Nuvugag and Kaninniivik hunting sites), January, April-September, November;
- (6) the Canning River Delta, January-December;
- (7) the Barter Island - Demarcation Point Area, January-December;
- (8) the Colville River Delta, January-December;
- (9) the Cross, Pole, Egg, and Thetis Islands, June-September;
- (10) the Flaxman Island waterfowl use and polar bear denning areas, January-December; (Leffingwell Cabin, a National Historic Site, is located on Flaxman Island);
- (11) the Jones Island Group (Pingok, Spy, and Leavitt Islands) and Pole Island are known polar bear denning areas, November-April; and
- (12) the Sagavanirktok River delta.

These areas are among areas of special biological and cultural sensitivity to be considered in the OSCP required by 30 CFR 250.42. Lessees are advised that they have the primary responsibility for identifying these areas in their OSCP's and for providing specific protective measures. Additional areas of special biological and cultural sensitivity may be identified during review of exploration plans and development and production plans.

Industry should consult with FWS or State of Alaska personnel to identify specific environmentally sensitive areas within National Wildlife Refuges or State special areas which should be considered when developing a project-specific OSCP.

Consideration should be given in an OSCP as to whether use of dispersants is an appropriate defense in the vicinity of an area of special biological and cultural sensitivity. Lessees are advised that prior approval must be obtained before dispersants are used.

(n) Information on Oil-Spill-Cleanup Capability. Exploratory drilling, testing, and other downhole activities will be prohibited in broken-ice conditions unless the lessee demonstrates to the RS/FO, the capability to detect, contain, clean up, and dispose of spilled oil in broken ice. For production operations, spill response plans must include a thorough evaluation of the burnability and emulsification characteristics of the field's crude oil under Arctic open-water and broken-ice conditions. The adequacy of these plans will be determined by the RS/FO with full consideration of the comments and recommendations received through the public review process. Lessees may be required to conduct additional field tests to verify response capabilities in broken-ice conditions.

(o) Information on Oil-Spill-Response Preparedness. Lessees are advised that they must be prepared to respond to oil spills which could occur as a result of offshore oil and gas exploration and development activities. With or prior to submitting a plan of exploration or a development and production plan, the lessee will submit for approval an OSCP in accordance with 30 CFR 250.42 and 30 CFR 254. Of particular concern are sections of the OSCP which address potential spill size and trajectory, specific actions to be taken in the event of a spill, the location and appropriateness of oil-spill equipment, and the ability of the lessee to protect communities and important resources from adverse effects of a spill. In the event local communities could be immediately affected by a spill, lessees are encouraged to stage response equipment within those communities and to utilize community resources in their response effort. In addition, lessees will be required to conduct spill response drills which include deployment of equipment to demonstrate response preparedness for spills under realistic conditions. Guidelines for oil-spill-contingency planning and response drills which supplement 30 CFR 250.43 and 30 CFR 254 have been developed and are available from the RS/FO.

(p) Information on the Oil Pollution Act of 1990 (33 U.S.C. 2701 et seq.) . Lessees are advised that Section 1016(c)(1) of the Oil Pollution Act (OPA) of 1990 (33 U.S.C. 2716(c)(1)) requires that lessees establish and maintain evidence of financial responsibility of \$150,000,000 for offshore facilities. This provision supersedes the \$35,000,000 requirement under Title III of the OCSLA, as amended (43 U.S.C. 1814). The authority to administer this provision has been transferred from the U. S. Coast Guard (USCG) to the MMS. On April 16, 1993, MMS issued a Notice to Lessees, No. 93-1N to establish interim guidelines for certificates of oil spill financial responsibility. The interim guidelines retain the \$35,000,000 oil spill financial responsibility requirement for offshore facilities until new superseding regulations are issued.

In addition, the MMS issued interim regulations at 30 CFR 254 pursuant to the Federal Water Pollution Control Act (33 U.S.C. 1321(j)), as amended by Section 4202(b)(4) of the OPA, addressing oil spill response plans for offshore facilities. The OCS lease activities will be subject to the provisions of this interim rule and subsequent final regulations in addition to existing OSCP regulations at 30 CFR 250 issued under the OCSLA.

(q) Information on Coastal Zone Management . The State of Alaska will review OCS plans and associated OSCP's through the review process for consistency with the Alaska Coastal Management Program (ACMP). The ACMP includes statewide standards found in 6 AAC 80 and enforceable policies found within approved coastal district programs. Contingency plans will be reviewed for compliance with state standards, the use of best available and safest technologies, and with state and regional contingency plans on a case-by-case basis.

(r) Information on Navigational Safety. Operations on some of the blocks offered for lease may be restricted by designation of fairways, precautionary zones, anchorages, safety zones, or traffic separation schemes established by the USCG pursuant to the Ports and Waterways Safety Act (33 U.S.C. 1221 et seq.), as amended. Lessees are encouraged to contact the USCG regarding any identified restrictions. The U.S. Corps of Engineers permits are

required for construction of any artificial islands, installations, and other devices permanently or temporarily attached to the seabed located on the OCS in accordance with Section 4(e) of the OCSLA, as amended.

For additional information, prospective bidders should contact the U.S. Coast Guard, 17th Coast Guard District, P.O. Box 3-5000, Juneau, Alaska 99802, (907) 586-7355. For Corps of Engineers information, prospective bidders should contact U.S. Corps of Engineers, Alaska District, Regulatory Branch (1145b), P.O. Box 898, Anchorage, Alaska 99506-0898, (907) 753-2724.

(s) Information on Offshore Pipelines. Lessees are advised that the Department of the Interior and the Department of Transportation have entered into a Memorandum of Understanding, dated May 6, 1976, concerning the design, installation, operation, and maintenance of offshore pipelines. Bidders should consult both departments for regulations applicable to offshore pipelines.

(t) Information on Affirmative Action Requirements. Revision of Department of Labor regulations on affirmative action requirements for Government contractors (including lessees) has been deferred, pending review of those regulations (see *Federal Register* of August 25, 1981, at 46 FR 42865 and 42968). Should changes become effective at any time before the issuance of leases resulting from this sale, section 18 of the lease form (Form MMS-2005, March 1986) would be deleted from leases resulting from this sale. In addition, existing stocks of the affirmative action forms contain language that would be superseded by revised regulations at 41 CFR 60-1.5(a)(1) and 60-1.7(a)(1). Submission of Form MMS-2032 (June 1985) and Form MMS-2033 (June 1985) will not invalidate an otherwise acceptable bid, and the requirements of the revised regulations will be deemed to be part of the existing affirmative action forms.

(u) Information on Discharge of Produced Waters. Lessees are advised that the State of Alaska prohibits discharges of produced waters on State tracts within the ten-meter depth contour. Discharges of produced waters into marine waters are subject to conditions of National Pollutant Discharge Elimination System permits issued by the EPA, and may also include a zero-discharge requirement on Federal tracts within the ten-meter contour.

(v) Information on Use of Existing Pads and Islands. During the review and approval process for exploration and development and production plans, MMS will encourage lessees to use existing pads and islands wherever feasible.

**UNITED STATES
DEPARTMENT OF THE INTERIOR
MINERALS MANAGEMENT SERVICE**

**Stipulations for Oil and Gas Lease Sale 144
Outer Continental Shelf
Beaufort Sea
Alaska**

Stipulation No. 1. Protection of Biological Resources

If biological populations or habitats that may require additional protection are identified in the lease area by the Regional Supervisor, Field Operations (RS/FO), the RS/FO may require the lessee to conduct biological surveys to determine the extent and composition of such biological populations or habitats. The RS/FO shall give written notification to the lessee of the RS/FO's decision to require such surveys.

Based on any surveys that the RS/FO may require of the lessee or on other information available to the RS/FO on special biological resources, the RS/FO may require the lessee to:

- (1) Relocate the site of operations;
- (2) Establish to the satisfaction of the RS/FO, on the basis of a site-specific survey, either that such operations will not have a significant adverse effect upon the resource identified or that a special biological resource does not exist;
- (3) Operate during those periods of time, as established by the RS/FO, that do not adversely affect the biological resources; and/or
- (4) Modify operations to ensure that significant biological populations or habitats deserving protection are not adversely affected.

If any area of biological significance should be discovered during the conduct of any operations on the lease, the lessee shall immediately report such findings to the RS/FO and make every reasonable effort to preserve and protect the biological resource from damage until the RS/FO has given the lessee direction with respect to its protection.

The lessee shall submit all data obtained in the course of biological surveys to the RS/FO with the locational information for drilling or other activity. The lessee may take no action that might affect the biological populations or habitats surveyed until the RS/FO provides written directions to the lessee with regard to permissible actions. The RS/FO will utilize the best available information as determined in consultation with the Arctic Biological Task Force.

Stipulation No. 2. Orientation Program

The lessee shall include in any exploration or development and production plans submitted under 30 CFR 250.33 and 250.34 a proposed orientation program for all personnel involved in exploration or development and production activities (including personnel of the lessee's agents, contractors, and subcontractors) for review and approval by the Regional Supervisor, Field Operations. The program shall be designed in sufficient detail to inform individuals working on the project of specific types of environmental, social, and cultural concerns that relate to the sale and adjacent areas. The program shall address the importance of not disturbing archaeological and biological resources and habitats, including endangered species, fisheries, bird colonies, and marine mammals and provide guidance on how to avoid disturbance. This guidance will include the production and distribution of information cards on endangered and/or threatened species in the sale area. The program shall be designed to increase the sensitivity and understanding of personnel to community values, customs, and lifestyles in areas in which such personnel will be operating. The orientation program shall also include information concerning avoidance of conflicts with subsistence, commercial fishing activities, and pertinent mitigation.

The program shall be attended at least once a year by all personnel involved in onsite exploration or development and production activities (including personnel of the lessee's agents, contractors, and subcontractors) and all supervisory and managerial personnel involved in lease activities of the lessee and its agents, contractors, and subcontractors.

The lessee shall maintain a record of all personnel who attend the program onsite for so long as the site is active, not to exceed 5 years. This record shall include the name and date(s) of attendance of each attendee.

Stipulation No. 3. Transportation of Hydrocarbons

Pipelines will be required: (a) if pipeline rights-of-way can be determined and obtained; (b) if laying such pipelines is technologically feasible and environmentally preferable; and (c) if, in the opinion of the lessor, pipelines can be laid without net social loss, taking into account any incremental costs of pipelines over alternative methods of transportation and any incremental benefits in the form of increased environmental protection or reduced multiple-use conflicts. The lessor specifically reserves the right to require that any pipeline used for transporting production to shore be placed in certain designated management areas. In selecting the means of transportation, consideration will be given to recommendations of any advisory groups and Federal, State, and local governments and industry.

Following the development of sufficient pipeline capacity, no crude oil production will be transported by surface vessel from offshore production sites, except in the case of an emergency. Determinations as to emergency conditions and appropriate responses to these conditions will be made by the Regional Supervisor, Field Operations.

Stipulation No. 4. Industry Site-Specific Bowhead Whale-Monitoring Program

Lessees proposing to conduct exploratory drilling operations, including seismic surveys, during the bowhead whale migration will be required to conduct a site-specific monitoring program approved by the Regional Supervisor, Field Operations (RS/FO); unless, based on the size, timing, duration, and scope of the proposed operations, the RS/FO, in consultation with the North Slope Borough (NSB) and the Alaska Eskimo Whaling Commission (AEWC), determine that a monitoring program is not necessary. The RS/FO will provide the NSB, AEWC, and the State of Alaska a minimum of 30 but no longer than 60 calendar days to review and comment on a proposed monitoring program prior to approval. The monitoring program must be approved each year before exploratory drilling operations can be commenced.

The monitoring program will be designed to assess when bowhead whales are present in the vicinity of lease operations and the extent of behavioral effects on bowhead whales due to these operations. In designing the program, lessees must consider the potential scope and extent of effects that the type of operation could have on bowhead whales. Scientific studies and individual experiences relayed by subsistence hunters indicate that, depending on the type of operations, individual whales may demonstrate avoidance behavior at distances of up to 24 km. The program must also provide for the following:

- (1) Recording and reporting information on sighting of other marine mammals and the extent of behavioral effects due to operations,
- (2) Inviting an AEWC or NSB representative to participate in the monitoring program as an observer,
- (3) Coordinating the monitoring logistics beforehand with the MMS Bowhead Whale Aerial Survey Project (BWASP),
- (4) Submitting daily monitoring results to the MMS BWASP,
- (5) Submitting a draft report on the results of the monitoring program to the RS/FO within 60 days following the completion of the operation. The RS/FO will distribute this draft report to the AEWC, the NSB, the State of Alaska, and the National Marine Fisheries Service (NMFS).

(6) Submitting a final report on the results of the monitoring program to the RS/FO. The final report will include a discussion of the results of the peer review of the draft report. The RS/FO will distribute this report to the AEW, the NSB, the State of Alaska, and the NMFS.

Lessees will be required to fund an independent peer review of a proposed monitoring plan and the draft report on the results of the monitoring program. This peer review will consist of independent reviewers who have knowledge and experience in statistics, monitoring marine mammal behavior, the type and extent of the proposed operations, and an awareness of traditional knowledge. The peer reviewers will be selected by the RS/FO from experts recommended by the NSB, the AEW, industry, NMFS, and MMS. The results of these peer reviews will be provided to the RS/FO for consideration in final approval of the monitoring program and the final report, with copies to the NSB, AEW, and the State of Alaska.

In the event the lessee is seeking a Letter of Authorization (LOA) or Incidental Harassment Authorization (IHA) for incidental take from the NMFS, the monitoring program and review process required under the LOA or IHA may satisfy the requirements of this stipulation. Lessees must advise the RS/FO when it is seeking an LOA or IHA in lieu of meeting the requirements of this stipulation and provide the RS/FO with copies of all pertinent submittals and resulting correspondence. The RS/FO will coordinate with the NMFS and advise the lessee if the LOA or IHA will meet these requirements.

This stipulation applies to the following blocks for the time periods listed and will remain in effect until termination or modification by the Department of the Interior, after consultation with the NMFS and the NSB.

SPRING MIGRATION AREA
April 1 through June 15

<u>OPD</u>	<u>Blocks Included</u>
NR 05-01, Dease Inlet	6004 - 6011, 6054 - 6061, 6104 - 6111, 6154 - 6167, 6204 - 6220, 6254 - 6270, 6304 - 6321, 6354 - 6371, 6404 - 6423, 6454 - 6473, 6504 - 6523, 6554 - 6573, 6604 - 6623, 6654 - 6673, 6717 - 6723
NR 05-02, Harrison Bay North	6401 - 6404, 6451 - 6454, 6501 - 6506, 6551 - 6556, 6601 - 6612, 6651 - 6662, 6701 - 6716

CENTRAL FALL MIGRATION AREA
September 1 through October 31

<u>OPD</u>	<u>Blocks Included</u>
NR 05-01, Dease Inlet	6704 - 6716, 6754 - 6773, 6804 - 6823, 6856 - 6873, 6908 - 6923, 6960 - 6973, 7011 - 7023, 7062 - 7073, 7112 - 7123
NR 05-03, Teshekpuk	6015 - 6024, 6067 - 6072
NR 05-02, Harrison Bay North	6751 - 6766, 6801 - 6818, 6851 - 6868, 6901 - 6923, 6951 - 6973, 7001 - 7023, 7051 - 7073, 7101 - 7123

CENTRAL FALL MIGRATION AREA
September 1 through October 31
(continued)

<u>OPD</u>	<u>Blocks Included</u>
NR 05-04, Harrison Bay	6001 - 6023, 6052 - 6073, 6105 - 6123, 6157 - 6173, 6208 - 6223, 6258 - 6274, 6309 - 6324, 6360 - 6374, 6410 - 6424, 6461 - 6471, 6512 - 6519, 6562 - 6566, 6613 - 6614
NR 06-01, Beechey Point North	6901, 6951, 7001, 7051 - 7062, 7101 - 7113
NR 06-03, Beechey Point	6002 - 6014, 6052 - 6064, 6102 - 6114, 6152 - 6169, 6202 - 6220, 6251 - 6274, 6301 - 6324, 6351 - 6374, 6401 - 6424, 6456 - 6474, 6509 - 6524, 6568 - 6574, 6618 - 6624, 6671 - 6674, 6723 - 6724, 6773
NR 06-04, Flaxman Island	6301 - 6303, 6351 - 6359, 6401 - 6409, 6451 - 6459, 6501 - 6509, 6551 - 6559, 6601 - 6609, 6651 - 6659, 6701 - 6709, 6751 - 6759, 6802 - 6809, 6856 - 6859

EASTERN FALL MIGRATION
August 1 through October 31

<u>OPD</u>	<u>Blocks Included</u>
NR 06-04, Flaxman Island	6360 - 6364, 6410 - 6424, 6460 - 6474, 6510 - 6524, 6560 - 6574, 6610 - 6624, 6660 - 6674, 6710 - 6724, 6760 - 6774, 6810 - 6824, 6860 - 6874, 6910 - 6924, 6961 - 6974, 7013 - 7022, 7066 - 7070, 7118 - 7119
NR 07-03, Barter Island	6401 - 6405, 6451 - 6455, 6501 - 6505, 6551 - 6555, 6601 - 6605, 6651 - 6655, 6701 - 6705, 6751 - 6755, 6801 - 6805, 6851 - 6855, 6901 - 6905

Stipulation No. 5, Subsistence Whaling and Other Subsistence Activities

Exploration and development and production operations shall be conducted in a manner that prevents unreasonable conflicts between the oil and gas industry and subsistence activities (including, but not limited to, bowhead whale subsistence hunting).

Prior to submitting an exploration plan or development and production plan (including associated oil-spill contingency plans) to the MMS for activities proposed during the bowhead whale migration period, the lessee shall consult with the potentially affected subsistence communities, Barrow, Kaktovik, or Nuiqsut, the North Slope Borough (NSB), and the Alaska Eskimo Whaling Commission (AEWC) to discuss potential conflicts with the siting, timing, and methods of proposed operations and safeguards or mitigating measures which could be implemented by the operator to prevent unreasonable conflicts. Through this consultation, the lessee shall make every reasonable effort to assure that exploration, development, and production activities are compatible with whaling and other subsistence hunting activities and will not result in unreasonable interference with subsistence harvests.

A discussion of resolutions reached during this consultation process and plans for continued consultation shall be included in the exploration plan or the development and production plan. In particular, the lessee shall show in the plan how activities will be scheduled and located to prevent unreasonable conflicts with subsistence activities. Lessees shall also include a discussion of multiple or simultaneous operations, such as ice management and seismic activities, that can be expected to occur during operations in order to more accurately assess the potential for any cumulative affects. Communities, individuals, and other entities who were involved in the consultation shall be identified in the plan. The RS/FO shall send a copy of the exploration plan or development and production plan

(including associated oil-spill contingency plans) to the potentially affected communities, and the AEWG at the time they are submitted to the MMS to allow concurrent review and comment as part of the plan approval process.

In the event no agreement is reached between the parties, the lessee, the AEWG, the NSB, the National Marine Fisheries Service (NMFS), or any of the subsistence communities that could potentially be affected by the proposed activity may request that the RS/FO assemble a group consisting of representatives from the subsistence communities, AEWG, NSB, NMFS, and the lessee(s) to specifically address the conflict and attempt to resolve the issues before making a final determination on the adequacy of the measures taken to prevent unreasonable conflicts with subsistence harvests. Upon request, the RS/FO will assemble this group before making a final determination on the adequacy of the measures taken to prevent unreasonable conflicts with subsistence harvests.

The lessee shall notify the RS/FO, of all concerns expressed by subsistence hunters during operations and of steps taken to address such concerns. Lease-related use will be restricted when the RS/FO determines it is necessary to prevent unreasonable conflicts with local subsistence hunting activities.

In enforcing this stipulation, the RS/FO will work with other agencies and the public to assure that potential conflicts are identified and efforts are taken to avoid these conflicts, (for example, timing operations to avoid the bowhead whale subsistence hunt). These efforts might include seasonal drilling restrictions, seismic and threshold depth restrictions, and requirements for directional drilling and the use of other technologies deemed appropriate by the RS/FO.

Subsistence whaling activities occur generally during the following periods:

August to October: Kaktovik whalers use the area circumscribed from Anderson Point in Camden Bay to a point 30 kilometers north of Barter Island to Humphrey Point east of Barter Island. Nuiqsut whalers use an area extending from a line northward of the Nechelik Channel of the Colville River to Flaxman Island, seaward of the Barrier Islands.

September to October: Barrow hunters use the area circumscribed by a western boundary extending approximately 15 kilometers west of Barrow, a northern boundary 50 kilometers north of Barrow, then southeastward to a point about 50 kilometers off Cooper Island, with an eastern boundary on the east side of Dease Inlet. Occasional use may extend eastward as far as Cape Halkett.

Stipulation No. 6, Agreement Between the United States of America and the State of Alaska

This stipulation applies to the following blocks or portions of blocks referred to in this Notice as disputed: NR 05-03, Teshekpuk, block 6024; NR 05-04, Harrison Bay, blocks 6001, 6421, 6423-6424, 6461-6463, 6470-6471, 6512-6515, 6562-6566, 6613-6614; NR 06-03, Beechey Point, blocks 6401, 6403, 6511-6514, 6562-6563, 6568-6570, 6612-6614, 6616, 6618-6621, 6663-6666, 6668-6669, 6718-6720, 6723-6724, 6768-6771, 6819-6820, 6870-6871, 6874, 6924; NR 06-04, Flaxman Island, blocks 6802-6803, 6857, 6901, 7014-7016, 7066-7067.

This lease is subject to the "Agreement Between the United States of America and the State of Alaska Pursuant to Section 7 of the Outer Continental Shelf Lands Act and Alaska Statutes 38.05.137 for the Leasing of Disputed Blocks in Federal Outer Continental Shelf Oil and Gas Lease Sale 144 and State Oil and Gas lease Sale 86" (referred to as the "Agreement"), and the lessee hereby consents to every term of that Agreement. Nothing in that Agreement or this Notice shall affect or prejudice the legal position of the United States in United States of America v. State of Alaska, United States Supreme Court No. 84, Original.

Any loss incurred or sustained by the lessee as a result of obtaining validation and recognition of this lease pursuant to the Agreement, and in particular any loss incurred or sustained by the lessee as a result of conforming this lease with any and all provisions of all applicable laws of the party prevailing in United States of America v. State of Alaska, No. 84 Original, shall be borne exclusively by the lessee.

No taxes payable to the State of Alaska will be required to be paid with respect to this lease until such time as

ownership of or jurisdiction over the lands subject to this lease is resolved. In the event that the lands subject to this lease or any portion of them are judicially determined to be State lands, the lessee shall pay to the State of Alaska a sum equivalent to the State taxes which would have been imposed under Alaska law if the lands, or portion thereof determined to be State lands, had been undisputed State lands from the date the lease was executed, plus interest at the annual legal rate of interest provided under Alaska law accruing from the date the taxes would have become due under Alaska law. Such payment shall be in lieu of, and in satisfaction of, the actual State taxes.

Stipulation No. 7. Agreement Regarding Unitization

This stipulation applies to the following blocks or portions of blocks referred to in this Notice as disputed: NR 05-03, Teshekpuk, block 6024; NR 05-04, Harrison Bay, blocks 6001, 6421, 6423-6424, 6461-6463, 6470-6471, 6512-6515, 6562-6566, 6613-6614; NR 06-03, Beechey Point, blocks 6401, 6403, 6511-6514, 6562-6563, 6568-6570, 6612-6614, 6616, 6618-6621, 6663-6666, 6668-6669, 6718-6720, 6723-6724, 6768-6771, 6819-6820, 6870-6871, 6874, 6924; NR 06-04, Flaxman Island, blocks 6802-6803, 6857, 6901, 7014-7016, 7066-7067.

This lease is subject to the "Agreement Regarding Unitization for the Outer Continental Shelf Oil and Gas Lease Sale 144 and State Oil and Gas Lease Sale 86 Between the United States of America and the State of Alaska" and the lessee is bound by the terms of that Agreement.

ATTACHMENT F
Agenda

Minerals Management Service
ARCTIC SEISMIC SYNTHESIS AND MITIGATING MEASURES WORKSHOP
Ilisagvik College, Barrow, Alaska

FINAL AGENDA

MARCH 5, 1997

8:30 am Statements about Workshop Objectives by Workshop Co-Chairs: Dr. Tom Albert, NSB and Steve Treacy, MMS; Chuck Mitchell, MBC, Facilitator

Ben Nageak, Mayor, North Slope Borough (NSB)
Robert Brock, Minerals Management Service (MMS)
Burton Rexford, Chairman, Alaska Eskimo Whaling Commission

9:00 am Seismic Operations: Data Requirements, Equipment, and Procedures

Representative from Alaska Oil and Gas Association, Anchorage
John Davis and Jeff Mayville, Western Geophysical, Anchorage and Houston

9:45 am 15 minute break

PANEL DISCUSSION ABOUT SCIENTIFIC AND TRADITIONAL INFORMATION

10:00 am Beaufort Sea Bowhead Whale Migration

Steve Treacy, MMS

10:20 am High-energy Seismic Survey Sounds and Propagation

Dr. Chris Clark, Bioacoustician, Cornell University, Ithaca
Dr. Charles Greene, Jr., Greeneridge Sciences, Santa Barbara
Christine Mire, Ocean Acoustics Branch, Naval Research Lab, Stennis Space Center

11:20 am Aerial Observations of Seismic-vessel Effects on Bowhead Whales

Dr. W. John Richardson, LGL environmental research associates, King City, Ontario, Canada

12:00 pm Lunch

CONTINUING PANEL DISCUSSIONS

1:00 pm Open Discussion Moderated by Workshop Co-chairs: Tom Albert, NSB and Steve Treacy, MMS

1:30 pm Comments by Subsistence Hunters regarding Impacts of Seismic Noise to Fall Migrating Bowhead Whales and to the Subsistence Hunt. Moderated by Tom Albert, NSB

Observations by 20 Subsistence Whalers from Barrow, Kaktovik, and Nuiqsut.

3:30 pm Break

3:45 pm Open Discussion with Panel members, moderated by Workshop Co-chairs: Tom Albert, NSB and Steve Treacy, MMS

4:30 pm End of Day One

MARCH 6, 1997

WORKING GROUP DISCUSSIONS

8:30 am Opening Remarks about current regulatory approaches and special mitigating measures for open-water seismic operations.

*Brad Smith and Ken Hollingshead, National Marine Fisheries Service
Dennis Thurston and Sue Banet, Resource Evaluation, MMS
Tom Bucceri and Brian Havelock, Division of Oil and Gas, Department of Natural Resources,
Anchorage*

9:15 am Charge to the Working Groups: general purpose and structure of the groups, identification of the Working Group Co-Chairs and Key Participants for the groups. Workshop Co-chairs: Tom Albert, NSB and Steve Treacy, MMS

Working Group I on zone-of-influence of seismic vessels

10:00 am 15 minute break

11:00 am Brief reports from Working Group I and the preparation of preliminary conclusions. Moderated by Chuck Mitchell, MBC, Facilitator

11:30 am If requested, additional brief presentations on scientific and traditional information about seismic effects on bowhead whales. Moderated by Workshop Co-chairs: Tom Albert, NSB and Steve Treacy, MMS

12:00 pm Lunch

1:00 pm Working Group II on Communication Among Subsistence Whalers, Industry, and Agencies; Communication Options for Conflict Resolution

Working Group III on Possible Technological Methods of Reducing Effects

Working Group IV on Potential Research and Monitoring Projects, including Co-managed or Cooperative Projects

2:00 pm Brief reports from the Working Groups and preparation of preliminary conclusions. Moderated by Chuck Mitchell, MBC, Facilitator

2:30 pm 15 minute break

SUMMARIES AND SYNTHESIS

2:45 pm Synthesis of information and preparation of workshop recommendations

Discussion led by Working Group Co-Chairs and Workshop Co-Chairs

4:30 pm End of workshop

ATTACHMENT G
Attendee List

**MMS Arctic Seismic Synthesis and Mitigating Measures Workshop
March 5 and 6, 1997
Iilisagvik College, Barrow, Alaska**

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