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05/18/2011 09:02 AM

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bcc

Subject Shell 2012 Chukchi Sea Drilling LOA Application

Dear Mr. Perham,

Shell Gulf of Mexico Inc. (Shell) hereby requests a Letter of Authorization (LOA) from the U.S. Fish and Wildlife Service (USFWS) for the non-lethal incidental, unintentional "take" of small numbers of Polar Bears and Pacific Walrus, and the intentional take of Polar Bears by harassment for a planned exploration drilling program in the Chukchi Sea beginning in the summer of 2012. Shell's request is submitted to fulfill the requirements regarding incidental, unintentional take of protected marine mammals pursuant to 50 Code of Federal Regulations (CFR) Part 18. The governing regulations are entitled, *Nonlethal Taking of Pacific Walruses and Polar Bears Incidental to Oil and Gas Exploration Activities in the Chukchi Sea and adjacent Coast of Alaska*.

On behalf of Susan Childs, Shell's Alaska Venture Support Integrator Manager, one hard copy and one CD of the IHA application and its attachments has been hand-delivered to your attention at the Marine Mammals Management section office in Anchorage.

If you have any questions regarding this request, please contact Susan Childs at (907) 646-7112 or at Susan.Childs@Shell.com , or Pauline Ruddy at (907) 771-7243 or at Pauline.Ruddy@Shell.com .

Warmest regards,

Greg Horner

Regulatory Affairs/Principal Scientist

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Shell Exploration & Production

May 12, 2011

U.S Fish and Wildlife Services
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Re: Request for Letter of Authorization (LOA) for the
Incidental Take of Polar Bears and Pacific Walrus, and the
Intentional Take of Polar Bears by Harassment;
Revised Outer Continental Shelf Lease Exploration Plan, Chukchi Sea, Alaska

Dear Mr. Perham:

Shell Gulf of Mexico Inc. (Shell) hereby requests a Letter of Authorization (LOA) from the U.S. Fish and Wildlife Service (USFWS) for the non-lethal incidental, unintentional "take" of small numbers of Polar Bears and Pacific Walrus, and the intentional take of Polar Bears by harassment, which may occur during Shell's revised Outer Continental Shelf Lease Exploration Plan, Chukchi Sea, Alaska. This letter is submitted to fulfill the requirements regarding incidental, unintentional take of protected marine mammals pursuant to 50 Code of Federal Regulations (CFR) Part 18. The governing regulations are entitled, *Nonlethal Taking of Pacific Walrus and Polar Bears Incidental to Oil and Gas Exploration Activities in the Chukchi Sea and Adjacent Coast of Alaska*.

As described in the attached supporting documentation, Shell's exploration drilling program is planned for various U.S. Department of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) OCS lease blocks in the Chukchi Sea. Shell's exploration drilling activities in the Chukchi Sea are planned to begin on or about July 4th and run through October 31st.

As part of the application for obtaining an LOA for a similar exploration drilling program in the Chukchi Sea in 2010, Shell developed a Plan of Cooperation (POC) in accordance with 50 CFR§18.124(c)(4) that was submitted to USFWS in May 2009. This POC was described in our initial Chukchi Sea EP submitted to BOEMRE also in May 2009. This POC has been updated for a revised Chukchi Sea EP as a POC Addendum that includes information regarding the proposed changes in the revised Chukchi Sea EP, and documents meetings undertaken to specifically inform North Slope stakeholders and obtain their input. The initial POC and POC Addendum mitigate the effects of Shell's planned exploration drilling program where exploration activities would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses. The POC and POC Addendum were prepared in consultation with affected Beaufort and Chukchi Sea communities, marine mammal commissions, and subsistence groups. During these consultations, Shell focused on lessons learned from prior year's activities and presented mitigation measures for avoiding potential conflicts, which are outlined in the POC Addendum included with Shell's current LOA application.

Any potential impacts from the revised Chukchi Sea exploration drilling program on the polar bear and Pacific walrus populations of the Chukchi Sea will be short-term and transitory (i.e., the temporary displacement of individuals or small groups of marine mammals that may be exposed to the planned activities). The planned activities will not result in any permanent impact on habitats used by marine mammals or their prey. As outlined in the attached documents, Shell will take appropriate measures to prevent unreasonable impacts on the availability of marine mammals for subsistence users.

Items required pursuant to 50 CFR 18 are attached. Items include:

- 1) Polar Bear, Pacific Walrus, and Grizzly Bear Avoidance and Human Encounter/Interaction Plan, *Revised Outer Continental Shelf Lease Exploration Plan, Chukchi Sea, Alaska* (which includes a complete description of proposed activities),
- 2) Marine Mammal Monitoring and Mitigation Plan (Attachment B to the Polar Bear, Pacific Walrus, and Grizzly Bear Avoidance and Human Encounter/Interaction Plan); and,
- 3) POC Addendum (Attachment H to the Polar Bear, Pacific Walrus, and Grizzly Bear Avoidance and Human Encounter/Interaction Plan).

If you have any questions regarding this submission, please contact me at (907) 646-7112 or at Susan.Childs@Shell.com, or Pauline Ruddy at (907) 771-7243 or at Pauline.Ruddy@Shell.com.

Thank you,

Susan Childs
AK Venture Support Integrator, Manager

Attachments:

Polar Bear, Pacific Walrus, and Grizzly Avoidance and Human Encounters/Interaction Plan

Cc:

Jeff Walker, U.S Department of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement, Alaska Region, Anchorage
Joel Garlich-Miller, USFWS, Marine Mammals Management, Anchorage
Don Perrin, Alaska Department of Natural Resources, Anchorage
Project File
Administrative Record



**Polar Bear, Pacific Walrus, and Grizzly Bear
Avoidance and Human Encounter/Interaction Plan
Exploration Drilling Program Chukchi Sea, Alaska**

May 2011

Prepared by:

**Shell Gulf of Mexico Inc.
3601 C Street, Suite 1000
Anchorage, Alaska 99503**

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Attachments

Attachment A	Ice Management Plan
Attachment B	Marine Mammal Monitoring and Mitigation Plan (4MP)
Attachment C	Bear Avoidance and Encounter Procedures
Attachment D	Wildlife Notification Flow Chart
Attachment E	Polar Bear Sighting Report
Attachment F	Grizzly Bear Observation Form
Attachment G	Walrus Sighting Report
Attachment H	Plan of Cooperation Addendum

ACRONYMS & ABBREVIATIONS

°C	Degrees Celsius
4MP	Marine Mammal Monitoring and Mitigation Plan
ACRT	Auxiliary Contract Response Team
ACS	Alaska Clean Seas
ADF&G	Alaska Department of Fish and Game
ADEC	Alaska Department of Environmental Conservation
bbl	barrels
BOEMRE	Bureau of Ocean Energy Management, Regulation, and Enforcement
CFR	Code of Federal Regulations
cm ³	cubic centimeter(s)
<i>Discoverer</i>	Motor Vessel <i>Noble Discoverer</i>
<i>drilling program</i>	Chukchi Sea Exploration Drilling Program
EA	Environmental Assessment
EC	Eurocopter
EP	Exploration Plan
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
<i>Fennica</i>	Motor Vessel <i>Fennica</i>
FONSI	Finding of No Significant Impact
ft	foot/feet
FR	Federal Register
IMP	Ice Management Plan
in ³	cubic inch(es)
km	kilometer(s)
LOA	Letter of Authorization
m	meter(s)
m ³	cubic meter(s)
mi	mile(s)
MMPA	Marine Mammal Protection Act
MMO	Marine Mammal Observer
MMS	U.S. Department of the Interior Minerals Management Service
NMFS	National Marine Fisheries Service
NSSRT	North Slope Spill Response Team
OCS	Outer Continental Shelf
ODPCP	Oil Discharge Prevention and Contingency Plan
OSR	Oil Spill Response
OST	Oil Storage Tanker
OSV	offshore supply vessel
Plan	Polar Bear, Pacific Walrus, and Grizzly Bear Avoidance and Human

	Encounter/ Interaction Plan
POC	Plan of Cooperation
RS/FO	Regional Supervisor/Field Operations
SAR	Search and Rescue
Shell	Shell Gulf of Mexico Inc.
Tor Viking	Motor Vessel <i>Tor Viking</i>
U.S.	United States
USFWS	U. S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRT	Village Response Team
VSI	vertical seismic imager
VSP	vertical seismic profile
WCD	Worst Case Discharge
ZVSP	zero-offset vertical seismic profile

1.0 INTRODUCTION

This Polar Bear, Pacific Walrus, and Grizzly Bear Avoidance and Human Encounter/Interaction Plan (Plan) has been developed by Shell Gulf of Mexico Inc. (Shell) in support of its exploration drilling program in the Chukchi Sea beginning in the summer of 2012.

1.1 Background

The Plan details the policies and procedures adopted by Shell and to be implemented at its operations across Alaska's North Slope and in the Chukchi Sea. The Plan is intended to support activities that may encounter polar bears (*Ursus maritimus*) and Pacific walrus (*Odobenus rosmarus divergens*), both trust species of the U.S. Fish and Wildlife Service (USFWS), as well as grizzly bears (*Ursus arctos horribilis*), which are under the jurisdiction of the Alaska Department of Fish and Game (ADF&G).

Even though the chance of interactions with grizzly bears is extremely remote in this offshore exploration drilling program, the Plan includes discussion and guidance for avoiding them.

The Plan ensures that workers are familiar with the issues and safety precautions associated with working in bear country. The goal of this document is to standardize bear interaction and avoidance protocol and wildlife reporting efforts for the project. With proper knowledge and training, workers will detect the presence of bears and walrus quickly and respond appropriately through monitoring, avoidance, and/or, if necessary, active deterrence by USFWS certified bear hazers. The awareness and prevention of human/bear and human/walrus interactions will ensure the safety of workers as well as wildlife.

This Plan is intended to fulfill the requirement for a "site specific polar bear awareness and interaction plan," as required by 50 Code of Federal Regulations (CFR) 18.124(c)(3), which is part of the requirements for a Letter of Authorization (LOA) for the incidental, non-lethal, unintentional take of polar bear and Pacific walrus as specified under 50 CFR 18, Subpart J. This Plan also applies to the intentional take of polar bears by hazing pursuant to section 101(a)(4)(A), 109(h), and 12(e) of the Marine Mammal Protection Act (MMPA). The MMPA prohibits, with certain exceptions, the "taking" of marine mammals. "Take" is defined to mean, "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill any marine mammal." The "taking" of polar bears is allowed for Alaska Native subsistence or to protect human life. The MMPA and supporting regulations make provision to "take" marine mammals in the course of scientific research and other legitimate work in polar bear habitat.

On May 15, 2008, the polar bear was listed as a threatened species under the Endangered Species Act (ESA). In June 2008, a special rule under authority of section 4(d) of the ESA was adopted which states that the regulatory requirements under the ESA are met by following the requirements of the MMPA, including obtaining a LOA. The grizzly bear is not protected in Alaska under the MMPA or ESA, but is protected by State game laws.

On October 29, 2009, a federal register notice (74 Federal Register [FR] 56058) was published outlining proposed critical habitat for the polar bear. The USFWS published a final critical habitat designation December 7, 2010, which became effective January 6, 2011.

Like polar bears, Pacific walrus are also protected under the MMPA. Also, as of February 10, 2011 the USFWS published its 12-month finding that listing the Pacific walrus as endangered or threatened under the ESA is warranted. Though, with publishing of the 12-month petition finding for the Pacific walrus, it has been added to the candidate species list. Consistent with section 4(b)(3)(C)(iii) of the ESA, USFWS will review the status of the Pacific walrus through an annual Candidate Notice of Review.

1.2 Proposed Exploration Plan

The locations of lease blocks where the planned exploration drill sites, and locations where activities in support of exploration drilling, will occur are found on Figure 1.2-1. Shell plans to use one drillship, the Motor Vessel *Noble Discoverer* (*Discoverer*), to drill the exploration wells. The *Discoverer* will be accompanied by ice management vessels, an oil spill response (OSR) fleet, and other support vessels during the exploration drilling program.

Exploration Drilling

Shell submitted its initial Chukchi Sea Exploration Plan (EP) to the former U.S. Department of the Interior Minerals Management Service (MMS) (now Bureau of Ocean Energy Management, Regulation and Enforcement hereinafter collectively referred to as “BOEMRE”) in May of 2009. The Chukchi Sea EP was deemed submitted by BOEMRE on 20 October 2009. BOEMRE subsequently prepared a draft Environmental Assessment (EA) wherein it analyzed the potential impacts of the proposed exploration drilling program, and it released that draft for public review and comment. On 7 December 2009, following the close of public comment, BOEMRE issued a final EA and Finding of No Significant Impact (FONSI), and approved Shell’s Chukchi Sea EP. In that initial Chukchi Sea EP, Shell identified seven blocks (Posey Area Blocks 6713, 6714, 6763, 6764, 6912 and Karo Area Blocks 6864 and 7007) of interest in three prospects (Burger, Southwest Shoebill, and Crackerjack), that contained five potential drill sites (Burger C, F, J, Southwest Shoebill C, and Crackerjack C). The exploration activities contemplated by the initial Chukchi Sea EP included the drilling of an exploration well at up to three of the above-reference five potential drill sites using the drillship *Frontier Discoverer*, which is now known as the Motor Vessel (M/V) *Noble Discoverer* (*Discoverer*) following the acquisition of Frontier by Noble Corporation. Shell planned to initiate exploration activities under the Chukchi Sea EP in the summer of 2010, but the exploration activities were postponed when BOEMRE suspended all exploration activities in the Arctic following the Deepwater Horizon incident in the Gulf of Mexico.

Pursuant to a revised Chukchi Sea EP submitted to BOEMRE in May 2011, which includes a complete Environmental Impact Analysis (EIA – Section 16 of the revised Chukchi Sea EP) of the revised Chukchi Sea EP, Shell plans to drill exploration wells at several of the same drill sites at one of the prospects identified in the initial exploration plan starting in 2012. The revised Chukchi Sea EP drill sites are shown in Table 1.2-1.

As required by 30 Code of Federal Regulations (CFR) 250.212-228, details of the planned exploration drilling program are provided in the following sections and accompanying attachment material. While Shell has made this submission as a plan revision, it acknowledges that, pursuant to 30 CFR 250.285(c), the impacts previously identified and evaluated in Shell’s

initial Chukchi Sea EP and BOEMRE's December 2009 Environmental Assessment and Finding of No Significant Impact are different than the impacts potentially resulting from the plan revision, and that this plan revision is subject to all of the procedures under 30 CFR 250.231 through 30 CFR 250.235.

Shell plans to conduct an exploration drilling program on BOEMRE Alaska Outer Continental Shelf (OCS) leases at drill sites greater than 64 miles (mi) [103 kilometers (km)] from the Chukchi Sea coast starting in the 2012 drilling season (Chukchi Sea Exploration Drilling Program, hereinafter, the "exploration drilling program") (Figure 1.2-1).

The leases were acquired during the Chukchi Sea Oil and Gas Lease Sales 193 held in February 2008. During 2012, the initial year of the exploration drilling program, Shell plans to drill up to three exploration wells at three drill sites, and potentially a partial well at a fourth drill site in the Chukchi Sea at the prospect known as Burger (Table 1.2-1). All wells are planned to be vertical.

Table 1.2-1 Chukchi Sea Drill Sites - Burger Prospect

Prospect	Well	Area	Block	Lease Number	'Coordinates (m)		Latitude	Longitude
					X	Y		
Burger	A	Posey	6764	OCS-Y-2280	563945.26	7912759.34	N71° 18' 30.92"	W163° 12' 43.17"
Burger	F	Posey	6714	OCS-Y-2267	564063.30	7915956.94	N71° 20' 13.96"	W163° 12' 21.75"
Burger	J	Posey	6912	OCS-Y-2321	555036.01	7897424.42	N71° 10' 24.03"	W163° 28' 18.52"
Burger	R	Posey	6812	OCS-Y-2294	553365.47	7907998.91	N71° 16' 06.57"	W163° 30' 39.44"
Burger	S	Posey	6762	OCS-Y-2278	554390.64	7914198.48	N71° 19' 25.79"	W163° 28' 40.84"
Burger	V	Posey	6915	OCS-Y-2324	569401.40	7898124.84	N71° 10' 33.39"	W163° 04' 21.23"

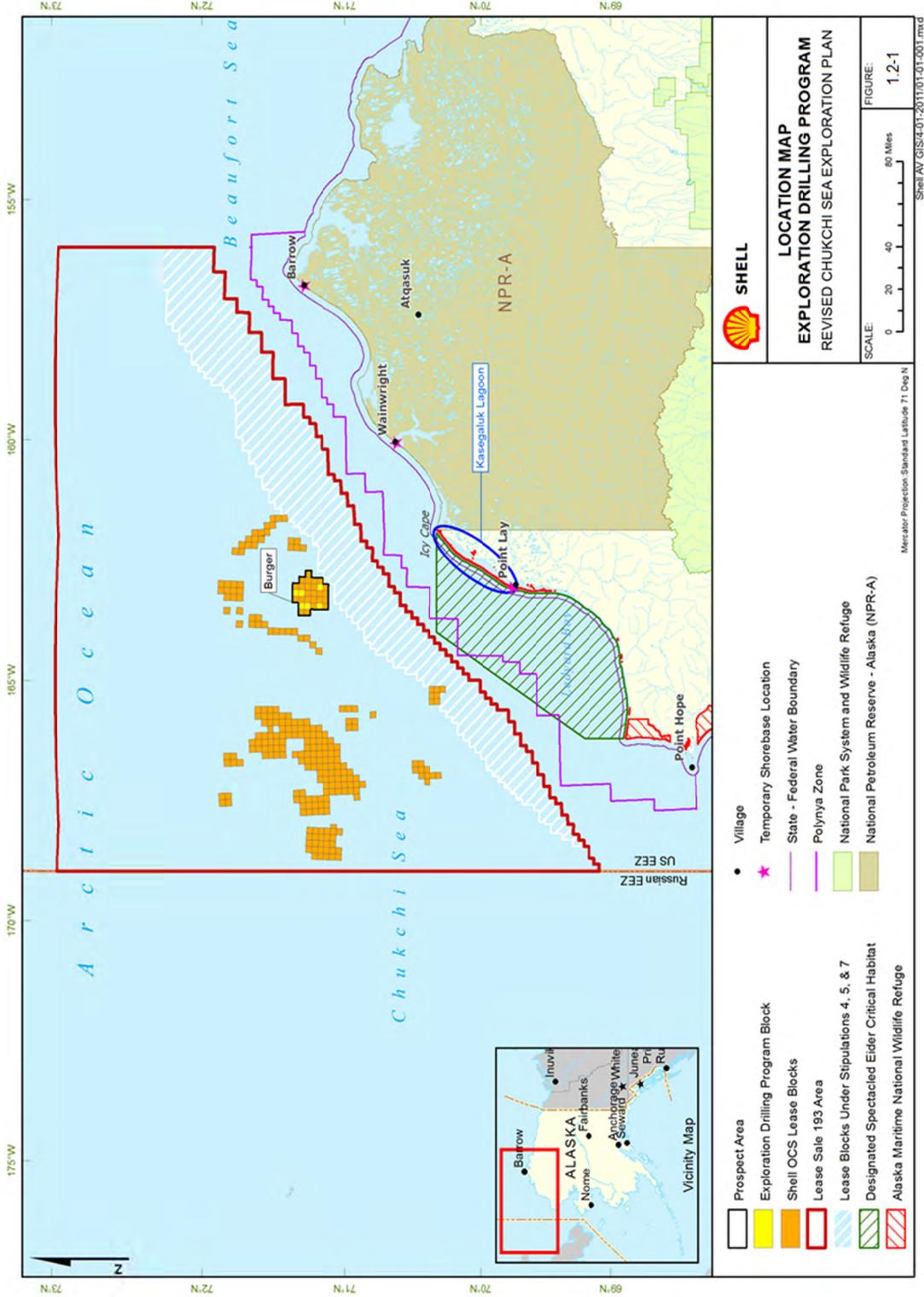
This plan also contemplates a situation where a well that is started must be temporarily suspended due to ice, weather, or other conditions, and finished at a later date. Any well on which exploration drilling is suspended will be secured in compliance with BOEMRE regulations and with the approval of the Regional Supervisor/Field Operations (RS/FO), whether it is permanently abandoned (30 CFR 250.1710 through 1717) or temporarily abandoned (30 CFR 250.1721-1723).

Shell may conduct a geophysical survey referred to as a zero-offset vertical seismic profile (ZVSP) at each drill site where a well is drilled. Once the objective intervals are fully evaluated, each exploration well will be plugged and abandoned in compliance with BOEMRE regulation.

Drilling Vessel

The ice strengthened drillship *Discoverer* will be used to drill the wells. While on location at the drill sites, the *Discoverer* will be affixed to the seafloor using eight, 7-ton Stevpris anchors arranged in a radial array. .

Figure 1.2-1 Planned EP Exploration Drilling Area



Support Vessels

During this exploration drilling program, the *Discoverer* will be attended by a minimum of ten vessels used for ice management, anchor handling, OSR, refueling, resupply, and servicing of the exploration drilling operations (Tables 1.2-2 and 1.2-3). In Table 1.2-3, the barges include an accompanying vessel(s) that together with the barge are counted as one vessel attending the *Discoverer*.

The M/V *Fennica* (*Fennica*), or a similar vessel, will serve as the ice management vessel in support of the *Discoverer*. This vessel will enter and exit the Chukchi Sea with the *Discoverer* and will remain at a location approximately 25 mi (40 km) upwind and upcurrent of the drillship when not in use. Any ice management would be expected to occur at a distance of 3-12 mi (5-19 km) upwind/upcurrent of the drillship. The M/V *Tor Viking* (*Tor Viking*) or a similar vessel will serve as the primary anchor handling vessel in support of the *Discoverer*. The vessel will enter and exit the Chukchi Sea with the *Discoverer* and will remain at a location approximately 25 mi (40 km) upwind and upcurrent of the drillship when not in use. Any ice management would be expected to occur within 0.6-6.0 mi (1.0-9.6 km) upwind from the *Discoverer*.

The planned exploration drilling operations will require two offshore supply vessels (OSVs) to resupply the *Discoverer* with drilling materials and supplies from facilities in Dutch Harbor and fuel. The vessels may be vessels such as the *Harvey Explorer*, and the *C-Leader*, or similar offshore supply boats.

Table 1.2-2 Chukchi Sea Exploration Drilling Program – Proposed Vessel List

Specification	Ice Management Vessel ¹	Anchor Handler ²	OSV ³	OSV ⁴
Length	380 ft	275 ft	280 ft	280 ft
	116 m	83.7 m	85.3 m	85.3 m
Width	85 ft	59 ft	60 ft	60 ft
	26 m	18.0 m	18.3 m	18.3 m
Draft	27 ft	20 ft	15.9 ft	19 ft
	8.4 m	6.0 m	4.9 m	5.8 m
Accommodations	82 berths	23 berths	37 berths	29 berths
Maximum Speed	16 knots	16 knots	13 knots	13 knots
	30 km/hr	30 km/hr	24 km/hr	24 km/hr
Fuel Storage	11,070 bbl	7,484 bbl	6,233 bbl	7,217 bbl
	1,760 m ³	1,190 m ³	991 m ³	1,147 m ³

¹ Based on *Fennica*, or similar vessel

² Based on *Tor Viking*, or similar vessel

³ Based on the *Harvey Spirit*, or similar vessel

⁴ Based on *C-Leader*, or similar vessel

Oil Spill Response Vessels

The OSR vessels supporting the exploration drilling program include a dedicated OSR barge and an OSR vessel, both of which have associated smaller workboats, and an oil storage tanker (OST). The OSR barge and the OST have not been contracted, but specifications for these vessels, based on the types of vessels that might be contracted, are provided below in Table 1.2-3. An OSR barge, or similar vessel and a tug, will be staged in the vicinity of the drillship. It will carry response equipment including a 47-ft (14-m) skimming vessels, three 34-ft (10-m)

workboats, four mini-barges, and boom and duplex skimming units for response and recovery. The workboats will also be used to shuttle OSR crews between a shorebase in Wainwright and the OSR barge for OSR training and drills and resupply as required. Together with the OSR vessel, this OSR barge will have sufficient containment, recovery, and storage capacity for the initial operational period in the event of a spill.

The containment barge will be tended by a tug and possibly an anchor handler (Table 1.2-3). The tug tending the containment barge will either drift or motor under “slow-steam” movement with the barge. An anchor handler is included in this plan only as an additional tending option for the containment barge, if Shell deems it necessary in advance of the season to anchor the containment barge. Shell does not assume the containment barge will be anchored or that the anchor handler is necessary, but includes the option of anchoring the barge and it being also tended by an anchor handler in case that option is chosen.

An OST such as the *Mikhail Ulyanov* or a vessel with similar liquid storage capacity will be staged in the vicinity of the Chukchi Sea drill sites so that it will arrive at a recovery site, if needed, within 24 hours of departure from the staging location. The purpose of the OST would be to provide a place to store large volumes of recovered crude oil, emulsion, and free water in the unlikely event of a spill and OSR operations. The OST will possess a minimum liquid storage capacity of 513,000 bbl. An OSR vessel such as the *Nanuq* will be staged in the vicinity of the drillship when the *Discoverer* is drilling in liquid hydrocarbon bearing zones to immediately respond to a spill and provide containment, recovery, and storage for the initial operational period following a spill event. In the unlikely event of a spill, the *Tor Viking* can also be used to lighter recovered oil, emulsions and free water to the *Mikhail Ulyanov*. The *Nanuq* or similar vessel will be paired with an OST such as the *Mikhail Ulyanov* and used to assist refueling the *Discoverer* and support vessels, if necessary.

Table 1.2-3 Chukchi Sea Exploration Drilling Program – Proposed Oil Spill Response Vessel List

Specification	OSR Vessel ^{1,2}	OSR Barge ^{1,3}		OST ^{1,4}	Containment Barge ^{1,5}		
		Barge	Tug		Barge	Tug	Anchor Handler
Length	301 ft 91.9 m	205 ft 62.5 m	90 ft 27.4 m	853 ft 260 m	400 ft	136 ft 36.5 m	275 ft 83.7 m
Width	60 ft 18.3 m	90 ft 27.4 m	32 ft 9.8 m	112 ft 34 m	100 ft	36 ft 11.1 m	59 ft 18.0 m
Fuel Storage	6,867 bbl (1,092 m ³)	390 bbl (62 m ³)	1,786 bbl (284 m ³)	221,408 bbl (35,200 m ³)	--	3,690 bbl (587 m ³)	7,484 bbl (1190 m ³)
Liquid Storage	12,690 bbl (2,017 m ³)	76,900 bbl (12,226 m ³)	--	543,000 bbl (86,328 m ³)	--	--	--
Accommodations (persons)	41	--	6	25	--	10	23
Maximum Speed	16 knots	--	5 knots	16 knots	--	10 knots	16 knots (30 km/hr)
Workboats	(3) 34 ft work boats	(1) skim boat 47 ft (14 m) (3) work boats 34 ft (10 m) (4) mini-barges	--	--	--	--	--

¹ Or similar vessel

² Based on the *Nanuq*

³ Based on the Crowley 450 series barges

⁴ Based on the *Mikhail Ulyanov*, may be a similar vessel with a minimum storage capacity of $\geq 513,000$ bbl

⁵ Based on a standard deck barge, Crowley Invader class ocean going tug, and a *Tor Viking*-style anchor handler

Aircraft

Offshore operations will be serviced by helicopters operated out of onshore support base locations. The helicopters are not yet contracted. A Sikorsky S-92 or Eurocopter EC225 capable of transporting 10 to 12 persons will be used to transport crews between the onshore support base and the drillship. It is expected that on average, 12 round trip flights per week will be necessary to transport supplies and rotate crews. The helicopters will also be used to haul small amounts of food, materials, equipment, and waste between vessels and the shorebase. The helicopter will be housed at facilities at the Barrow airport. Shell will have a second helicopter for Search and Rescue (SAR). The SAR helicopter is expected to be a Sikorsky S-61 or S-92, Eurocopter EC225 or similar model. This aircraft will stay grounded at the Barrow shorebase location except during training drills, emergencies, and other non-routine events.

A fixed wing propeller or turboprop aircraft, such as Saab 340-B 30-seat, Beechcraft 1900, or deHavilland Dash8 will be used to routinely transport crews, materials, and equipment between the shorebase and hub airports such as Barrow or Fairbanks. A fixed wing aircraft, deHavilland Twin Otter (DHC-6) will be used for marine mammal observer (MMO) flights.

Table 1.2-4 Chukchi Sea 2012 Exploration Drilling Program – Proposed Aircraft List

Aircraft	Flight Frequency
Sikorsky S-92 or Eurocopter EC225 - crew rotation	Approximately 12 round trips/week between land and offshore vessels throughout the 2012 drilling season
Sikorsky S-61, S-92 or Eurocopter EC225 helicopter – SAR	Trips made only in emergency; one training flight/month
Saab 340-B or Beechcraft 1900 or deHavilland Dash8 (Only 1) – onshore crew/supply trips	Infrequent, onshore trips from shorebase to hub airports in Barrow and Fairbanks
deHavilland Twin Otter (DHC-6) – 4MP	Twice weekly during drilling season

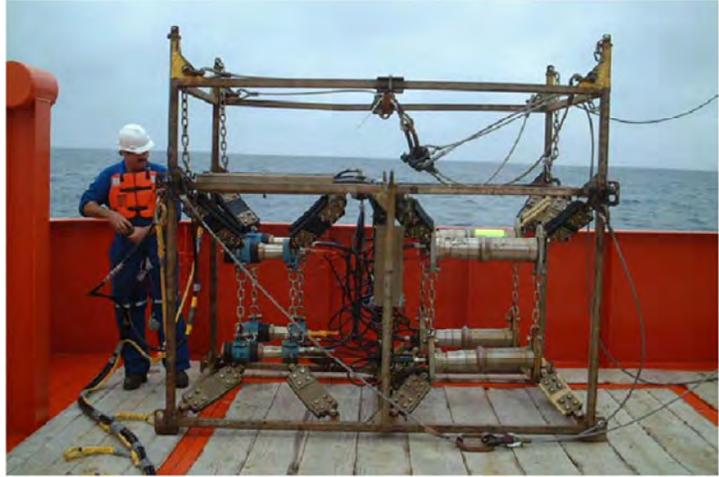
The ice strengthened drillship *Discoverer* will move through the Bering Strait and into the Chukchi Sea on or after 1 July, and then onto the Burger Prospect as soon as ice and weather conditions allow. Exploration drilling activities may continue through 31 October. The drillship and support vessels will exit the Chukchi Sea at the end of the drilling season.

Barrow and/or Wainwright have been selected as the temporary shorebase locations for the Chukchi Sea exploration drilling program. However, no exploration drilling program activities are planned to occur onshore. Nearshore or onshore incursions by exploration drilling program support activities (e.g., OSR training exercises) will occur at the shorebase in Wainwright, on a limited basis. A Barrow shorebase will be used as the primary airbase for crew changes and SAR between land and the drillship and for temporary housing for these crewmembers. It is estimated that there will be up to 12 round trips per week with OSR work boats between the Wainwright shorebase and offshore OSR vessels for training and drills. This interaction plan therefore includes interaction and awareness guidance for Program workers regarding grizzly bears, and polar bears that may be present in the nearshore or land. Interactions with grizzly bears are highly unlikely offshore, and at the shorebases as well. Pacific walrus are present in offshore and nearshore waters of the Chukchi Sea including the area of Shell's prospects, and observations of walrus are likely to occur during the exploration drilling program. All three

species are addressed in this plan, although interactions and encounters grizzly bears are considered unlikely for this project.

Vertical Seismic Profile

Shell may conduct a geophysical survey referred to as a vertical seismic profile or VSP at each drill site where a well is drilled in 2012. During VSP surveys, an airgun array is deployed at a location near or adjacent to the drillship, while receivers are placed (temporarily anchored) in the wellbore. The sound source (airgun array) is fired repeatedly, and the reflected sonic waves are recorded by receivers (geophones) located in the wellbore. The geophones, typically a string, are then raised up to the next interval in the wellbore and the process is repeated until the entire wellbore has been surveyed. The purpose of the VSP is to gather geophysical information at various depths, which can then be used to tie-in or ground-truth geophysical information from the previous seismic surveys with geological data collected within the wellbore.



Photograph of the ITAGA 8-airgun Array in Sled

Shell will be conducting a particular form of VSP referred to as a ZVSP, in which the sound source is maintained at a constant location near the wellbore (Figure 1.2-2). A typical sound source that likely would be used by Shell in 2012 is the ITAGA eight-airgun array, which consists of four 150 cubic inches (in.^3) (2,458 cubic centimeters [cm^3]) airguns and four 40 in.^3 (655 cm^3) airguns. These airguns can be activated in any combination and Shell would utilize the minimum airgun volume required to obtain an acceptable signal. Current specifications of the array are provided in Table 1.2-5. The airgun array is depicted within its frame or sled, which is approximately 6 ft x 5 ft x 10 ft (see photograph below). Typical receivers would consist of a Schlumberger wireline four level vertical seismic imager (VSI) tool, which has four receivers 50-ft (15.2-m) apart.

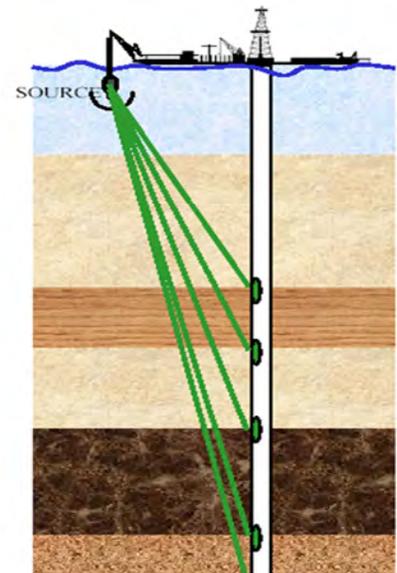


Figure 1.2-2 Schematic of ZVSP

Table 1.2-5 Sound Source (Airgun Array) Specifications for ZVSP Surveys in the Chukchi Sea in 2012

Source Type	No. Sources	Maximum Total Chamber Size	Pressure	Source Depth	Calibrated Peak-Peak Vertical Amplitude	Zero-Peak Sound Pressure Level
SLB, ITAGA Sleeve Array	8 airguns 4 X 150 in. ³ 4 X 40 in. ³	760 in. ³ 12,454 cm ³	2,000 psi 140 bar	3.0 m / 9.8 ft 5.0 m / 16.4 ft	16 bar @1 m 23 bar @1 m	238 dB re1μPa @1 m 241 dB re1μPa @1 m

A ZVSP survey is normally conducted at each well after total depth is reached but may be conducted at a shallower depth. For each survey, Shell would deploy the sound source (airgun array) over the side of the *Discoverer* with a crane (sound source will be 50-200 ft (15-60 m) from the wellhead depending on crane location), to a depth of approximately 10-23 ft (3-7 m) below the water surface. The VSI with its four receivers will be temporarily anchored in the wellbore at depth. The sound source will be pressured up to 2,000 psi, and activated 5-7 times at approximately 20-second intervals. The VSI will then be moved to the next interval of the wellbore and re-anchored, after which the airgun array will again be activated 5 to 7 times. This process will be repeated until the entire wellbore is surveyed in this manner. The interval between anchor points for the VSI usually is between 200-300 ft (60-91 m). A normal ZVSP survey is conducted over a period of about 10-14 hours depending on the depth of the well and the number of anchoring points.

1.3 Ice Management

Polar bears and walrus are strongly associated with sea ice so that ice management has the potential to affect individuals of these species. Some ice management may be required for Shell's 2012 exploration drilling program. Shell has included two ice management vessels in the fleet supporting the drillship and has prepared and will implement an Ice Management Plan (IMP) (see Attachment A) for this contingency. The IMP includes ice detection and monitoring, identifies ice alert levels and actions, defines and assigns personnel and responsibilities, and describes well suspension and re-entry procedures.

Shell's IMP relies heavily on the observations and experience of its Ice Specialists and Ice Advisors, a group of arctic-seasoned mariners whose sole duty is to provide critical information and advise drilling vessel supervisors and the drilling vessel master about any and all ice-related threats. These observers and advisors will be stationed on the drillship, the ice management vessel and the anchor handler. Marine mammal monitoring by MMOs is also ongoing while ice management vessel movements and actions are underway with regard to ice-related threats. MMOs, operating under the guidance of the marine mammal monitoring and mitigation plan (4MP) (see Attachment B) for this exploration drilling program will advise ice management specialists and advisors on the necessary mitigation measures designed by the agencies to assist avoidance of incidental take of marine mammals, notably polar bears and Pacific walrus, while ice is being managed by vessels. Ice and weather forecasting is provided by Shell's Ice and Weather Advisory Center. This center is continuously manned by experienced personnel who rely on number of data sources for ice forecasting and tracking including:

- Radarsat and Envisat data – satellites with Synthetic Aperture Radar providing all-weather imagery of ice conditions with very high resolution;

- Moderate Resolution Imaging Spectroradiometer – a satellite providing lower resolution visual and near infrared imagery;
- Aerial reconnaissance – provided by specially deployed fixed wing or rotary wing aircraft for confirmation of ice conditions and position;
- Reports from Ice Specialists on the ice management vessel and anchor handler and from the Ice Observer on the drillship;
- Incidental ice data provided by commercial ships transiting the area; and
- Information from the National Oceanographic and Atmospheric Administration ice centers and the University of Colorado

General ice management practices are summarized below. Salient aspects include:

- Ice management around the *Discoverer* will involve redirecting, rather than breaking, ice floes while the floes are well away from the drill sites; and
- To minimize impacts on marine mammals, vessels that can safely travel outside of the polynya zone will do so, unless it is necessary to break ice (as opposed to managing ice by pushing it out of the way), or if sea state conditions require an alternative route

Shell's ice management fleet will consist of two vessels: an ice management vessel (the *Fennica* or similar) and an anchor handler/icebreaker (the *Tor Viking* or similar). This fleet will manage the ice by deflecting any ice floes that could affect the *Discoverer* when it is drilling and would also handle the *Discoverer's* anchors during connection to, and separation from the seafloor.

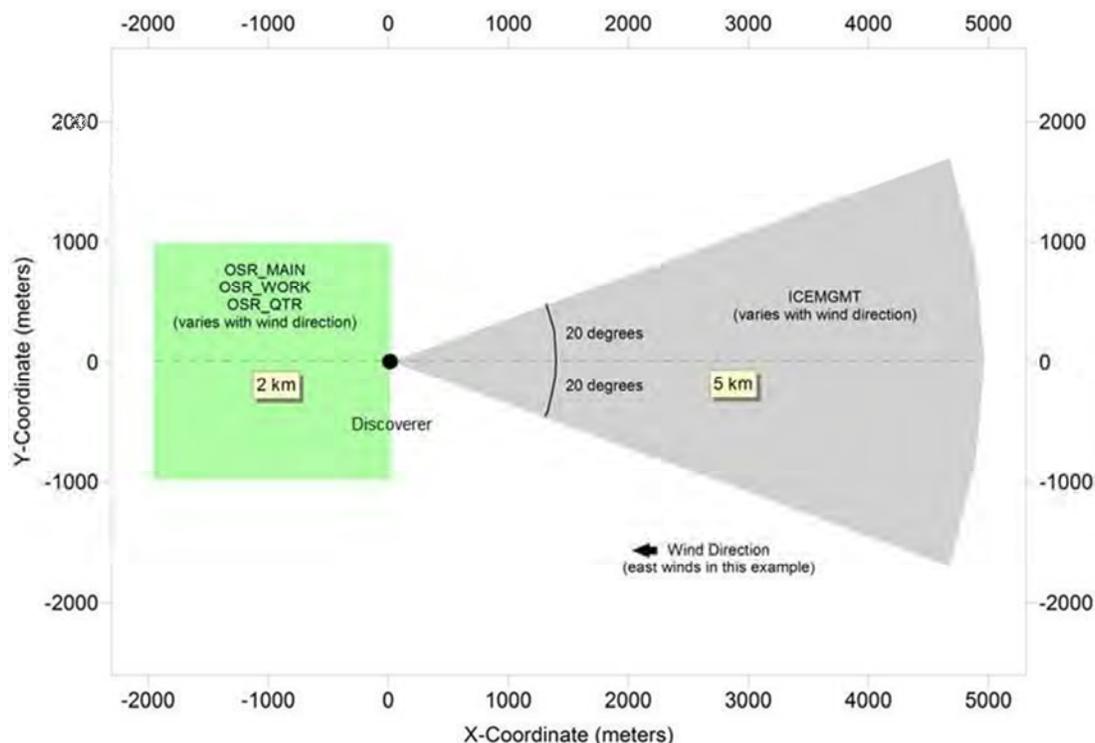
Drift ice will be actively managed by ice management vessels, consisting of an ice management vessel and an anchor handling vessel. Ice management for safe operation of Shell's planned exploration drilling program will occur far out in the OCS, remote from the vicinities of any routine marine vessel traffic in the Chukchi Sea thereby resulting in no threat to public safety or services that occurs near to shore. Shell vessels will also communicate movements and activities through Communications and Call Centers on the North Slope. Management of ice by ice management vessels will occur during a drilling season predominated by open water and thus will not contribute to ice hazards, such as ridging, override, or pileup in an offshore or nearshore environment.

The ice management/anchor handling vessels would manage any ice floes upwind of the *Discoverer* by deflecting those that could affect the *Discoverer* when it is on location conducting exploration drilling operations. The ice management/anchor handling vessels would also manage the *Discoverer's* anchors during connection to and separation from the seafloor. The ice floe frequency and intensity are unpredictable and could range from no ice to ice densities that exceed ice management capabilities, in which case exploration drilling operations would be stopped, the well secured properly and the *Discoverer* disconnected from its anchors and moved off site. Ice management activities may be necessary in early July and towards the end of operations in late October, but data regarding historic ice patterns in the Burger area indicate that it will not be required throughout the planned exploration drilling seasons. When ice is present at the drill site, ice disturbance will be limited to the minimum needed to allow drilling to continue. First-year ice will be the type most likely to be encountered. The ice management

vessels will be tasked with managing the ice so that it will flow easily around and past the *Discoverer* without building up in front of it. This type of ice is managed by the ice management vessel continually moving back and forth across the drift line, directly updrift of the *Discoverer* and making turns at both ends. During ice management, the vessel's propeller is rotating at approximately 15-20 percent of the vessel's propeller rotation capacity. Ice management occurs with slow movements of the vessel using lower power and therefore slower propeller rotation speed (*i.e.*, lower cavitation), allowing for fewer repositions of the vessel, thereby reducing cavitation effects in the water. Occasionally, there may be multi-year ice ridges that would be managed at a much slower speed than that used to manage first-year ice. Shell does not intend to break ice with the ice management vessels but, rather push it out of the area as described here. Ice breaking could be conducted if the ice poses an immediate safety hazard at the drill sites, but is far from preferred as indicated in the IMP (see Attachment A).

The primary driver of the ice floe is the wind, so the ice management vessels will be typically upwind of the *Discoverer* when managing ice. The ice management vessels will generally remain outside the immediate drill site area, the *Fennica* and *Tor Viking* will generally occupy a 40° arc up to 3.1 mi (5 km) upwind originating at the *Discoverer* (Figure 1.3-1). It is anticipated that the ice management vessels will be managing ice for up to 38 percent of the time when within 25 mi (40 km) of the *Discoverer*. The actual distances (distances between vessels, and width of the swath in which ice management occurs) will be determined by the ice floe speed, size, thickness, and character, and wind forecast.

Figure 1.3-1 Anticipated Locations of Ice Management Vessels in support of *Discoverer*



Ice may also build up at the bow of the *Discoverer*. In these situations the *Tor Viking* would periodically pass close to the *Discoverer* bow and dislodge the ice with its propeller wash. During these “bow washing” events, which are expected to last no more than one hour, the *Tor Viking* would operate at low power, and operate from either side of the bow (rather than in front of the bow).

Occasionally, there may be multi-year ice ridges that would be managed at a much slower speed than that used to manage first-year ice. Shell doesn't plan on breaking ice with the ice management vessels but, rather, intends to push it out of the area. Ice breaking would be conducted; however, if the ice poses an immediate safety hazard at the drill sites. Shell will stop operations and move off site if ice were to become so prevalent in the drilling area that it is difficult to safely continue operations.

1.4 Oil Spill Response

Shell is committed to conducting safe and environmentally responsible operations in the Chukchi Sea. To achieve this goal, oil spill prevention is a primary priority in all aspects of operations. Shell's Chukchi Sea Regional Exploration Program Oil Discharge Prevention and Contingency Plan (ODPCP) emphasizes the prevention of oil pollution by employing the best control mechanisms for blowout prevention, fuel transfer operations, as well as implementing mandatory prevention training programs for field operating personnel. Prevention training will include strict procedures and management practices to eliminate spills in all aspects of operations. All project personnel, including employees and contractors, involved in oil spill contingency prevention and response would receive prevention and response training as described in the ODPCP. Training drills also would be conducted periodically to familiarize personnel with on-site equipment, proper deployment techniques, and maintenance procedures.

The likelihood of a large oil spill event is very low. Shell has designed a response program based upon a regional capability of responding to a range of spill volumes, from small operational spills up to and including the Worst Case Discharge (WCD) from an exploration well blowout. Shell's program is developed to fully satisfy the response planning requirements of the State of Alaska and federal oil spill planning regulations. The ODPCP presents specific information on the response program that includes a description of personnel and equipment mobilization, the incident management team organization, and the strategies and tactics used to implement effective and sustained spill containment and recovery operations.

A dedicated OSR vessel possessing sufficient onboard storage capacity to provide containment, recovery, and storage for the initial 24-hour operational period will be staged in the vicinity of the drillship when drilling into potential liquid hydrocarbon bearing zones. An Arctic OST also will be staged so that it will arrive at the recovery site within 24 hours of departure from its staging location. The OST will possess a minimum liquid storage capacity of 513,000 bbl (81,560 m³), sufficient capacity to store all recovered liquids (oil and emulsified oil/water) from a 30-day blowout.

An OSR barge with skimming capability, and an associated tug, will be located in the nearshore zone and will possess capacity to mobilize prior to earliest projected time oil could arrive in the Chukchi nearshore zone. The OSR barge possess storage capacity of 76,900 bbl (212,226 m³)

for recovered liquids. It will also carry response equipment, including a 47-ft (14-m) skimming vessel, 34-ft (10-m) workboats, mini-barges, boom and duplex skimming units for nearshore recovery and possibly support nearshore protection. The OSR barge will carry designated response personnel and will mobilize to recovery areas, deploy equipment and begin operations.

Alaska Clean Seas (ACS) is Shell's primary response action contractor for the Chukchi Sea spill response program. ACS would lead the containment, control, and recovery efforts in the offshore, nearshore, and shoreline environments. ACS's response personnel and oil spill response equipment would be available while critical exploration drilling operations into hydrocarbon bearing zones are underway providing spill containment and response capability in the unlikely event of an actual oil spill incident. Additionally, ACS provides program oversight, spill management team support, response training, and additional responders through Auxiliary Contract Response Teams (ACRT), North Slope Spill Response Team (NSSRT) and Village Response Teams (VRTs).

Shell provides dedicated response vessels and equipment for the onshore, nearshore and offshore operations. Response activities will be conducted using Shell or ACS tactics as defined in Shell's Beaufort and Chukchi Seas Regional Tactics Manual and/or ACS's Technical Manual, or otherwise as defined in the ODPCP. The protection of wildlife, including polar bears and walrus, is addressed in Section 1.6.11 and Appendix E of the ODPCP, and in Tactics W-1 through W-6 in Volume 1 of the ACS Technical Manual. The primary objective is to protect wildlife by preventing birds and mammals from entering spill or containment areas. Containment areas will be monitored until USFWS and/or ADF&G determine that monitoring is no longer required. In general, wildlife protection strategies include, but are not limited to:

- Containment and controls to limit the spread of oil, and the area influenced by the spill and response options
- The drillship has marine mammal observers (MMOs) aboard at all times
- Hazing of birds and mammals
- Capture and relocation of wildlife in direct threat
- Aircraft monitoring

Refer to the following documents (not attached) for additional information:

- Chukchi Sea Regional ODPCP Appendix E - Wildlife Capture, Treatment and Release Programs, Chukchi Sea Oil Spill Response Planning
- ACS Tactics Manual – Sections W1 through W6
- DRAFT “Oil Spill Response Plan for Polar Bears in Alaska”, USFWS Marine Mammals Management, June 2010

In the event of an accidental release that may impact shoreline resources additional certified bear guards and security staff would be deployed to protect workers and polar bears. Hazing equipment will be stored at the Deadhorse warehouse and office building. USFWS staff may also be deployed to provide additional oversight and consultation in the event of a major

response. Section 3.5 of this plan outlines an adaptive management approach between Shell and the USFWS to protect polar bears and walrus in the unlikely event of an oil spill.

2.0 POLAR BEAR, GRIZZLY BEAR, AND PACIFIC WALRUS, PRESENCE DURING PLANNED EXPLORATION DRILLING ACTIVITIES OFFSHORE CHUKCHI SEA

2.1 *Polar Bear*

Polar bears are widely distributed at low densities throughout the Arctic. About 2,000 polar bears can be found in the Chukchi-Bering Sea stock which inhabits an area as far west as the extreme eastern portion of the Eastern Siberian Sea, as far east as Point Barrow, and as far south as the Bering Sea. A small portion of the Southern Beaufort Sea stock of polar bears also utilizes the Chukchi Sea, primarily during the ice-covered season.

Polar bears spend most of their time during summer on the drifting pack ice (ADF&G 2008a). Polar bears typically remain widely distributed in their range, as they are predominantly solitary animals. Polar bears in the Chukchi Sea spend most of their time near pack and annual ice over shallow, productive waters where their predominant prey of ice seals exist. Predominant polar bear distribution in the Chukchi Sea retreats north in the spring/summer with the retreating ice pack, then returns south in the fall as the ice pack again extends south. In the area of Shell's planned exploration drilling activities of the Chukchi Sea, polar bears are more abundant in May and June, then again in late October and November, but may be found in the area of Shell's prospects at any time throughout the drilling season. Polar bears were encountered near Shell's prospects during previous drilling efforts in 1989-1991, and a small number were observed during recent Shell baseline surveys conducted in the prospects in August and September of 2008.

Shell's exploration drilling program activities will begin approximately 4 July and will end on or before 31 October. There will likely be some sightings of polar bears during the exploration drilling program, with the number of bears depending on the amount of ice in the area. Nearshore sightings or encounters only are envisioned if Shell's marine vessels traveling to a shorebase observed such a bear. Bears have been known to venture inland, but this is not common. When polar bears emerge from dens with their cubs in the spring they start traveling on drifting sea ice and forage for food. Extra care is necessary at these times to properly store and dispose of food waste to prevent polar bear attraction and their entry into work areas. Polar bears will generally avoid human activities if they are not attracted by food and food wastes. U.S. Geologic Service (USGS) data document polar bear sightings and den locations (Fischbach et al. 2007). Polar bears typically exit their dens in March or April; therefore there would be no active dens during the exploration drilling program.

2.2 *Pacific Walrus*

A single stock of Pacific walrus inhabits the shallow continental shelf waters of the Bering and Chukchi seas. The distribution of walrus varies seasonally from the winter concentrations in the Bering Sea, to open leads, polynyas, on pack ice, and island or shoreline haul outs. Most Pacific

walrus migrate northward following the retreating ice pack during spring and return south during the fall. Migrations are directly related to the seasonal advance and retreat of the sea ice (ADF&G 2008b). During the summer months, Pacific walrus are widely distributed across the shallow continental shelf of the Chukchi Sea with the most significant concentrations in the ice pack within 62 mi (100 km) of the leading edge of the ice pack. If pack ice is not suitable, walrus haul out on land, but usually remain near their prey base. There are haul-outs along the eastern Chukchi shoreline at Cape Thompson, Cape Lisburne, and Icy Cape. Pacific walrus can also be expected in shallow waters near the coast or on ice closer to land.

USFWS surveys have estimated up to 101,213 walrus on the Chukchi Sea pack ice in September. Walrus distributions in the Chukchi Sea are highly dependent on the distribution and extent of seasonal pack ice. Walrus were observed in the area of the drillship and support vessels in previous exploration drilling efforts in 1989-1991, and some were observed in the vicinity of Shell's prospects during baseline surveys conducted July-October of 2008 and 2009. When Shell's exploration drilling program could be expected to be on location in the Chukchi, most walrus are assumed to be within the pack ice north of the prospects. The number of walrus that will be encountered during the planned exploration drilling program will depend on the amount of ice in the area.

2.3 Grizzly Bear

Grizzly bears are present on the North Slope during the summer months and may be present along the shoreline where they forage for food, taking advantage of whale or seal carcasses or eating human refuse. Given that the vast majority of the exploration drilling program activities are over 64 mi (103 km) offshore, and the habitat of grizzly bear is onshore, it is extremely unlikely that interactions with grizzly bears will happen during drilling activities with the possible exceptions at the shorebase(s).

3.0 THE PLAN – SPECIFIC OBJECTIVES AND ACTIONS

Because exploration drilling activities and/or support activities will be occurring in polar bear habitat and in areas where Pacific walrus and grizzly bear may occasionally be found, complete avoidance of these animals cannot be ensured. However, precautions detailed in this document can reduce the chances of human encounters and problems with bears and walrus.

Objectives of the Plan are to:

- prevent (avoid) bear/human and walrus/human encounters and interactions;
- educate workers about the controls used to prevent encounters and interactions;
- protect workers, bears and walrus during drilling activities, ice management and in the unlikely event of an oil spill; and
- implement reporting and observation procedures.

During the duration of the exploration drilling activities, Shell will be aware of, or have established, a 24 hour direct connection (duty line) to personnel from the USFWS.

3.1 Prevent Polar and Grizzly Bear/Human Interactions

There is always the potential for bear encounters during field activities even when all precautions are taken to avoid and eliminate attractants. Early detection of bears in the vicinity of operations is an essential element to prevent bear/human encounters. Bear avoidance and encounter procedures are presented in Attachment C. Workers will regularly and frequently observe their surroundings to detect bears in project areas. MMOs are the most likely personnel to notice bears or walrus because their job description requires them to look for and identify marine mammals (Attachment B) near project activities. They will be the primary support for project activities with the potential to encounter bears.

In contact situations, the main concern is to maintain the safety of personnel. The goal is to avoid and minimize potential conflict and bear/human interactions.

Actions to take if bears are in the area:

- If a bear is observed, alert all on-site personnel so work activities can be altered or stopped to avoid interactions. Bear sightings will be reported to the designated representative.
- Depending on the distance between the bear and the activities, retreating to the safety of vessels, emergency shelter, or buildings or vehicles if an encounter occurs in developed onshore areas may be necessary.
- Personnel should give bears plenty of room and should not approach or crowd bears. Every bear has “personal space” – the distance in which they feel threatened. The greater the distance between the worker and the bear, the better for conflict avoidance.
- Personnel are forbidden from feeding bears or any other wildlife.

3.2 Protecting Workers and Bears

Worker safety is a priority. The following procedures will be implemented to ensure worker awareness and knowledge about their own safety concerning bears. A copy of the Bear Avoidance and Encounter Procedures are provided as Attachment C.

- To avoid surprise encounters, personnel exiting a vessel or other facility will check behind doors, blind spots, and access areas prior to exiting to avoid a surprise encounter.
- Polar bears traverse along the barrier island corridor throughout the year. During summer months, increased numbers are anticipated in this area, particularly during the months of August and September.
- Personnel will be made aware that bears will hide behind structures, and to be conscience of this.
- Areas will be illuminated during hours of darkness, when workers are present.
- Periodic safety sessions will be conducted to address and elevate awareness of bear avoidance techniques and activities.

- Outdoor work crews will survey the surrounding area, to ensure bears cannot enter without being detected.
- Workers will become familiar with the local environment.
- A “buddy system” will be employed, to ensure fellow workers are informed about the whereabouts and activities that may bring workers in contact with bears.
- Workers and facility occupants will be alerted if a bear is observed.
- A Bear Guard will be designated, if necessary, to monitor for the presence of bears. The Bear Guard may also hold another work position that would allow him or her to monitor for the presence of bears, such as equipment operator.
- Bear hazing will be approved by the designated representative (e.g., site manager). Only a designated properly trained and authorized bear hazer will be permitted to haze bears. Personnel other than the designated bear Hazer will not attempt to haze a bear.
- Aircraft and vessels will not operate within 0.5-mi (800 m) exclusion zone of bears observed on land or ice during travel status.
- Aircraft will maintain a minimum altitude of 1,500 ft (457 m) within 0.5 mi [800 m] of bears hauled out onto land or ice, unless weather does not permit this altitude.
- When within 900 ft (274 m) of polar bears in water, vessels will reduce speed, and avoid multiple changes of direction.
- Vessel speed to be reduced during inclement weather conditions in order to avoid collisions with bears.

Polar bear monitoring, reporting, and survey activities will be conducted in accordance with the regulations that implement the MMPA as outlined in 71 FR 26770. The basic monitoring and reporting requirements are:

- Follow a chain-of-reporting, and responding to polar bear sightings. Attachment D depicts the Wildlife Notification Flow Chart.
- Designating a qualified individual or individuals to observe, record, and report the effects of the activity on polar bears. A USFWS-approved monitoring plan requires trained onboard MMOs. MMOs will monitor the exclusion zone for bears. If a bear is sighted, mitigation measures as specified in the 4MP (Attachment B) will be implemented.

3.3 *Protecting Workers and Walrus*

Worker safety is priority. The following procedures are to ensure worker awareness and knowledge about their own safety concerning walrus.

- Drilling support vessels will observe a 0.5 mi (800 m) exclusion zone around walrus observed on land or ice during travel status except during active ice management (see Section 3.4 for procedures during ice management)

- Aircraft will maintain a minimum altitude of 1,500 ft (457 m) within 0.5 mi (800 m) of Pacific walrus hauled-out onto land or ice, unless weather does not permit this altitude
- When within 900 ft (274 m) of walrus in water, vessels will reduce speed, and avoid multiple changes of direction
- Vessel speed to be reduced during inclement weather conditions in order to avoid collisions with walrus.

Walrus monitoring, reporting, and survey activities will be conducted in accordance with those outlined in 71 FR 26770 of the MMPA. The basic monitoring and reporting requirements are:

- Follow a chain-of-reporting, and responding to walrus sightings. Attachment D depicts the Wildlife Notification Flow Chart
- Designating a qualified individual or individuals to observe, record, and report the effects of the activity on walrus. A USFWS-approved monitoring plan requires trained onboard MMOs. MMOs will monitor the exclusion zone for walrus. If a walrus is sighted, mitigation measures as specified in the 4MP (Attachment B) will be implemented.

3.4 *Protecting Polar Bear and Walrus During Ice Management*

Broken ice is an important habitat for walrus. Pack ice provides a moving platform that increases the likelihood of the animals finding fresh food resources on each foraging trip. The ice also creates a platform on which the walrus, especially females and their young in the Chukchi Sea, haul out for rest. Large numbers of walrus sometimes haul out on relatively small diameter ice floes resulting in densely packed distribution. Hundreds of walrus may be found on ice floes less than 600-1,000 ft (200-300 m) in diameter. The behavior of walrus at haulout sites renders them susceptible to stampedes from ice / land platforms, which can result in injuries or mortalities to the animals.

Because ice management is conducted for the integrity and safety of the drillship and its crew, and because the vessels must come into contact with the ice floes during ice management activities, special protocols (as outlined below) will be in place during these activities to minimize the potential for effects on walrus. These are in addition to those identified above in Section 3.3. Shell will implement these protocols in a phased approach, based partially on the number of observed walrus in the vicinity of the ice management operations and the perceived ice threat to drilling operations and safety. The approach will also necessarily be one of adaptive management because all situations cannot be foreseen, because both the ice conditions (trajectory, size, density) and walrus behavior (hauled out, swimming, etc.) are subject to change as they approach the drill site without interference by Shell.

Reconnaissance

- Shell will conduct real-time monitoring of sea ice as described in the IMP (see Attachment A) and summarized above in Section 1.3.
- Shell will have MMOs on the ice management vessels as required by the IHA and 4MP.

Consultation with USFWS

- A 24 hour duty phone will be established with the USFWS
- All polar bear and walrus sightings will be reported to USFWS as described in Sections 8.1 and 8.3, respectively
- Indication that large areas of pack ice are approaching the area of the drillship and may require management, and/or sightings of large numbers of walrus on ice, will be reported to the USFWS contact identified in Section 8.3, immediately by telecommunications (duty phone); this will commence consultation and involve the USFWS in the adaptive management process

Adaptive Management

- If the polar bears are deemed to be a threat to personnel safety, or to themselves, hazing techniques as permitted under an intentional take authorization will be used to keep the bears out of harms way. Shell will follow the appropriate reporting protocol in this event (Section 8.1).
- If hauled-out walrus are present, Shell will monitor to ascertain whether the walrus appear as if they are going to stay on the ice or might abandon the ice on their own. Shell will avoid, to the maximum extent possible, the management of ice on which walrus have hauled out. Shell will attempt to communicate with the USFWS and consult with the agency before management of ice with hauled out walrus.
- If the walrus stay on the ice in the vicinity of ice management activities, Shell will notify the USFWS (via the USFWS 24 hour duty line) and begin discussions regarding appropriate action. With the USFWS input, we would consider the following ice management options:
- Low Threat Level: If the ice does not represent a significant threat to the drill vessel, allow the ice to pass through the drilling area with walrus onboard
- Moderate Threat Level: If ice poses a significant threat and hauled out walrus presence is moderate on the ice, carefully conduct ice management
- High Threat Level: If ice poses a significant threat to the drill vessel and hauled out walrus presence is high on the ice, or the consequences of ice management are high, Shell will engage in further consultation with USFWS to come to a resolution regarding intentional harassment of walrus

All mitigation measures listed in Section 3.2 and 3.3 will be adhered to unless the mitigation measures need to be adjusted/alterd/or avoided based on guidance from USFWS because they are in conflict with the adaptive management approach described in this section.

3.5 Protecting Polar Bears and Walrus During an Oil Spill

The probability of a very large oil spill from a well blowout occurring is extremely low. Worker safety is a priority during the unlikely event that there will be an oil spill response situation. Shell has prepared an ODPCP for implementation in the event of an oil spill and the plan includes procedures to be implemented in order to protect wildlife. The ODPCP has been approved by BOEMRE and the State of Alaska, Alaska Department of Environmental Conservation (ADEC) and is currently being revised for the 2012 exploration program. ACS is Shell's primary response action contractor. Wildlife protection strategies to be implemented in the event of an oil spill are outlined in Tactics W1-W6 in Volume 1 of the ACS' Technical Manual, and summarized below. The tactics manual is part of the ODPCP approved without conditions in 2010, has undergone revision for exploration drilling planned to begin in 2012 and is currently under review by BOEMRE.

The following procedures are to ensure worker awareness and knowledge about their own safety concerning polar bears and walrus. The approach will also necessarily be one of adaptive management because all situations cannot be foreseen. Defined levels of response for both offshore and onshore in the event of an oil spill are adapted from the ACS Tactics Manual Section W-1, which in turn is based on the Wildlife Protection Guidelines for Alaska, Annex G of the Alaska Regional Response Team Unified Plan:

- **Primary Response – Containment and Recovery of Oil:** this level of response deals with controlling the spread of oil and keeping it from important habitat; oil is recovered as quickly as possible:
 - Primary response for protecting polar bears and walrus from oil spills shall be to prevent oil from reaching areas where the animals are concentrated
 - Areas of concentration for walrus include areas of pack ice, and locations on the mainland and barrier island shores of the Chukchi Sea, where walrus are known to haul out – such as Cape Thompson, Cape Lisburne, and Icy Cape as well as numerous locations along the Chukotka coast and Wrangel Island in Russia
 - Areas of concentration for polar bears include areas of pack ice and barrier islands
- **Secondary Response – wildlife hazing by trained personnel:** haze wildlife away from and prevent them from entering the spill area; hazing techniques include passive excluders (e.g., balloons, reflector tape), propane fueled cannons, shotguns, pistols, cracker shells, banger, rubber bullets (for bear deterrence) and shotgun slugs (for protection from bears); electric fencing may be used on land.
 - Secondary response for protecting polar bears and walrus from oil spills shall be to deter the animals from an oil slick or contaminated habitat
 - Any deterrence or hazing of polar bears or walrus would require an intentional take authorization from the on-scene coordinator and a permit from USFWS or National Marine Fisheries Service (NMFS), and would be conducted according to protocol identified in Tactic W-1 of the ACS Technical Manual

- Dead oiled wildlife shall be collected and disposed of as indicated in Tactic W-14 of the ACS Technical Manual to prevent any secondary poisoning through ingestion of petroleum
- Tertiary Response – Capture, stabilization and treatment of oiled wildlife by trained and authorized personnel.
 - Tertiary response includes the capture, stabilization, and treatment of oiled wildlife
 - Any capture or treatment of polar bears or walrus would require authorization from the on-scene coordinator and a permit from USFWS or NMFS
 - Any tertiary response would be conducted according to protocol identified in Tactic W-1 and W-2 of the ACS Technical Manual

Oiled walrus or polar bears may be captured by authorized USFWS personnel (or personnel authorized by the USFWS; not Shell) using tranquilizers or baited culvert traps (polar bears only). Upon capture, it will be transported by truck or helicopter to an ACS stabilization facility. Those animals that are determined to be able to survive in the wild are released. Other animals that are deemed incapable of surviving release to the wild will be held for potential transport to a zoo. In some cases, animals may be euthanized depending on the extent of their injuries. Details surrounding the capture, stabilization and treatment of oiled polar bears can be found in the DRAFT version of the *Oil Spill Response Plan for Polar Bears in Alaska*, USFWS Marine Mammal Management June 2010.

ACS maintains a facility and equipment in Prudhoe Bay that is capable of being transported in an emergency situation. Equipment includes a cleaning, treatment and necropsy kit; three temporary holding cages and a large water tank. Potential short term holding facilities occur in Barrow at the BASC/NARL facility, the Anchorage Zoo and the Seward Sealife Center. All mitigation measures listed in Section 3.2 and 3.3 will be adhered to by Shell personnel involved in implementing response tactics, unless after consultation with USFWS personnel they are in direct conflict with the adaptive management procedures.

4.0 FOOD WASTE MANAGEMENT PLAN

The most important factor in the avoidance of attracting bears to active operations is to correctly handle food and associated waste. Proper handling of food and food-associated waste is important in reducing the potential for bears to associate humans and facilities with food. The following practices will be implemented.

- Food wastes will not be discharged overboard from the drillship.
- Personnel will separate food waste from other solid wastes. Food and food-associated waste will be placed only into containers secured from wildlife access aboard vessels or in vehicles. Personnel will use only designated receptacles for food and associated waste inside facilities or those that are secure from wildlife access.
- No food-associated wastes may be placed into solid-waste containers.

- Containers will be located where there is good visibility and away from high-traffic areas.
- Personnel will back-haul food-associated waste to approved bear-proof containers.
- Dedicated receptacles will be secured – there should be no food-associated attractants in the containers.
- Back-hauled food-associated waste will not be left in unmanned facilities, vessels, or unsecured vehicles.

5.0 SAFETY AND COMMUNICATION

The following safety and communication practices will be implemented.

- Personnel should contact the designated Bear Guard or designated representative for the most recent bear sighting information.
- If you sight a bear, look around for other bears while moving to a safe location. Alert other workers in the area. Do not attempt to scare the bear away. Do not approach a bear for any reason. Once in a secure location, immediately report the bear sighting to the on-site Shell representative. Only trained personnel are authorized to deal with animal problems. Do not try to photograph a bear unless you are in a secure location. Early bear detection is essential to limit human/bear encounters.
- Use the “buddy system” during outside jobs.
- Make sure personnel are trained to operate radios or other communication equipment.
- Make noise before walking into an area with poor visibility.
- Do NOT take food with you. If it is necessary to eat away from the designated camp mess unit, make sure that all food is safely stored inside secure containers.
- Personnel should coordinate with other field operations to ensure the activities are compatible with bear avoidance and protection.

6.0 TRAINING

6.1 *Marine Mammal Observer Training*

Prior to any vessel departure, MMOs will have completed a training course to recognize marine mammals, including polar bear and Pacific walrus, in water or on land or ice, to properly record sightings, and to advise what mitigation measures should be followed. The MMO training curricula will be pre-approved by the USFWS and NMFS. Trained MMOs will receive a document to verify course completion. Course information will include:

- Overview of MMPA and relevance to drilling activity and mammals
- Overview of drilling activities
- Overview of mitigation measures

- MMO roles and responsibilities
- MMO regulatory requirements
- Identification of arctic marine mammals by species, sex, and age
- Search methods for marine mammals
- Overview of data collection and reporting requirements

6.2 Bear Guard Training

Bear guards will undergo an intensive training program performed by USFWS. Training will include:

- bear habits, range, and habitat
- how to minimize the number of human/bear interactions
- the proper use of deterrents and projectiles to haze bears
- how to report a bear sighting, hazing, and/or fatal taking
- weapons handling/safety qualification

6.3 Other Training Materials and Meetings

Employees will be provided training that describes bear behavior and safety concerns, including hazing (e.g., new employee orientation, safety discussions). All hazing will be performed by a designated person who is trained in appropriate hazing tactics and firearms safety. The employee safety training program will include:

- Bear Avoidance Action Plan;
- USFWS or ADF&G (or comparable) Bear Encounter/Hazing Training;
- Firearms training for designated Bear Guards;
- Bear awareness reinforced at daily safety meetings; and
- Video training material:
 - “Human/Polar Bear Interaction” (Alaska Oil and Gas Association)
 - Working in Polar Bear Country, for Industrial Managers, Supervisors and Workers
 - Staying Safe in Polar Bear Country, A Behavioral-based Approach to Reducing Risk.

7.0 AT-RISK LOCATIONS AND SITUATIONS

Work areas during the exploration drilling program will be exclusively offshore and distant from most prospective at-risk locations. Also, given that all personnel will be vessel-based, the prospect of at risk situations are remote for offshore exploration workers. However, in the event

that exceptional circumstances occur, the following lists locations/situations where the risk of a bear encounter may be higher and where attention to mitigating these risks is essential:

- sea ice floes, during ice management by vessels;
- coastal bluffs;
- barrier islands;
- small watercraft (i.e., oil spill response drills or onshore equipment inspections);
- marine vessels;
- waste generation and collection facilities; and
- “blind” areas that are obscured by facilities, equipment or other obstacles.

At-risk situations and activities include:

- transit in sea ice, and ice management by vessels;
- activities on or around barrier islands;
- any portable, temporary shelter (i.e., oil spill response drills or equipment caching);
- emerging from vessels or facilities; and
- dark/unlighted and visually obscured areas.

8.0 REPORTING

Sightings of bears or walrus by MMOs or other workers during the exploration drilling program will be recorded and reported to USFWS and ADF&G by a Shell Regulatory Affairs staff designee. Given that MMOs will be drillship-, and vessel-based, the majority of sightings/observations are expected to be marine mammals. Polar bear sightings will be reported according to the procedures and process described in Section 8.1 of this Plan. Grizzly bear sightings will be reported in accordance with Section 8.2. Walrus sightings will be reported in accordance with Section 8.3.

Shell developed a 4MP (see Attachment B) for its exploration drilling program activities in the Chukchi Sea. The 4MP supports protection of the marine mammal resources in the area by adhering to mitigation measures, fulfilling wildlife sighting/observation and reporting obligations to the USFWS (and NMFS), and providing data useful for understanding the impacts of exploration drilling activities on Pacific walrus and polar bear. The 4MP dedicates multiple personnel 24-hours per day to the task of watching for, recording observations of, and instituting mitigation measures for wildlife observed, most notably those protected by the MMPA, ESA, or both. The outcome of conducting the 4MP will be resolute reporting of polar bear and Pacific walrus observed in the vicinities of the exploration drilling program activities. The 4MP for program activities is provided with the LOA application (see Attachment B) as well as included in the exploration plan.

After the appropriate bear or walrus encounter procedures have been followed, workers will be required to report the presence of a bear or walrus using the procedure outlined below. A copy of the Wildlife Notification Flow Chart is included as Attachment D.

- 1) Workers are required to notify immediately the on-site Shell representative of a bear or walrus sighting and complete the appropriate sighting/observation form (Attachments E through G).
- 2) Workers are to document any interactions (such as the use of cracker shells, vehicle horns, or other auditory devices; using vehicles or equipment to deter bears from an area; taking direct action to harass a bear out of an area; etc.) in the sighting/observation form.
- 3) If the bear or walrus was sighted within an exclusion zone or human/bear interaction took place (i.e., actions listed under bullet 2 above), the on-site Shell representative must promptly contact Shell Regulatory Affairs at 907-830-7435 (24 hours) or 907-646-7152 (business hours). The on-site Shell representative must also fax or e-mail the completed sighting/observation form to the Shell Regulatory Affairs designee in Anchorage at 907-646-7145 (fax). The Shell Regulatory Affairs designee will send (fax or e-mail) the completed sighting/observation form within 24 hours of the bear observation to the USFWS or ADF&G agency contact.
- 4) If the bear or walrus was sighted outside an exclusion zone and no human/bear interaction took place, the MMO will provide the sighting/observation information to the Shell Regulatory Affairs designee in Anchorage by e-mail in the daily MMO report.

8.1 Polar Bear Reporting

Actions will be taken to the maximum extent practicable to avoid and minimize potential interactions with polar bears. MMOs will be assigned to project vessels to identify potential encounters and record polar bear behavior. Using the procedure provided in Section 8.0 and in the Wildlife Notification Flow Chart (Attachment D), the Shell Regulatory Affairs designee will be informed of polar bear sightings/observations. All relevant information must be recorded. The Polar Bear Sighting Report (Attachment E) must be completed to the greatest extent possible prior to submission. Regular reports of polar bear sightings in accordance with the LOA stipulations will be made to the USFWS.

The primary polar bear contact:

Craig Perham
USFWS – Marine Mammals Section
1011 East Tudor Road
Anchorage, Alaska 99503
Telephone: 907-786-3810 (direct); 907-786-3800 (main office)
Fax: 907-786-3816

Alternate Polar Bear Contact:

Terry DeBruyn
USFWS – Marine Mammals Section
1011 East Tudor Road
Anchorage, Alaska 99503
Telephone: 907-786-3812 (direct); 907-786-3800 (main office)
Fax: 907-786-3816

8.2 Grizzly Bear Reporting

Actions will be taken to the maximum extent practicable to avoid and minimize potential interactions with grizzly bears. Using the procedure provided in Section 8.0 and in the Wildlife Notification Flow Chart (Attachment D), the Shell Regulatory Affairs designee will be informed of grizzly bear sightings/observations. All relevant information must be recorded. The Grizzly Bear Observation Form (Attachment F) is a typical report form must be completed to the greatest extent possible prior to submission. Regular reports of grizzly bear sightings will be made to the ADF&G.

The ADF&G grizzly bear contact is:

Dick Shideler
Alaska Department of Fish & Game
1300 College Road
Fairbanks, AK 99709-4173
Phone: 907-459-7283
Fax: 907-459-3091
E-mail: dick.shideler@alaska.gov

Local Contact:

Geoff Carroll, ADF&G
Area Wildlife Biologist
P.O. Box 1284
Barrow, Alaska 99723-1284
Phone: 907-852-3464
Fax: 907-852-3465
E-mail: geoff.carroll@alaska.gov

8.3 Walrus Reporting

Vessel traffic will avoid any walrus to the maximum extent practicable to avoid and minimize potential interactions. MMOs will be assigned to project vessels to identify potential encounters and record walrus behavior. Weekly reports of walrus sightings would be made to the USFWS using the Walrus Sighting Report Form (Attachment G).

Actions will be taken to the maximum extent practicable to avoid and minimize potential interactions with walrus. MMOs will be assigned to project vessels to identify potential encounters and record walrus behavior. Using the procedure provided in Section 8.0 and in the Wildlife Notification Flow Chart (Attachment D), the Shell Regulatory Affairs designee will be informed of walrus sightings/observations. All relevant information must be recorded. The Walrus Sighting Report (Attachment G) is a typical report that must be completed to the greatest extent possible prior to submission. Regular reports of walrus sightings in accordance with the LOA stipulations will be made to the USFWS.

Primary Pacific walrus contact:

Joel Garlich-Miller
USFWS – Marine Mammals Section
1011 East Tudor Road
Anchorage, Alaska 99503
Telephone: 907-786-3820 (direct); 907-786-3800 (main office)
Fax: 907-786-3816

Secondary Pacific walrus contact:

Craig Perham
USFWS – Marine Mammals Section
1011 East Tudor Road
Anchorage, Alaska 99503
Telephone: 907-786-3810 (direct); 907-786-3800 (main office)
Fax: 907-786-3816

9.0 INTENTIONAL “TAKE” ACTIONS FOR BEARS

Early detection and worker awareness will reduce chance encounters with a bear. If a bear remains on site for an extended period, the on-site Shell representative/Shell Regulatory Affairs designee will contact USFWS or ADF&G (as appropriate) for advice. Firearms with bean bags or rubber bullets, noisemakers, or other appropriate materials will be available on site to provide deliberate and intentional harassment of bears to ensure worker safety. These actions constitute a “take”. If a lethal or non-lethal “take” occurs, despite preventative action to protect human life, the following information must be recorded and actions performed:

- Personnel must record all details of the event including time, exact location, bear’s behavior, preventive measures followed, etc.
- Personnel must record all witness statements.
- Polar Bears - Immediately notify Craig Perham with USFWS at (907) 786-3810 (direct line) or (907) 786-3800 (main office). An alternate contact is Terry DeBruyn with USFWS at 907-786-3812 (direct line) or 907-786-3800 (main office).
- Grizzly Bears – Immediately notify Dick Shideler (Fairbanks ADF&G) at (907) 459-7283 and Geoff Carroll (Barrow ADF&G) at (907) 852-3464.

- If there is a lethal “take”, the entire animal carcass will be transported to Barrow for sealing and processing under the direction of either a responsible USFWS agent designee (polar bear) or ADF&G agent designee (grizzly bear). The agent designee will determine disposition of useable meat (e.g., donation to a Native village).

The trained bear Guard (or Watch) or designated representative is responsible for:

- recording all the event details including time, exact location, bear’s behavior, preventive measures followed, etc.; and
- recording all witness statements.

10.0 PLAN OF COOPERATION

A Plan of Cooperation (POC) has been developed as a required component of a LOA application under 50 CFR 18.128(d). A POC is also required as part of an application for an IHA from NMFS under 50 CFR § 216.104(a) (12), and under the BOEMRE lease stipulation 5 for lease sales 195 and 202. A POC was prepared and was submitted with the initial Chukchi Sea EP. An addendum to the POC was prepared for this revised exploration program and it updates the initial POC with information regarding proposed changes in proposed exploration drilling program, and documentation of meetings undertaken to inform the stakeholders of the revised exploration drilling program. The POC Addendum builds upon the previous POC. The POC Addendum is provided to USFWS as Attachment H to this LOA.

The POC Addendum identifies the measures that Shell has developed in consultation with North Slope communities and will implement during its planned Chukchi Sea exploration drilling program to minimize any adverse effects on the availability of marine mammals for subsistence uses. In addition, the POC Addendum details Shell’s communications and consultations with local communities concerning its proposed revised Chukchi Sea EP exploration drilling program beginning in the summer of 2012, potential conflicts with subsistence activities, and means of resolving any such conflicts (50 CFR § 18.128(d) and 50 CFR § 216.104(a) (12) (i), (ii), (iv)). Shell has documented its contacts with the North Slope communities, as well as the substance of its communications with subsistence stakeholder groups. Tables summarizing the substance of Shell’s communications, and responses thereto, are included in Attachment H. This POC Addendum may be further supplemented, as appropriate, to reflect additional engagements with local subsistence users and any additional or revised mitigation measures that are adopted as a result of those engagements.

11.0 REFERENCES

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Attachment A
Ice Management Plan

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Shell Gulf of Mexico Inc.
3601 C Street, Suite 1000
Anchorage, AK 99503

ICE MANAGEMENT PLAN
Chukchi Sea

Submitted to:

U. S. Department of the Interior
Bureau of Ocean Energy
Management, Regulation and
Enforcement
Alaska OCS Region

Submitted by:
Shell Gulf of Mexico Inc.

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I. INTRODUCTION

SCOPE

A Critical Operations and Curtailment Plan (COCP) will be in place for the Shell Gulf of Mexico Inc. (Shell) Chukchi Sea Exploration Drilling Program. As part of the COCP, this Ice Management Plan (IMP) has been developed. The description of notification of curtailment (an excerpt from the COCP) is presented in Attachment 1.

The IMP addresses the following activities:

- Vessels
- Shell Ice and Weather Advisory Center (SIWAC)
- Ice Alerts and Procedures
- Ice Management Philosophy
- Well Suspension Procedures
- Mooring System Recovery and Release
- Moving onto the Drill Site
- Training

The IMP:

- Defines Roles and Responsibilities
- Establishes Alert Levels; and
- Establishes Responses to Alert Levels.

The IMP facilitates appropriate decision-making and responses to the threat of hazardous ice and procedures set forth in the IMP prevent damage or harm to personnel, assets, or the environment.

Nothing in this document takes away the authority and accountability of the Master(s) of the vessels for the safety of their personnel and vessels and for protection of the environment.

This plan is not a substitute for good judgment.

Guidance Note: This document is not intended to contain detailed procedures. Detailed procedures are contained within the vessel-specific operating manuals.

II. DEFINITIONS

A. Roles and Responsibilities

Responsibilities have been defined for key personnel in section V. In addition to the defined personnel, the following positions have a role in IMP,

Chief Officer /Second Officer/Third Officer	In addition to regular duties will assist the Ice Advisor (IA)
Shell Drilling Superintendent	Shell's Drilling Superintendent is the senior Shell shore-based manager responsible for all Shell well operations offshore Alaska.
Noble Drilling Superintendent	The senior shore-based manager (Alaska). Liaising with the Shell Drilling Superintendent.

B. Definitions and Abbreviations

AHTS	Anchor Handling Tug Supply
API	American Petroleum Institute
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BOP	blowout preventer
CFR	Code of Federal Regulations
COCP	Critical Operations and Curtailment Plan
cm	centimeter(s)
<i>Discoverer</i>	Turret-moored Drillship Motor Vessel (M/V) <i>Noble Discoverer</i>
DNV	Det Norske Veritas
<i>Fennica</i>	<i>M/V Fennica</i>
ft	foot/feet
FTP	file transfer protocol
FY	First-year ice. Sea ice of not more than one winter's growth, developing from young ice; 12 inches (in.) (30 centimeters [cm]) or greater. It may be subdivided into thin FY – sometimes referred to as white ice, medium FY and thick FY.
GFS	Global Forecast System
GIS	Geographic Information System
Hazardous Ice	Ice, which due to its size, stage of development, concentration, set and drift is considered to be a threat to the safety of personnel, the drilling vessel and well operations. Close proximity of an ice feature regardless of its set and drift may be determined to be hazardous ice. Guidance Note: Sea state as well as visibility may influence what is categorized as hazardous ice.
HOS	hang-off sub
HT	Hazard Time. The estimated time it will take for hazardous ice to reach the drill site.
IA	Ice Advisor
IMO	International Maritime Organization
IMP	Ice Management Plan

IMV	Ice management vessel. Any ice class vessel tasked with ice management duties in support of the drilling vessel. This includes the primary ice management vessel (IMV) and the ice class Anchor Handling Tug Supply (AHTS)
in.	inch(es)
<i>Kulluk</i>	conical drilling unit <i>Kulluk</i>
LMRP	Lower Marine Riser Package
m	meter(s)
MODU	Mobile Offshore Drilling Unit
MT	Move-off Time. The time required to clear decks on the anchor handler recover all anchors conventionally and move off the drill site in an orderly fashion.
M/V	Motor Vessel
MY	Multi-year ice. OI which has survived at least two summers' melt. Hummocks are smoother than on SY and the ice is almost salt-free. Where bare, this ice is usually blue in color. The melt pattern consists of large interconnecting, irregular puddles and a well developed drainage system.
NOAA	National Oceanic and Atmospheric Administration
OI	Old ice. Sea ice which has survived at least one summer's melt. Topographic features generally are smoother than FY. It may be subdivided into SY and multiyear ice.
OSR	Oil Spill Response
OSV	Offshore Supply Vessel
PIC	Person in Charge
RP	Recommended Practice
SAR	Synthetic Aperture Radar
Shell	Shell Gulf of Mexico Inc.
SIWAC	Shell Ice and Weather Advisory Center located in Anchorage. The center develops forecasts from various sources, and disseminates same.
Support Vessels	Includes all vessels defined in this plan (IMV/OSR/AHTS/OSV).
SY	Second-year ice. OI which has survived only one summer's melt. Thicker than FY, it stands higher out of the water. In contrast to MY, summer melting produces a regular pattern of numerous small puddles. Bare patches and puddles are usually greenish-blue.
ST	Secure Time. The time required to secure the well, disconnect the Lower Marine Riser Package (LMRP) from the blowout preventer (BOP), recover and secure the riser.
TD	total depth
T-Time	Total Time. The sum of ST + MT.
<i>Tor Viking</i>	<i>M/V Tor Viking</i>
U.S.	United States
USCG	United States Coast Guard
VMT	Vessel Management Team. This team is headed by the Vessel Master and includes the Shell Drilling Foreman, Noble Drilling Superintendent, Drilling Vessel IA and the Chief Engineer.

III. VESSELS COVERED BY IMP

- Drillship - Motor Vessel (M/V) Noble *Discoverer* (*Discoverer*)
- Primary Ice Management Vessel (IMV) - the *M/V Fennica* (or similar)
- Secondary Ice Management Vessel and Anchor Handler – the *M/V Tor Viking* (or similar) –

Drillship *Discoverer*

The *Discoverer* is a true, self-contained drillship. Station keeping is accomplished using the turret-moored, 8-point anchor system. The underwater fairleads prevent ice fouling of the anchor lines. Turret mooring allows orientation of vessel's bow into the prevailing ice drift direction to present minimum hull exposure to drifting ice. The vessel is rotated around the turret by hydraulic jacks. Rotation can be augmented by the use of the fitted bow and stern thrusters.

The hull has been strengthened for ice resistance. Ice-strengthened sponsons have been retrofitted to the ship's hull.

The *Discoverer* is classed by Det Norske Veritas (DNV) as a Mobile Offshore Drilling Unit (MODU) for worldwide service. It is a "1A1 Ship-Shaped Drilling Unit I" and is capable of performing drilling operations offshore Alaska. The *Discoverer* has been issued with a DNV Appendix to Class stating:

"the structural strength and material quality of the 'Ice Belt' formed by the sponsons below the 8950mm A/B level, have been reviewed against the requirements for the DNV ICE-05 Additional Class Notation and found to meet those requirements (as contained in DNV Rules for Classification of Ships, Pt 5 Ch 1, July 2006) for a design temperature of -15 degrees C."

The *Discoverer* will comply with the requirements of 30 CFR Part 250.417, the IMO, the USCG and DNV. All drilling operations will be conducted under the provisions of 30 CFR Part 250 Subpart D, API RP 53, 65 Part 2 and 75 and other applicable regulations and notices including those regarding the avoidance of potential drilling hazards and safety and pollution control. Such measures as inflow detection and well control, monitoring for loss of circulation and seepage loss, and casing design will be the primary safety measures. Primary pollution prevention measures are the contaminated and non-contaminated drain systems, the mud drain system, and the oily water processing system.

Structurally, this is comparable to Canmar drillships used safely and successfully in exploration campaigns in the Beaufort and Chukchi Seas into the 1990s.

Additional specifications on the drillship are provided in Attachment 2.

Drillship Principal Dimensions

Dimension	<i>Discoverer</i>	
Length Overall	514 ft	156.7 m
Draft	27 ft	8.2 m
Width	85 ft	26 m

Ice Management Vessels

Ice management support to the drillship will be provided by the *Fennica* (or similar) and *Tor Viking* (or similar). The drillship will be supported by these IMVs from the beginning of the campaign until the vessel departs the area. A description of these vessels is provided in Attachment 2.

Ice Management Vessel Principal Dimensions

Dimension	<i>Fennica</i>	<i>Tor Viking</i>
Length Overall	380 ft (116 m)	275 ft (83.7 m)
Draft	27 ft (8.4 m)	20 ft (6.0 m)
Width	85 ft (26 m)	59 ft (18.0 m)

Primary Ice Management Vessel

The *Fennica* (or similar vessel) is designated as the primary IMV. The *Fennica* is classed by the DNV as +1A1. Designed for the management, maintenance and service of offshore oil wells, the 380-ft (116-m) *Fennica* is a multipurpose vessel specialized in marine construction and icebreaking. *Fennica* is equipped with diesel-electric propulsion systems and their innovative combination of capabilities, based on extensive design and engineering work, facilitates use of these systems in arctic conditions.

Secondary Ice Management Vessel / Anchor Handler

Tor Viking is designated as the secondary IMV and anchor handler. Designed for the management, anchor handling, and maintenance and service of offshore oil wells, the 275-ft (83.7-m) *Tor Viking* is a multipurpose vessel specialized in marine construction and icebreaking.

Guidance Note: IMVs supporting the drilling vessel may be deployed to assist other vessels, as operations and ice conditions dictate. Diverting ice management resources away from the drilling vessel may require a curtailment of activities. This decision shall be made jointly by the Shell Drilling Foremen and the Master on the drilling vessel. The onshore Shell Drilling Superintendent (in consultation with the Noble Drilling Superintendent) will endorse the plan or set priorities if agreement cannot be reached at the field level.

IV. SHELL ICE AND WEATHER ADVISORY CENTER

SIWAC is an integrated forecasting service staffed 24/7 by industry-leading specialists under Shell contract in Anchorage, Alaska. SIWAC's primary function is to provide current and forecast ice and weather conditions directly to field operations and planning managers during the operational season. SIWAC provides information to decision makers and field principals to help them minimize risks when operating in the presence of ice. To provide quality and accurate information, SIWAC depends on skilled forecasters, subscription and public satellite imagery, numerical models, field observations, Geographic Information System (GIS) software tools, and a robust communication network.

SIWAC ICE DATA INPUTS

Ice forecasts are developed and issued daily. The Lead Ice Analyst compiles available data from subscription, specialized, and public services in ArcMAP (GIS Software) such as:

- MDA RadarSat 2 imagery
- MODIS satellite
- Canadian Ice Services
- National Ice Center
- Contract weather services
- Field observations
- IceNav images

Data Transmission

Effective communication of SIWAC ice and weather guidance and reciprocal feedback and field observations requires a robust and capable data network. The drilling vessel and IMVs are equipped with high-speed data and voice satellite service that has been proven to perform well in the U.S. Chukchi and Beaufort Seas.

Data, including satellite imagery and observations, are relayed through a file transfer protocol (FTP) site between SIWAC and the field vessels using automated processes. This keeps both the field and forecasters continuously refreshed with the latest information. In addition, SIWAC maintains a secure website that allows direct, on demand access to all forecast reports and data products.

Additional information about SIWAC is in Attachment 3.

Ice Information Flow Chart

NOTE: The following graphic, Ice Management Communications Flow Chart, depicts the constant two-way communication that would occur between the various components of the system.

V. ICE ALERT LEVELS AND PROCEDURES

These procedures define five Alert Levels that are linked to the time that hazardous ice is forecast to be at the drilling vessel location, and the time required to secure the well and move the drilling vessel off location if it becomes necessary. Roles, responsibilities and actions required are specified according to the Alert Level.

Ice Alert Levels

ALERT LEVEL	TIME CALCULATION	STATUS
Green	(HT – T-Time) is greater than 24 hours	Normal operations
Blue	(HT – T-Time) is greater than 12 hours and less than 24 hours	Initiate risk assessment. Validate secure times and move times.
Yellow	(HT – T-Time) is greater than 6 hours and less than 12 hours	Limited well operations in line with COCP. Commence securing well.
Red	(HT – MT) is less than 6 hours	Well-Securing Operations Completed. Commence anchor recovery operations.
Black	Drill site evacuated	Move drilling vessel to a safe location.

HT = Hazard Time

MT = Move-off Time

T-Time = Total Time

Guidance Note: If HT becomes greater than T-Time at any time, well securement and drill site evacuation contingency plans will be implemented.

Ice Alert Roles and Responsibilities

The following table summarizes roles, responsibilities and actions required for each Ice Alert Level.

Alert	Drilling Vessel Master	Drilling Vessel IA	IMV IA (Shell)	IMV Master	Noble Drilling Superintendent	Shell Drilling Foreman
<p>ROLES AND RESPONSIBILITIES FOR ALL ALERT LEVELS</p>	<p>The Drilling Vessel Master is the person in charge (PIC) of the drilling vessel. He is the final authority in regards to safety of the vessel, crew and complement. All changes of Alert level are issued by the Master. The responsibility to evacuate the drill site in response to a hazard rests with the Master</p> <p>Evaluates information from SIWAC, IAs and Vessel Management Team (VMT)</p> <p>Establishes Ice Alert Level and directs ice management operations.</p> <p>Establishes MTs in conjunction with the IMV Masters.</p> <p>Ensure Alert Level status is broadcast to fleet and internally throughout drilling vessel at intervals dependent on Alert Level or at change of alert Level</p>	<p>Collates and evaluates information from the SIWAC, IMV IAs and VMT</p> <p>Advises Master in establishing Ice Alert Level.</p> <p>Correlates Secure Time (ST) with information from rig operations.</p> <p>Establishes HT and MT in conjunction with IMVs and drilling vessel and advises Master and VMT.</p> <p>Works in conjunction with IAs on IMVs to develop and establish effective ice management strategies and advises Drilling Vessel Master.</p> <p>Ensures current ice drift is broadcast to fleet and liaises with SIWAC</p>	<p>The IA is Shell's representative onboard the IMVs and is the primary contact for all communications with the Drilling Vessel Master. He advises the IMV Master in executing the ice management strategies.</p> <p>Works in conjunction with Master of IMVs to determine the local ice conditions and hazardous ice.</p> <p>Works in conjunction with Drilling Vessel IA and Master of IMVs to develop and implement effective ice management strategies.</p> <p>Provides feedback on effectiveness of strategy and reports any anomalies pertaining to ice.</p>	<p>The Master is the PIC of the IMVs. He is the final authority in regards to safety of the vessel, crew and complement.</p> <p>Evaluates advice from the SIWAC and IA (drilling vessel & IMVs).</p> <p>Works in conjunction with IA on drilling vessel and IA of IMVs to develop and execute effective ice management strategies within the capability of the vessel.</p> <p>Provides feedback on effectiveness of the strategy to the IA on the IMVs.</p> <p>Reports to IMVs IA any condition which inhibits vessel performance</p>	<p>The Noble Drilling Superintendent is the on-site supervisor responsible for all rig functions and drilling-related operations aboard the drilling vessel.</p> <p>Establishes ST & informs VMT of ST and well conditions.</p> <p>Validates drilling team is aware of their duties under present Ice Alert Level.</p> <p>Validates well secure contingency plans</p>	<p>The Drilling Foreman is the senior on-site Shell supervisor with responsibility for overseeing drilling and well operations and for initiating spill response as the On-site Incident Commander for spills originating from the well site.</p> <p>Validates well ST in conjunction with the Rig Superintendent. Informs Drilling Vessel Master and Noble Drilling Superintendent regarding ongoing & upcoming critical operations and curtailment plans.</p> <p>Communicates status of well and Ice Alert level to Shell shore-based management</p> <p>Under the authority of the Shell Drilling Superintendent the Shell Drilling Foreman may raise the Ice Alert Level at any time, He may order the suspension of drilling operations, securing of the well.</p>

Alert	Condition	VMT Comms Frequency	Drilling Vessel Master	Drilling Vessel IA	IMV IA (Shell)	IMV Master	Noble Drilling Superintendent	Shell Drilling Foreman
Green	(HT – T-Time) is greater than 24 hours	Every 24 hours, or more frequently as needed	Discharges duties as per accountabilities	Discharges duties as per accountabilities	Discharges duties as per accountabilities	Discharges duties as per accountabilities	Discharges duties as per accountabilities	Discharges duties as per accountabilities
Blue	(HT – T-Time) is greater than 12 hours and less than 24 hours	Every 12 hours, or more frequently as needed	Ensures readiness to execute contingency plans. Ensures primary IMV is available to execute Ice Management strategies for the given ice regime. Ensures anchor handling tug supply (AHTS) IMV readiness to manage ice and anchor handling operations.	Establish Ice Management Strategies in conjunction with IMVs and IA onboard IMVs.	Establishes Ice Management Strategies in conjunction with IMV Master and Drilling Vessel IA Validate readiness of IMV to execute ice management strategy	Executes Ice Management Strategies in conjunction with IA on IMVs Establishes and states readiness of IMV to execute ice management strategy	Establishes ST and assesses upcoming well operations for changes to ST Informs VMT of ST and well conditions Validates securing contingency plans Evaluates ongoing & upcoming stage of drilling program with regard to ST and COCP	Validates ST in conjunction with the Rig Superintendent Informs Drilling Vessel Master and Noble Drilling Superintendent regarding ongoing & upcoming COCP Reports Alert changes to Shell shore-based management
Yellow	(HT – T-Time) is greater than 6 hours and less than 12 hours	Every 6 hours, or more frequently as needed	Directs ice management operations Establishes and Validates MT Establishes departure strategy Ensures Alert status is broadcast to fleet and internally at 1-hour intervals or at change of Alert Level	Establishes HT & advises Master & VMT Works in conjunction with IA on IMVs to initiate ice management strategies Ensures current ice drift is broadcast to fleet	Implements ice management strategies as directed by Drilling Vessel Master in conjunction with IMV Master Provides feedback on effectiveness of strategy	Executes ice management strategies as directed by Drilling Vessel Master and IA on IMV Provides feedback on effectiveness of the strategy	Commences securing well in accordance with agreed upon plan, informs VMT of progress	Monitors Well Securing Operations and effectiveness of ice management operations Communicates overall drilling vessel status to Shell shore management
Red	(HT – MT) is less than 6 hours	Every hour	Initiates departure plans following confirmation from Rig Superintendent that lower marine riser package (LMRP) has been retrieved and secured and guide wires are released Ensures Alert Level status is broadcast to fleet and internally Directs IMV and AHTS activities	Assess effectiveness of Ice Management Strategy in line with ongoing operations, Assist Drilling Vessel Master as needed Ensures current ice drift is broadcast to fleet during anchor recovery operations	Continues to implement ice management strategies in support of drilling vessel and anchor recovery operations	Executes ice management strategies and or activities associated with releasing the drilling vessel from moorings as directed by Drilling Vessel Master and IMV IA	Confirms well is secured and that LMRP is disconnected, retrieved & secured Commences securing drill floor for departure from site	Monitors rig securing operations and departure plan Communicates status to Shell shore management Organizes additional support as needed for site departure operations (for example logistics)
Black	Drill site evacuated	As needed	Directs IMV support operations leading to safe departure from drill site to pre-agreed safe area Complies with all regulatory reporting requirements (internal and external) Works with VMT and IA and IMVs to establish further course of action	Continues to monitor ice conditions. Works in conjunction with IA on IMVs during transit Provides Master of Drilling Vessel and VMT with information to aid further decision making	Advises IMV Master on operations leading to safe transit from drill site to pre-agreed safe area Provides information to Drilling Vessel Master to aid further decision making	Works under direction of the Drilling Vessel Master and IMV IA during transit	Confirms drill floor and associated areas are secured and ready to depart drill site Provides information to Master and VMT to aid further decision making	Informs Shell shore management of evacuation Complies with all regulatory reporting requirements (internal and external) Provides information to Master and VMT to aid further decision making

VI. ICE MANAGEMENT PHILOSOPHY

An effective IMP is designed to enable execution of the exploration program, with the appropriate barriers in place to manage and mitigate against risks that are specific to exploration drilling operation in offshore Alaska (in this case, threat of ice). Additionally, the IMP identifies the “top” event caused by the failure of barriers and addresses the procedures to deal with consequences of escalation.

The “top” event, for the purpose of the IMP, is a yellow alert level that triggers the commencement of well suspension operations. This section addresses the activities associated with ice management as a barrier to the top event.

The strategy to prevent the top event is to have the following elements as effective barriers:

- proper equipment,
- skilled people,
- appropriate information, and
- work processes.

The key elements identified above are discussed herein.

Proper Equipment

- The IMVs will be capable IMVs, with the appropriate ice strengthening, and have been contracted to support the exploration campaign.
- IceNav: The drilling vessel and IMVs will be outfitted with IceNav Equipment (Enhanced radar imaging of ice)
- *Tor Viking* (or similar vessel) is a high specification anchor handling vessel and will be the primary anchor handling vessel.
- *Fennica* (or similar vessel) designated as the primary IMV has anchor handling capability and could be used to supplement *Tor Viking* if needed.

Skilled People

- The drilling vessel and IMVs will carry specialist IA, in addition to the regular crew complement.
- The drilling vessel and the *Fennica* (or similar vessel) will have two IAs onboard providing 24/7 coverage.
- The IAs supporting the exploration campaign will have documented experience of having performed ice management activities associated with supporting exploration activities.
- SIWAC will be staffed with world-class industry-acknowledged experts in weather, satellite and Ice Synoptic analysis.
- IMVs will have crews with ice management experience.

Appropriate Information

A multi-layered, systematic approach is taken to provide relevant information from SIWAC with a feedback loop from the vessels using:

- Wide Area Satellite Imagery
- High Resolution Satellite Imagery
- Meteorological Buoys
- Field Observation
- Numerical Models
- Local Radar
- Vessels are outfitted with Fit-for-Purpose Data and Communications link.

Work Processes

A systematic approach for risk mitigation is adopted by developing effective work processes.

- Development of effective ice management strategies based on available information (global and local)
- Deployment of assets to deliver strategy
 - Threat sectors identified
 - Assess manageability of ice feature
 - Appropriate management of ice feature (breaking/deflecting)
 - Primary IMV deployed at an effective perimeter to reduce floes to manageable size in advance of HT
- Scheduled VMT meetings (frequency dictated by Alert levels)
- Planning/Coordination meetings with specific focus on Ice Alert Levels

VII. WELL SUSPENSION PROCEDURES.

Effectiveness of the IMP depends on accurately establishing HT, ST and MT. Secure Time is time taken to secure the well, disconnect and retrieve the LMRP.

As part of securing the well, well suspension procedures will be established. These procedures will supplement the detailed well securing procedures that will be contained within the Rig Operations Procedures and will be specific to securing the well in response to the threat of hazardous ice.

Return to the drill site following exit due to the threat of hazardous ice is covered in Section IX.

Examples of well suspension options and procedures are presented in Attachment 4.

A. Well Suspension Options

Securing and suspending the well can be accomplished by several means. The base case is to suspend the well by plugging, (mechanical or cement). The chosen option or combination thereof will be dependent upon well conditions, environmental conditions, and (or) equipment limitations. Shell will employ the most effective suspension procedure under the specific circumstances at the time.

Relevant information associated with well suspension will be documented in the daily drilling reports. The BOEMRE field representative will be apprised, and relevant records will be submitted to BOEMRE.

Potential well suspension options are listed in the following table.

	Mechanical Plugging	Drillpipe Hang-off	Pull Out of Hole	Shearing Drill Pipe	Dropping String
Time Required / Preference	Requires most time. Is the base case procedure for securement.	Less time than plugging	Potentially less time depending upon position in hole.	Least amount of time ;Stuck pipe contingency	Comparable to shearing drillpipe. Contingency to cope with mechanical hoisting failure
Provides Wellbore Isolation	Yes	Yes (blind/shears closed)	Yes (blind/shears closed)	Yes (blind/shears closed)	Yes (blind/shears closed)
Hang-off Sub (HOS) Required	No	Yes (Emergency Drill Pipe Hang-off Tool)	No	No	No
Packers / Bridge Plug Required	Yes	No	No	No	No
Potential to Leave String in Hole	Yes, if suspended below packer.	Yes	No	Yes, but access to pump through sheared string is questionable.	String in hole but requires fishing trip and overshot to circulate
Remarks	Mechanical plugs are preferred method in cased hole.	In this case no downhole plugging has been assumed.	This method is acceptable in situations where casing has been run and cemented, but not drilled out yet. Pipe can be pulled and blind/shears closed without further containment.	Contingency for stuck pipe situation	Contingency to cope with mechanical hoisting failure
Advantages	Provides complete wellbore isolation. Equipment readily available.	Provides wellbore isolation via blind/shear rams. Equipment readily available. Can be done in a timely manner. Leaves kill string in place for potential well control requirements.	Requires less time in situations where casing has been run but not drilled out, or if already out of the hole as noted above, for logging or changing BHA.	Quickest way to secure the well and prepare for move-off	Next to shearing, quickest way to prepare rig for move-off. Also leaves the top of the string in the hole undamaged and ready for recovery or circulating via overshot and packoff
Disadvantages	Takes longer. Packers require additional tripping. Cementing requires mixing / pumping time and introduces potential for contamination.	No downhole wellbore isolation.	Not a preferred method with open hole conditions because no pipe is left in the hole for potential well control methods. No downhole wellbore isolation.	Potential to leave a deformed pipe profile complicating fishing and circulating operations	No downhole isolation is accomplished. Requires fishing trip to reestablish downhole circulation

VIII. MOORING SYSTEM RELEASE/ RECOVERY

A. Conditions Present to Initiate Mooring System Release and Recovery

This section addresses mooring system release and recovery if ice conditions have triggered an Ice Alert Level of yellow and escalated to a red. The following discussion assumes the well has been secured and all recoverable well-related equipment has been retrieved.

B. Release Options

Mooring system release /recovery can be accomplished by several means. The base case is to recover moorings in the conventional manner. The selection of a specific release option and the execution of the procedures rest with the Drilling Vessel Master who informs the VMT. Potential options are listed in the table below.

Mooring System Release/ Recovery

	Conventional Anchor Retrieval	Rig Anchor Release (RAR)	Running off Wires
Time Required / Preference	Requires most time. Is the base case procedure for retrieval	Less time than conventional recovery	Contingency plan if RARs fail to activate.
Advantages	System is intact. Ready for redeployment	Reduced MT	None
Disadvantages	None	Increased redeployment time. Requires back up equipment. Potential loss of buoys. Relies on activation by acoustic release.	Complicates redeployment. High potential for seabed fouling. Potential to compromise system.

IX. MOVING ONTO OR RETURNING TO THE DRILL SITE

The authority to move on to or return to the drill site will be issued by the Shell Drilling Superintendent with the concurrence of the Rig Manager. Relevant regulatory authorities will be notified in accordance with the requirements.

Upon authorization, the final decision to move on to or return to the drill site is dependent upon the Drilling Vessel Master and the VMT who are able to assess the various parameters properly with input from the IMV Masters and IA to determine the practicality of the decision.

X. TRAINING

All personnel will be made aware of their roles and responsibilities within this IMP through a training session on each vessel. This training will include a table-top exercise, which will be executed prior to beginning operations to provide exposure to and test communications and procedures of the COCP and the IMP. Participants at the table-top exercise will include:

- Shell and Drilling leadership
- Rig Crews (both Drilling and Marine Operations staff)
- Oil Spill Response (OSR) representative
- SIWAC representatives
- BOEMRE operations representatives
- IMVs
- IAs
- Alaska Logistics (Marine and Aviation) Representatives

Observations from the table-top exercise will be documented.

XI. ATTACHMENTS

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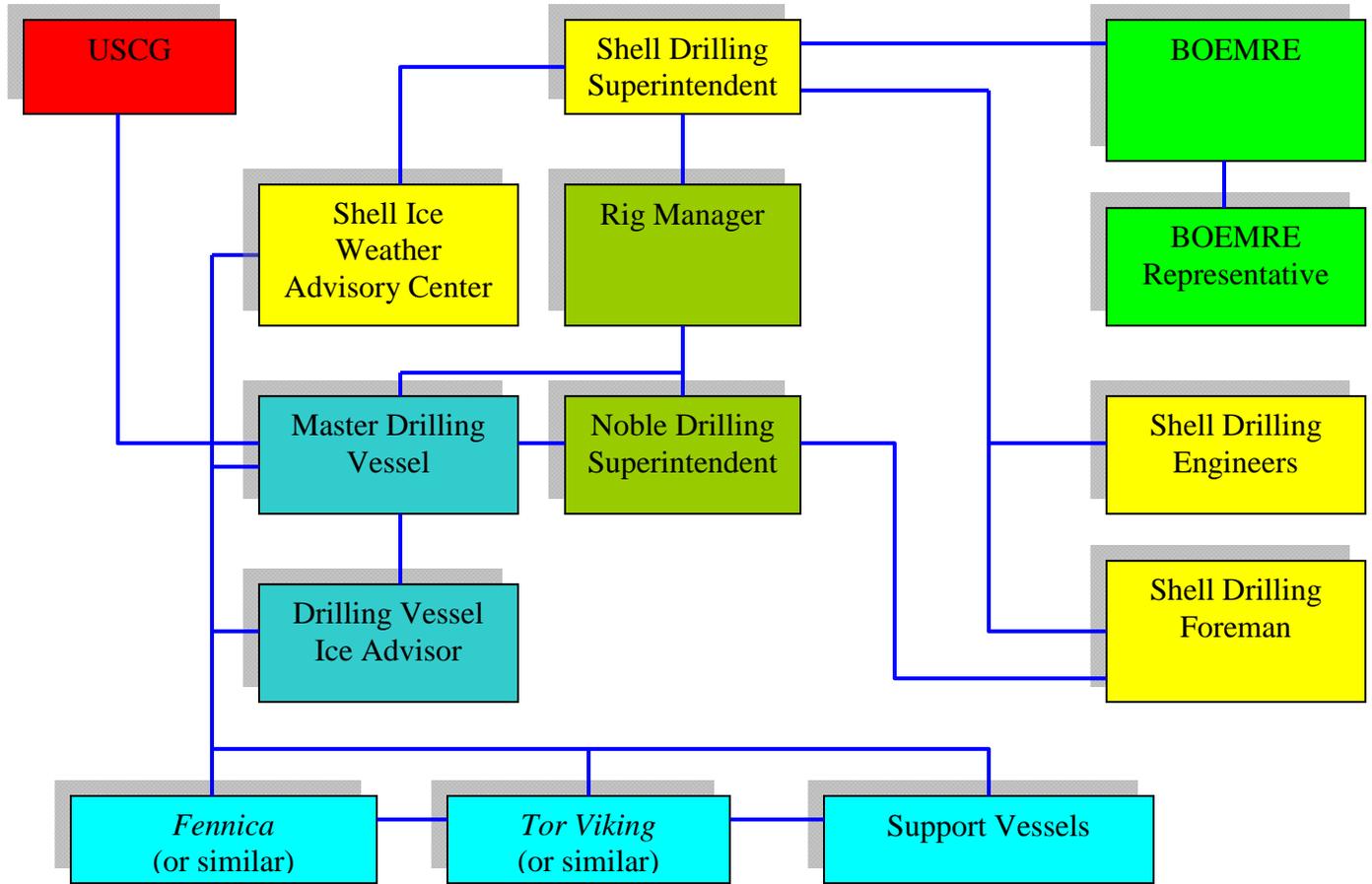
Attachment 1 – Extract from Critical Operations Curtailment Plan**Per Section 10 of the COCP:**

Notification of the decision for curtailments requiring the rig to disconnect from the well and depart location will be made as soon as practical, but not to interfere with the safety of the crew, environment, or vessel. This notification will be made either verbally to a representative on site or by telephone to a BOEMRE representative on duty; the notification may also be made in written form through the use of fax or email.

All operations curtailment decisions will be documented on the Shell Daily Operations Report. This information will be conveyed to BOEMRE on a weekly basis via the Well Activity Report and at the end of the well operations as part of the End of Operations Report.

The following flow chart depicts notifications in the event of curtailment.

Curtailment Notification Flow Chart (Attachment 1 continued)



Attachment 2 - Vessel Descriptions

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Discoverer Specifications

DISCOVERER SPECIFICATIONS	
TYPE-DESIGN	Drillship - Sonat Offshore Drilling <i>Discoverer</i> Class
SHAPE	Monohull with sponsons added for ice-resistance ¹
SHIP BUILDERS & YEAR	Namura Zonshno Shipyard, Osaka, Japan - hull number 355
YEAR OF HULL CONSTRUCTION	1965
YEAR OF CONVERSION	1976
DATE OF LAST DRY-DOCKING	2010

DISCOVERER DIMENSIONS		
LENGTH	514 ft	156.7 m
LENGTH BETWEEN PERPENDICULARS (LBP)	486 ft	148.2 m
WIDTH	85 ft	26 m
MAXIMUM (MAX) HEIGHT (ABOVE KEEL)	274 ft	83.7 m
HEIGHT OF DERRICK ABOVE RIG FLOOR	175 ft	53.3 m

DISCOVERER MOORING EQUIPMENT	
Anchor pattern symmetric 8 points system. The unit is fitted with Sonat Offshore Drilling patented roller turret mooring system giving the unit the ability to maintain favorable heading without an interruption of the drilling operations	
ANCHORS	Stevpris New Generation 7,000 kilograms (kg) each (ea) 15,400 pounds (lb) ea
ANCHOR LINES	Chain Wire Combination
SIZE/GRADE	2.75-in. wire 3-in. ORQ Chain
LENGTH	2,750 ft (838 m) wire + 1,150 ft (351 m) chain (useable) per anchor

DISCOVERER OPERATING WATER DEPTH		
MAX WATER DEPTH	1,000 ft (305 m) with present equipment (can be outfitted to 2,500 ft [762 m])	
MAX DRILLING DEPTH	20,000 ft	6,098 m

Table 1.c-2 Discoverer Specifications (continued)		
DRAW WORKS	EMSCO E-2,100 - 1,600 horsepower (hp)	
ROTARY	National C-495 with 49 ½ -in. opening	
MUD PUMPS	2 ea. Continental Emsco Model FB-1600 Triplex Mud Pumps	
DERRICK	Pyramid 170 ft. with 1,300,000 lb nominal capacity	
PIPE RACKING	BJ 3-arm system	
DRILL STING COMPENSATOR	Shaffer 400,000 lb with 18-ft (5.5 m) stroke	
RISER TENSIONS	8 ea. 80,000 lb Shaffer 50-ft (15.2 m) stroke tensioners	
CROWN BLOCK	Pyramid with 9 ea. 60-in. (1.5 m) diameter sheaves rated at 1,330,000 lb	
TRAVELING BLOCK	Continental - Emsco RA60-6	
BLOWOUT PREVENTOR (BOP)	Cameron Type U 18 ¾ -in. (48 cm) x 10,000 pounds per square in. (psi)	
RISER	Cameron RCK type, 21-in. (53 cm)	
TOP DRIVE	Varco TDS-3S, with GE-752 motor, 500 ton	
BOP HANDLING	Hydraulic skid based system, drill floor	
DISCOVERER DISPLACEMENT		
FULL LOAD	20,253 metric tons (mt)	
DRILLING	18,780 mt (Drilling, max load, deep hole, deep water)	
DISCOVERER DRAUGHT		
DRAFT AT LOAD LINE	27 ft	8.20 m
TRANSIT	27 ft (fully loaded, operating , departure)	8.20 m
DRILLING	25.16 ft	7.67 m
DISCOVERER HELIDECK		
MAXIMUM HELICOPTER SIZE	Sikorsky 92N	
FUEL STORAGE	2 ea. 720-gallon tanks	
DISCOVERER ACCOMODATIONS		
NUMBER OF BEDS	140	
SEWAGE TREATMENT UNIT	Hamworthy ST-10	
DISCOVERER PROPULSION EQUIPMENT		
PROPELLER	1 ea 15 ft 7-in. (4.8 m) diameter, fixed blade	
PROPULSION DRIVE UNIT	Marine Diesel, 6 cylinder, 2 cycle, Crosshead type	
HORSEPOWER	7,200 hp @ 135 revolutions per minute (RPM)	
TRANSIT SPEED	8 knots	
GENERAL STORAGE CAPACITIES		
SACK STORAGE AREA	934 cubic meters (m ³)	
BULK STORAGE		
Bentonite / Barite	180 m ³ - 4 tanks	
Bulk Cement	180 m ³ - 4 tanks	
LIQUID MUD		
Active	1,200 barrels (bbl)	
Reserve	1,200 bbl	
Total	2,400 bbl	
POTABLE WATER	1,670 bbl / 265.5 m ³ (aft peak can be used as add. pot water tank)	
DRILL WATER	5,798 bbl / 921.7 m ³	
FUEL OIL	6,497 bbl / 1,033 m ³	

¹ Sponsons designed and constructed to meet requirements of Det Norske Veritas (DNV) Additional Class Notation ICE-05.

Fennica Specifications**OFFSHORE**

Powerful, high-tech, multipurpose vessels for global underwater oil field construction

Designed for the management, maintenance and service of offshore oil wells, the 97-metre Botnica is a multipurpose vessel specialised in marine construction and icebreaking, as are the 116-metre vessels Fennica and Nordica. They are equipped with diesel-electric propulsion systems and their innovative combination of capabilities, based on extensive design and engineering work, facilitates their use in both arctic and tropical conditions. All three of these multipurpose vessels are highly advanced, powerful and extremely well designed and built.

Unique technology for demanding conditions

These vessels are ideal for offshore operations. The working deck is about 1,000 m², making it exceptionally large and level for ships of this length. The deck was designed for fast equipment changes. Depending on the ship, such equipment may range from simple deck cranes to a 160-tonne pedestal active heave compensated crane, or from deepwater installation equipment to pipe-laying systems, underwater machinery control or the towing and installation of large pipelines.

With their 15,000 kW power output and 230-tonne bollard pull, the Nordica and the Fennica are ideal for seabed ploughing and towing, and they are also fully equipped for anchor-handling operations. The ships' main engine and generator solution makes it possible to perform heavy-duty maintenance tasks without affecting their operating ability.

Both the Fennica and the Nordica are also equipped with a stern roller.

Accurate, safe and highly suitable

The Botnica's moon pool and the large size of its working deck make this ship highly suitable for a variety of offshore operations. Different types of special tools and structures can be installed on the working deck. The attributes of the Botnica, a class 3 DP ship, are in keeping with the strict rules and stipulations demanded in oil well management, as well as the requirements on oil fields set by the Norwegian Maritime Directorate.

The multipurpose icebreakers are equipped with Kongsberg Simrad's Dynamic Positioning (DP) system, which has five independent control units operating their main propellers and three bow thrusters. Even in a sector in which ocean vessels equipped with DP systems are a normal sight, these vessels have performed their tasks exceptionally well in terms of manoeuvrability and accuracy. Their unusual asymmetrical and spacious navigation bridge was designed with an eye to the requirements placed on the ship's multiple applications, both on the open sea and in icebreaking and towing operations.

The vessels have a separate deck for the clients' use, with cabins and offices and a separate data network. The high quality facilities accommodate a total of 45-47 guests, depending on the ship.

Fennica**Dimensions**

Length 116.00 m
Beam 26.00 m
Draught 8.40 m max.
Built 1993
Max. speed 16 knots

Class

DnV + 1A1 – Tug Supply Vessel – SF – EO –
Icebreaker polar – 10, Dynpos, AUTR,
Helideck

Dynpos

Simrad ADP 702

Accommodation

82 persons
24 cabins for client use (47 persons)
Client's offices: 1 operation centre on 4th
bridge deck, 1 x 20 m² office

Helideck

Superpuma or similar

Deck

Working deck area 1090 m²
Anchor handling/winch
Aquamaster TAW 3000/3000 E

Machinery

Main engines
2 x Wärtsilä Diesel, Vasa 16V 32,
each 6000 kW
2 x Wärtsilä Diesel, Vasa 12V 32,
each 4500 kW
Generators
ABB Strömberg Drives
2 x HSG 1120 MP8, power 8.314 kVA,
Volt 6.3 KV, speed 750 rpm
2 x HSG 900 LR8, power 6.235 kVA,
Volt 6.3 KV, speed 750 rpm
Propellers
2 x HSSOL 18/1654, output 7.500 kW each,
ABB Strömberg Drives
2x Aquamater-Rauma US ARC 1,
7500 kW each,
FP propellers, variable RPM
Bow thrusters
3 x Brunvoll FV-80 LTC-2250, VP propellers
1.050 kW each

Bollard pull 234 tons

Crane(s) (optional)

Stb 30 tons/38 metre jib
Port 15 tons
A-frame 120 tons

Navigation Equipment

Robertson ECDIS Navigation System
Doppler speed log
Loran C
GPS
Fiber optic gyros
Differential GPS Gyro.
Navintra Ecdis
Direction finder
Echo sounder
Facsimile recorder

Communication Equipment

1 x Skanti TRP 8400D MF/HF SSB, including
all GMDSS requirements
1 x Watch receiver
1 x Aero VHF. Helicopter communication
6 x VHF
1 x Navtex receiver
1 x Inmarsat B satellite comm. system
VSAT online satellite comm. system
3 x UHF walkie-talkie
3 x VHF walkie-talkie
2 x Freefloat EPRIB, 121,5 and 406 MHz
2 x Distress transponders, 96 Hz
Call signal OJAD

Nordica**Dimensions**

Length 116.00 m
Beam 26.00 m
Draught 8.40 m max.
Built 1994
Max. speed 16 knots

Class

DnV + 1A1 – Tug Supply Vessel – SF – EO –
Icebreaker polar – 10, Dynpos, AUTR,
Helideck

Dynpos

Simrad ADP 702

Accommodation

82 persons
24 cabins for client use (47 persons)
Client's offices: 1 operation centre on 4th
bridge deck, 1 x 20 m² office

Helideck

Superpuma or similar

Deck

Working deck area 1090 m²
Anchor handling/towing winch
Aquamaster TAW 3000/3000 E

Machinery

Main engines
2 x Wärtsilä Diesel, Vasa 16V 32,
each 6000 kW
2 x Wärtsilä Diesel, Vasa 12V 32,
each 4500 kW
Generators
ABB Strömberg Drives
2 x HSG 1120 MP8, power 8.314 kVA,
Volt 6.3 KV, speed 750 rpm
2 x HSG 900 LR8, power 6.235 kVA,
Volt 6.3 KV, speed 750 rpm
Propellers
2 x HSSOL 18/1654, output 7.500 kW each,
ABB Strömberg Drives
2x Aquamater-Rauma US ARC 1,
7500 kW each,
FP propellers, variable RPM
Bow thrusters
3 x Brunvoll FV-80 LTC-2250, VP propellers
1.050 kW each

Bollard pull 234 tons

Main crane (optional)

Lifting capacity 160 T/9 m
30 T/32 m

Main winch Active Heave
Compensated
Constant Tension
Heave amplitude + 3,5 m double part
+ 7 m single part

Operating depth 500 m–160 T (double part)
1000 m–80 T (single part)

Aux winch 10 T, 33 m,
Constant Tension

Tugger winches 2 x 4 T Constant Tension
Port 15 tons

A-frame (optional) 120 tons

Navigation Equipment

Navintra ECDIS Navigation System
Doppler speed log
Loran C
GPS
Fiber Optic Gyros
Differential GPS Gyro.
Direction finder
Echo sounder
Facsimile recorder

Communication Equipment

1 x Skanti TRP 8400D MF/HF SSB, including
all GMDSS requirements
1 x Watch receiver

1 x Aero VHF. Helicopter communication
6 x VHF
1 x Navtex receiver
1 x Inmarsat B satellite comm. system
VSAT online satellite comm. system
3 x UHF walkie-talkie
3 x VHF walkie-talkie
2 x Freefloat EPRIB, 121,5 and 406 MHz
2 x Distress transponders, 96 Hz
Call signal OJAE

Botnica**Dimensions**

Length 96.70 m
Beam 24.00 m
Draught 7.2 to 8.5 m
Built 1998
Max. speed 15 knots

Class

DnV + 1A1 – Supply Vessel – SF – EO –
Icebreaker Ice – 10,
Dynpos AUTRO, RPS
NMD Mobile offshore Units, DP UNIT, with
equipment class 3

Dynpos

Simrad SDP22 + SDP12 backup
2 x HIPAP combined SSBI/MUI BI
hydroacoustic system
2 x Seatex DPS DGPS combined
GPS/Glonass

Accommodation

72 persons
24 cabins for client use (45 pers.)
2 x client's office

Helideck

Superpuma or similar

Deck

Working deck area 1000 m²

Machinery

Main engines
12 x Caterpillar 3512B, 1257 kW, 1500 rpm
Main generators
6 x ABB-AMG 560, 2850 kVA, 3,3 kV 3 N,
50 Hz
Emergency generators
1 x Caterpillar 3406, 200 kW, 400 V, 3 N,
50 Hz
Main propulsion
Stern 2 x 5000 kW Azipod, FP
Bow thrusters
3 x Brunvoll tunnel, variable pitch á 1150 kW

Bollard pull 117 tons

Crane(s) (optional)

1 x Hydralift, 160 tons
1 x 15 tons

Main cranes

Lifting capacity 160 T/9 m
30 T/32 m

Main winch Active Heave
Compensated
Constant Tension

Heave amplitude + 4 m double part
+ 8 m single part

Operating Depth 550 m–160 T (double part)
1100 m– 80 (single part)

Aux winch 10 T, 33 m,
Constant Tension

Moonpool 6.5 x 6.5 metres

Navigation and communication equipment

GMDSS
Inmarsat B
VSAT online satellite comm. system
Call signal OJAK

**Shipping Enterprise**

Valimotie 16
FI-00380 Helsinki, Finland
Phone +358 30 620 7000, fax +358 30 620 7030
e-mail: shipping@finstaship.fi
www.finstaship.fi

GDV Maritime AS

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Phone +47 3701 2260, fax +47 3701 2862
e-mail: maritime@gdv.no
www.gdv.no

Tor Viking Specifications

AHTS/Icebreaker Tor Viking II- Main Characteristics

Design: KMAR 808 AHTS/ ICEBREAKER (Now; MOSSMAR)

Classification: DnV,+1A1, SUPPLY, SF, TUG ICEBREAKER ICE-10, DK(+) EO HELDK-SH DYNPOS-AUTR HL(2,8) W1-OC

Built / Delivered: Havyard Leirvik, Norway - 03/2000

Registered / Flag: Skärhamn, Sweden

Dimensions

Length Over All (LOA): 83.70 metres

Length between p.p.: 75.20 metres

Breadth, moulded: 18.00 metres

Depth, moulded: 8.50 metres

Draught (scantling): 7.20 metres

Draught (design): 6.00 metres

Freeboard (design): 2.50 metres

Dead Weight: 2,528 tonnes

Light Ship: 4,289 tonnes

Gross: 3,382 tonnes

Net: 1,145 tonnes

Capacities

Dry Bulk: 283 m³ in 4 tanks - totalling 10,000 ft³

Pot Water: 724 m³

Drill Water / Ballast: 1,205 m³

Brine: 400 m³ – SG 2.5

Oil Based Mud: 612 m³ – SG 2.8

Base Oil: 242 m³

Fuel Oil: 1,190 m³ Marine Gas Oil (Diesel)

Urea: 94 m³

Diesel Overflow: 21 m³ with alarm

Diesel Service / Settling: 2 x 20 m³

Deck Load: Abt 1,350 ts

Deck Area: 603 m² / 40.20 m x 15.0 m

All products in dedicated tanks – no dual purpose tanks

Propulsion

Main Engine: MAK 18,300 BHP - 4 eng (father/son) 2 x 3,840 kW + 2 x 2,880 kW = 13,440 kW

Thrusters: Bow 1,200 BHP in tunnel (Electr) + 1,200 BHP 360 deg retractable = 2,400 BHP: Stern 1,200 BHP in tunnel

Bollard Pull: Bollard Pull: 202 continuous (DnV certified) / Abt. 210 max pull

Speed/Consumption: 16 knots – Abt. 42.7 MT / 24 hrs at 6.0 metres draught , 12 knots – Abt. 25.0 MT

Towing & Anchorhandling Equipment

AHT Winch: Brattvaag towing/anchorhandling winch 400 ts pull / 550 ts brake holding caps

AHT Drum: One of 1,400 mm dia. x 3,750 dia x (1,250 mm + 1,250 mm) length

Wire Capacity: 2 x 1,900 metres of 77 mm wire or 2 x 1,650 metres of 83 mm wire

AH Drum: One of 1,400 mm dia. x 3,750 mm dia. x 3,000 mm length

Wire Capacity: 4,100 metres of 83 mm wire

Winch Control: TOWCON 2000 Automatic Control with printer

Pennant Reels: One off 2 x 1,500 m of 77 mm wire or 2 x 1,300 m of 83 mm wire capacity

: One off 3,400 m of 77 mm wire or 1 x 3,100 m of 83 mm wire capacity

Large Reel Inner Core: 1,500 mm dia

Cable Lifters: 2 x 76 mm and 2 x 84 mm onboard

Chain Lockers: 2 x 129 m³ / giving abt 2 x 6,000 ft of 3 inch chain

Shark Jaws: 2 pairs of Karm Forks arranged for chain up to 165 mm dia / 750 ts SWL

Inserts for handling of 65, 75, 85, 100, and 120 mm dia. wire/chain

Stern Roller: One of 3,5 metres dia. x 6.0 metres length – SWL 500 ts

Guide Pins: 2 pairs Karm Fork Hydraulic pins – SWL 170 ts

Deck Equipment

Capstans: 2 x 15 ts pull

Tugger Winches: 2 x 15 ts pull

Smit Brackets: One bracket on B Deck Forward – SWL 250 ts

Cranes: 1 hydraulic crane on fore cargo deck giving 6 / 12 ts at 20/10 m arm (360 degr) : 1 telescopic crane on aft cargo deck

giving 1.5 / 3 ts at 15/10 m arm (360 degr) : 1 hydraulic crane on for-castle deck for stores etc

Windlass: 1 hydraulic windlass / mooring winch. 2 declutch-able drums 46 mm K3 chain

Accommodation: Accommodation of a total of 23 persons, including crew.

All accommodation equipped with air-condition and humidification facilities.

Dynamic Positioning

The vessel is equipped with Kongsberg Simrad SDP 21 Redundant DP System – GreenDP

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Attachment 3 – Shell Ice and Weather Advisory Center

Operational Support Overview

Safe and efficient offshore operations in the Arctic are contingent upon quality and timely ice and weather forecasts. Using state-of-the art satellite technology, large areas of the Beaufort and Chukchi Seas are monitored remotely by the SIWAC to track and forecast movement of ice and make estimates of ice type and concentration.

Synthetic Aperture Radar (SAR) instruments on board the RADARSAT 2 satellite are contracted to acquire necessary images of sea ice over areas of interest several times per week. These images are transmitted to ground stations, processed, and made available for analysis within hours of acquisition. Interpretation of the ice edge and features are performed by experienced specialists using powerful mapping software to produce ice charts that are considerably more detailed than those available from national ice centers. These charts are then distributed to operational personnel and planning managers.

Knowing the location and composition of the ice at any given moment is a valuable tool. However, it is important to forecast how the ice may change over time. A complementary component of ice forecasting is quality weather information. Weather conditions in the Arctic are among the most severe on the planet and can change dramatically over a short time. The National Weather Service does not provide measurements and forecasts that sufficiently resolve the conditions over small areas or short time spans in the Arctic offshore. Therefore, dedicated meteorologists with Arctic forecasting experience are employed full time to produce accurate snapshots of the current conditions and reliable forecasts of weather conditions into the future.

Using the Global Forecast System (GFS) numerical weather model as a starting point, the meteorologists produce a high resolution grid in proprietary modeling software of weather parameters, such as atmospheric pressure, wind speed, and wave height that have been corrected based on local observations and weather instrumentation from Shell's vessels at sea, meteorological buoys, and coastal weather stations. The result is a model that accurately reflects current and forecast weather conditions over short distances in the Beaufort and Chukchi Seas, making marine operations and vessel transits safer and more responsible. Without this innovative forecast effort, weather products from other sources tend to describe the average or general conditions that one could expect over large areas, such as the entire U.S. Beaufort Sea, which results in reports of local conditions rarely matching what is forecast for the specific areas of operations.

The wind vectors, a set of points indicating the speed and direction of the wind distributed over the Beaufort and Chukchi Seas, and other output from the weather model are applied to the ice charts in the mapping software. This allows the ice analyst to assess the effect of wind and weather systems on the future movement and development of the ice.

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Attachment 4 – Well suspension Options and Contingencies

In all the following well suspension scenarios, the assumption is that a determination has been made by the Shell Drilling Superintendent, the Shell Drilling Foreman, the Drilling Superintendent, the Drilling Vessel Master and the VMT that a hazard exists and the well should be suspended. The Shell Drilling Foreman and the Drilling Superintendent in conjunction with the Shell Drilling Engineer and the Shell Drilling Superintendent will have analyzed the trip time, borehole stability, well control issues, operational parameters, depth of hole, and time available to decide upon the contingency steps most appropriate for well securement, and a detailed procedure will have been worked up. The Shell Drilling Foreman then presents the procedure to the BOEMRE Field Representative aboard the drilling vessel for comment and concurrence.

Well Suspension Scenario 1 – Mechanical Plugging

1. After determining that the well should be suspended under the assumptions described above, the Shell Drilling Foreman orders the Noble Drilling Superintendent to stop all normal drilling operations and to commence circulating the hole.
2. The driller completes circulating at minimum a full “bottoms up.”
3. The drilling assembly is pulled out of the hole and a mechanical packer suitable to the last casing or liner size is made up on the bottom of the drill string.
4. The packer is tripped in the hole, set approximately 200 ft above the last casing or liner shoe depth and pressure tested.
5. Depending on actual water depth, sufficient pipe is pulled to enable having the end of the string 200 ft above the top of the packer when hung off in the wellhead via the hang-off sub (HOS).
6. A full-opening safety valve and an inside blowout preventer (BOP) are made up in the top of the drill pipe, and one additional joint is added above these valves. The HOS is installed in the top of this joint. (The full opening safety valve is left in the open position.)
7. The HOS assembly is run in the hole on drill pipe to land the HOS in the wellhead bowl.
8. The proper hydraulic fluid volume to actuate the BOP stack is confirmed by the Subsea Engineer and the system operating pressure is checked. Pipe rams in the BOP are closed on the HOS profile. The drill pipe is backed out from the HOS and the landing string is pulled from the riser. The blind/shear rams are closed and locked above the HOS. BOP failsafe valves are all left in the closed position.
9. The master bushings are removed and the riser spider is installed.
10. The diverter handling tool is made up and the diverter assembly is laid down.
11. The riser landing joint is made up into the slip joint inner barrel. The slip joint inner barrel is collapsed and the inner barrel is locked.
12. BOP stack functions are blocked, and the LMRP connector is unlocked.

13. The LMRP is pulled off the top of the BOP with the block motion compensator and riser tensioners.
14. Once the Shell Drilling Foreman has ascertained that the LMRP is released from the BOP, he advises the Drilling Vessel Master that he is free to initiate (or continue) mooring recovery and departure procedures.
15. The drill crew and Subsea Engineer pull the landing joint to surface. The landing joint, slip joint and riser are then layed down and the LMRP is secured on deck.
16. The Drilling Vessel Master confirms with the IA that the Ice Alert Level has reached “red” status (ice hazard is due to arrive within 6 hours of completing anticipated mooring recovery time). The Drilling Vessel Master advises the Drilling Superintendent to have the Subsea Engineer shear guidelines loose from the top of the BOP guideposts and to retrieve the lines to surface.
17. The drill floor and moonpool area are cleared and inspected in preparation for mobilizing the drilling vessel.
18. All decisions and supporting facts are recorded on the Daily Report and issued to the BOEMRE, SIWAC, and the normal distribution list.

Well Suspension Scenario 2 – Drillpipe Hang-off

1. After determining that the well should be suspended, the Shell Drilling Foreman orders the Drilling Superintendent to stop all normal drilling operations and to commence circulating the hole.
2. The driller completes circulating at minimum a full “bottoms up.”
3. A pill of heavy, kill-weight drilling mud is mixed and spotted at total depth (TD), then the rig pulls the bottomhole assembly back into the casing such that the bit will be at least 200 ft above the shoe when the pipe has been hung off on the BOP rams.
4. After pulling the proper distance into the casing, a full-opening safety valve and an inside BOP are made up in the top of the drillpipe. (The full opening safety valve is left in the *open* position.) One additional joint of drillpipe is added above these valves and all connections made up properly.
5. Drill pipe is added to the top of the single, but the connection at the hang-off point is not fully tightened.
6. The drill string is lowered back into the well with the loose connection positioned just above a pipe ram.
7. The proper hydraulic fluid volume to actuate the BOP stack is confirmed by the Drilling Superintendent and the system operating pressure is checked. Pipe rams in the BOP just below the loose drill pipe connection are closed. The drill string is lowered until all string weight is resting on the closed pipe ram. The loose connection is backed off and the remaining drill pipe is pulled from the riser. The blind/shear rams are closed and locked above the backed off drill pipe. BOP failsafe valves are all left in the closed position.
8. Proceed with steps 9 through 18 as indicated in Scenario 1 above.

Well Suspension Scenario 3 – Pull Out of Hole:

It is assumed the wellbore is isolated from the formation (i.e., a casing string has been run and cemented, but not yet drilled out). A drilling assembly has been run in the hole to the top of cement.

1. After determining that the well should be suspended, the Shell Drilling Foreman orders the Drilling Superintendent to pull out of the hole.
2. After pulling out of the hole, the proper hydraulic fluid volume to actuate the BOP stack is confirmed by the Drilling Superintendent and the system operating pressure is checked.
3. The blind/shear rams are closed and locked. BOP fail-safe valves are left in the *closed* position.
4. Proceed with steps 9 through 18 as indicated in scenarios 1 and 2 above.

Well Suspension Scenario 4 – Shearing Drill Pipe

It is assumed the drill string is stuck and unable to be pulled from the hole.

1. After determining that the well should be suspended, the Shell Drilling Foreman orders the Drilling Superintendent to circulate at minimum a full “bottoms up” (assuming circulation is possible).
2. While circulating, the Drilling Superintendent and the Toolpusher calculate the location of the drill string tool joints below the rotary.
3. Once circulation is completed the proper hydraulic fluid volume to actuate the BOP stack is confirmed by the Drilling Superintendent and the system operating pressure is checked.
4. Pipe rams are closed under the nearest connection.
5. The drill string is slacked down until all string weight is resting on the closed ram or the string weight has been transferred to the point at which pipe is stuck.
6. The blind/shear rams are closed, shearing the drill string above the hang-off point. The blind/shear rams are locked closed. BOP fail-safe valves are left in the *closed* position.
7. The cut section of drill string is pulled to surface.
8. Proceed with steps 9 through 18 as indicated in scenarios 1 and 2 above.

Well Suspension Scenario 5 – Dropping String

It is assumed that there has been a failure to the rig’s hoisting capability; for example, failure of the drawworks to be able to pick up or position the string by lifting, and an approaching hazard has been identified. (Dropping the string is normally associated with being unable to shear the pipe across the shear rams, whether it is in the form of drill collars or heavywall casing, etc., and comes into play more often with a dynamically positioned vessel in a “drive off” situation.) Under most all circumstances with encroaching ice (barring mechanical failure), there is adequate time to trip drill collars out of the hole if across the stack or to install a crossover and run casing past the stack on drill pipe and then utilize a conventional hang-off tool.)

1. After determining that the well should be suspended and the string dropped because of a mechanical failure, the Shell Drilling Foreman orders the Drilling Superintendent to circulate at minimum a full bottoms up (if circulation is possible).
2. Once circulation is completed the proper hydraulic fluid volume to actuate the BOP annulars is confirmed by the Drilling Superintendent and the system operating pressure is checked.
3. Operating pressure for both annulars is increased to maximum, and both annulars are closed.
4. The string is slacked down until all string weight is supported by the closed annular elements.
5. Elevators are unlatched.
6. Opening pressure is applied to the annulars, releasing their hold upon the string and allowing it to fall downhole.
7. The blind/shear rams are closed and locked. BOP failsafe valves are left in the closed position.
8. At this point, the BOP stack functions are blocked, and the LMRP connector is unlocked. The LMRP is pulled off the top of the BOP with the riser tensioners alone, allowing it to clear the BOP sufficiently to enable moving off location.
9. Note that in this circumstance the LMRP may be left hanging until the hoisting capabilities of the rig have been restored. Movement off location will thus have to take water depth into consideration and clearance between the bottom of the LMRP and the seabed.
10. Once hoisting capabilities have been restored, proceed beginning with step 9 in the scenarios above to get the diverter and slip joint layed down and the LMRP secured on deck.

Attachment B
Marine Mammal Monitoring and Mitigation Plan (4MP)

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**Marine Mammal Monitoring
and Mitigation Plan**

for

**Exploration Drilling of Selected Lease Areas in
the Alaskan Chukchi Sea**



Shell Gulf of Mexico Inc.

May 2011

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ACRONYMS & ABBREVIATIONS

μPa	micropascal(s)
4MP	Marine Mammal Monitoring and Mitigation Plan
AEWC	Alaska Eskimo Whaling Commission
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
dB	decibel
CDs	compact discs
cm^3	cubic centimeter(s)
Com Center	Communications and Call Center
<i>Discoverer</i>	Motor Vessel <i>Noble Discoverer</i>
GPS	Global Positioning System
ft	feet
ft^2	square feet
Hz	Hertz
in.	inch(es)
in.^2	square inch(es)
IHA	Incidental Harassment Authorization
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
lb	pound(s)
Leq	energy equivalent sound level
LOA	Letter of Authorization
m	meter(s)
m^2	square meter(s)
mi	mile(s)
MMO	Marine Mammal Observer
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
M/V	Motor Vessel
NMFS	National Marine Fisheries Service
Noble	Noble Corporation
NSB	North Slope Borough
NVD	night-vision device
psi	pounds per square inch
rms	root mean square
Scripps	Scripps Institute of Oceanography
Shell	Shell Gulf of Mexico Inc.
SPL	Sound Pressure Level
USB	universal serial bus
USFWS	U.S. Fish and Wildlife Service
VSI	vertical seismic imager
VSP	vertical seismic profile
ZVSP	zero-offset vertical seismic profile

INTRODUCTION

Shell Gulf of Mexico Inc. (Shell) will conduct a Marine Mammal Monitoring and Mitigation Plan (4MP) for exploration drilling activities in the Chukchi Sea during the 2012 drilling season. The 4MP developed for Shell's exploration drilling program supports protection of the marine mammal resources in the area, fulfills reporting obligations to the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), the National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (USFWS), and establishes a means for gathering additional data on marine mammals for future operations planning.

Shell plans to conduct exploration drilling within existing lease holdings in the Chukchi Sea. Drilling will be conducted from the drillship *M/V Noble Discoverer (Discoverer)* owned and operated by Noble Corporation. The drillship is an ice-strengthened drilling vessel designed, engineered and constructed to safely operate in arctic waters like the Chukchi Sea. In addition to the drillship, several support vessels will be used. The support vessels will include tugs and barges, a primary ice management vessel, an anchor handler/ice management vessel, and oil spill response vessels.

At, or near the end of each well, a zero-offset vertical seismic profile (ZVSP) likely will be conducted. During ZVSP surveys, an airgun array is deployed adjacent to the drillship, while receivers are placed (temporarily anchored) in the wellbore. The sound source (airgun array) is fired repeatedly, and the reflected sonic waves are recorded by receivers (geophones) located in the wellbore. The survey will last 10-14 hours as the receivers are moved through the length of the wellbore and the airguns are fired 5-7 times after each movement. The purpose of the ZVSP is to gather geophysical information at various depths, which can then be used to tie-in or ground-truth geophysical information from the previous seismic surveys with geological data collected within the wellbore.

Shell's 4MP is a combination of active monitoring of the area of operations and the implementation of mitigation measures designed to minimize project impacts to marine resources. Monitoring will provide information on the numbers of marine mammals potentially affected by the exploration operations and facilitate real time mitigation to prevent injury of marine mammals by industrial sounds or activities. These goals will be accomplished by conducting vessel-based, aerial, and acoustic monitoring programs to document the potential reactions of marine mammals in the area to the various sounds and activities and to characterize the sounds produced by the drilling activities, support vessels, and ZVSP.

Aerial monitoring and reconnaissance of marine mammals in coastal areas of the Chukchi Sea and recordings of ambient sound levels and vocalizations of marine mammals along the Chukchi Sea coast will be used to interpret potential impacts to marine mammals in subsistence use areas. Acoustic measurements will be made to establish safety radii for real time mitigation, if necessary, around the activities. These measurements will be used to determine the sound levels produced by various equipment and to establish any safety and disturbance radii if necessary. An initial sound source analysis will be supplied to NMFS within 120 hours of completion of the measurements, if possible. A detailed report will be issued to NMFS as part of the 90-day report following the end of the drilling season. Shell will continue to measure the sound propagation of

the drillship at various times or throughout the drilling program. Sound energy from support vessels will also be measured. Bottom-founded hydrophones will also be placed in a large array across the Chukchi Sea to collect information on the use of the region by marine mammals and additional information on the propagation of sounds from human activities.

VESSEL-BASED MARINE MAMMAL MONITORING PROGRAM

Introduction

The vessel-based operations of Shell's 4MP are designed to meet the requirements of the Incidental Harassment Authorization (IHA) and the Letter of Authorization (LOA) which Shell requested from the NMFS and the USFWS, respectively, and to meet any other stipulated agreements between Shell and other agencies or groups. The objectives of the program will be to ensure that disturbance to marine mammals and subsistence hunts is minimized, that effects on marine mammals are documented, and to collect data on the occurrence and distribution of marine mammals in the project area.

The 4MP will be implemented by a team of experienced marine mammal observers (MMOs). These MMOs will be trained, experienced field observers, including both biologists and Inupiat personnel. The MMOs will be stationed aboard the drillship and associated support vessels throughout the drilling period. The duties of the MMOs will include watching for and identifying marine mammals; recording their numbers, distances, and reactions to the drilling operations; initiating mitigation measures when appropriate; and reporting the results. Reporting of the results of the vessel-based monitoring program will include the estimation of the number of marine mammal "takes" as defined by the NMFS and stipulated in the IHA.

The vessel-based operations of Shell's 4MP will be required to support the vessel based drilling activities in the Chukchi Sea. The dates and operating areas will depend upon ice and weather conditions, along with Shell's arrangements with agencies and stakeholders. The *Discoverer* and associated support vessels will transit through the Bering Strait into the Chukchi Sea on or about July 1, arriving on location at the Burger Prospect as soon as ice and weather conditions allow. Drilling will then commence on or about July 4, as ice, weather, and other conditions allow for safe drilling operations, and may last until October 31. Vessel-based monitoring for marine mammals will be done throughout the period of drilling operations to comply with provisions in the anticipated IHA and LOA from NMFS and USFWS, respectively.

The vessel-based work will provide:

- the basis for real-time mitigation, if necessary, as required by the various permits that Shell receives;
- information needed to estimate the number of "takes" of marine mammals by harassment, which must be reported to NMFS and USFWS;
- data on the occurrence, distribution, and activities of marine mammals in the areas where the drilling program is conducted;
- information to compare the distances, distributions, behavior, and movements of marine mammals relative to the drillship at times with and without drilling activity;

- a communication channel to coastal communities including Inupiat whalers; and
- employment and capacity building for local residents, with one objective being to develop a larger pool of experienced Inupiat MMOs.

The 4MP will be operated and administered consistent with monitoring programs conducted during seismic and shallow hazards surveys in 2006–2010 or such alternative requirements as may be specified in the IHA and LOA received from NMFS and USFWS, respectively for this project. Any other agreements between Shell and agencies or groups such as BOEMRE, the North Slope Borough (NSB), and the Alaska Eskimo Whaling Commission (AEWC) will also be fully incorporated. All MMOs will be provided training through a program approved by NMFS, USFWS (if so stipulated) and Shell, as described in the MMO section of this 4MP. At least one observer on each vessel will be an Inupiat who will have the additional responsibility of communicating with the Inupiat community and (during the various subsistence harvests) directly with Inupiat hunters and whalers. Details of the vessel-based marine mammal monitoring program are described below.

Mitigation Measures during Drilling Activities and Zero-Offset Vertical Seismic Profile Surveys

Shell's planned exploration drilling program incorporates both design features and operational procedures for minimizing potential impacts on marine mammals and on subsistence hunts. The design features and operational procedures of the mitigation measures have been described in the IHA (Section 12 of the IHA application to which this 4MP is appended) and LOA applications submitted to NMFS and USFWS respectively, and are not repeated in entirety here. Survey design features include:

- timing and locating drilling and support activities to avoid interference with the annual subsistence hunting by the peoples of the Chukchi villages;
- conducting pre-season acoustic modeling to establish the appropriate safety zones and behavioral or disturbance radii;
- vessel-based monitoring to implement appropriate mitigation if necessary, and to determine the effects of project activities on marine mammals;
- acoustic monitoring of drillship and vessel sounds and marine mammal vocalizations; and
- seismic activity mitigation measures during performance of ZVSP surveys.

The potential disturbance of marine mammals during operations will be minimized further through the implementation of several vessel-based mitigation measures (see Section 12 of the IHA application to which this 4MP is appended) if mitigation becomes necessary.

Safety and Disturbance Zones

Under current NMFS guidelines (e.g., NMFS 2000), "safety radii" for marine mammals around industrial sound sources are customarily defined as the distances within which received pulse levels are ≥ 180 decibels (dB) re 1 micropascal (μPa) root mean square (rms) for cetaceans and ≥ 190 dB re 1 μPa (rms) for pinnipeds. These safety criteria are based on an assumption that sound energy received at lower levels will not injure these animals or impair their hearing

abilities, but that higher received levels might have some such effects. Disturbance or behavioral effects to marine mammals from underwater sound may occur after exposure to sound at distances greater than the safety radii (Richardson et al. 1995). NMFS assumes that marine mammals exposed to underwater impulsive sounds at received levels ≥ 160 dB (rms) have the potential to exhibit behavioral reactions great enough to meet the definition of “harassment” in the MMPA. For continuous sounds NMFS has established a similar disturbance threshold at ≥ 120 dB (rms).

Drilling Activities

Expected safety and disturbance radii based on sound propagation from the drillship *Discoverer* were modeled by JASCO Applied Sciences at the three potential drill sites (JASCO 2009). Changes in the water column of the Chukchi Sea through the course of the drilling season will likely affect the propagation of sounds produced by drilling activities, so models were run for expected oceanographic conditions in July and October to bracket the seasonal variability. These radii will be used for mitigation purposes, should they be necessary, until direct measurements are available early during the exploration drilling activities. Shell will measure the received levels of underwater sound versus distance and direction from the sound sources using calibrated hydrophones. The acoustic data will be analyzed as quickly as reasonably practicable in the field and used to verify (and if necessary adjust) the safety and disturbance radii.

Sounds from the *Discoverer* have not previously been measured in the Arctic. However, measurements of sounds produced by the *Discoverer* were made in the South China Sea in 2009 (Austin and Warner 2010). The results of those measurements were used to model the sound propagation from the *Discoverer* (including a nearby support vessel) at planned drilling locations in the Chukchi and Beaufort seas (Warner and Hannay 2011). Broadband source levels of sounds produced by the *Discoverer* varied by activity and direction from the ship, but were generally between 177 and 185 dB re 1 μ Pa @ 1 m rms (Austin and Warner 2010). Propagation modeling at the Burger prospect resulted in an estimated distance of 0.814 miles (mi) (1.31 kilometers [km]) to the point at which drillings sounds would likely fall below 120 dB. The estimated 0.814 mi (1.31 km) distance was multiplied by 1.5 (= 1.22 mi [1.97 km]) as a further precautionary measure before calculating the total area that may be exposed to continuous sounds ≥ 120 dB re 1 μ Pa rms by the *Discoverer* at each drill site on the Burger prospect. Assuming one well will be drilled in each season (summer and fall), the total area of water ensonified to ≥ 120 dB rms in each season is estimated to be 4.6 mi² (12 km²).

The source levels noted above for exploration drilling activities are not high enough to cause a temporary reduction in hearing sensitivity or permanent hearing damage to marine mammals. Consequently, mitigation as described for seismic activities including ramp ups, power downs, and shut downs should not be necessary for drilling activities, but will be employed during the ZVSP survey described below. Shell plans to use MMOs onboard the drillship and the various support vessels to monitor marine mammals and their responses to industry activities and to initiate mitigation measures should in-field measurements of the operations indicate conditions represent a threat to the health and well-being of marine mammals.

ZVSP Surveys

The sound source likely to be used by Shell for the ZVSP survey in 2012 will be similar to the ITAGA eight-airgun array, which consists of four 150 cubic inches (in.³) (2,458 cubic centimeters (cm³)) airguns and four 40 in.³ (655 cm³) airguns. These airguns can be activated in any combination and Shell would utilize the minimum airgun volume required to obtain an acceptable signal. A similar airgun source was used in the region in 2008 during the BP Liberty seismic survey. Preseason estimates of the propagation of airgun sounds from the ITAGA vertical seismic profile (VSP) sound source have been estimated based on the measurements of the seismic source reported in BP's 90-day report (Aerts et al. 2008). The BP Liberty source was also an eight-airgun array, but had a slightly larger total volume of 880 in.³ (14,421 cm³). Because the number of airguns is the same, and the difference in total volume only results in an estimated 0.4 dB decrease in the source level of the ZVSP source, the 100th percentile propagation model from the measurements of the BP Liberty source is almost directly applicable. However, the BP Liberty source was towed at a depth of 5.9 ft (1.8 m), while the ZVSP source will be lowered to a target depth of 13 ft (4 m) (from 10-23 ft [3-7 m]). The lower depth of the ZVSP source has the potential to increase the source strength by as much as 6 dB. Thus, the constant term in the propagation equation from the BP Liberty source has been increased from 235.4 to 241.4 while the remainder of the equation ($-18 \cdot \text{Log}R - 0.0047 \cdot R$) has been left unchanged. This equation results in the following estimated distances to maximum received levels: 190 dB = 1,719 ft (524 m); 180 dB = 4,068 ft (1,240 m); 160 dB = 12,041 ft (3670 m); 120 dB = 34,449 ft (10,500 m).

MMOs on the drillship will initially use these estimated safety radii for monitoring and mitigation purposes. An acoustics contractor will perform direct measurements of the received levels of underwater sound versus distance and direction from the ZVSP array using calibrated hydrophones. The acoustic data will be analyzed as quickly as reasonably practicable (within 5 days) in the field and used to verify (and if necessary adjust) the safety distances. The mitigation measures to be implemented will include pre-ramp up watches, ramp ups, power downs and shut downs as described below.

Ramp Ups

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

During the proposed ZVSP surveys, the operator will ramp up the airgun arrays slowly. Full ramp ups (i.e., from a cold start when no airguns have been firing) will begin by firing a single airgun in the array. A full ramp up will not begin until there has been a minimum of 30 minutes of observation of the safety zone by MMOs to assure that no marine mammals are present. The entire safety zone must be visible during the 30-minute lead-in to a full ramp up. If the entire safety zone is not visible, then ramp up from a cold start cannot begin. If a marine mammal(s) is sighted within the safety zone during the 30-minute watch prior to ramp up, ramp up will be delayed until the marine mammal(s) is sighted outside of the safety zone or the animal(s) is not

sighted for at least 15-30 minutes: 15 minutes for small odontocetes and pinnipeds, or 30 minutes for baleen whales and large odontocetes.

Power Downs and Shut Downs

A power down is the immediate reduction in the number of operating energy sources from all firing to some smaller number. A shut down is the immediate cessation of firing of all energy sources. The arrays will be immediately powered down whenever a marine mammal is sighted approaching close to or within the applicable safety zone of the full arrays, but is outside the applicable safety zone of the single source. If a marine mammal is sighted within the applicable safety zone of the single energy source, the entire array will be shut down (i.e., no sources firing).

Marine Mammal Observers

Vessel-based monitoring for marine mammals will be done by trained MMOs throughout the period of drilling operations to comply with expected provisions in the IHA and LOA that Shell receives. The observers will monitor the occurrence and behavior of marine mammals near the drillship and support vessels during all daylight periods during the drilling operation, and during most periods when drilling is not being conducted. MMO duties will include watching for and identifying marine mammals; recording their numbers, distances, and reactions to the drilling operations; and documenting “take by harassment” as defined by NMFS.

Number of Observers

A sufficient number of MMOs will be onboard each vessel to meet the following criteria:

- 100 percent monitoring coverage during all periods of drilling operations in daylight;
- maximum of four consecutive hours on watch per MMO; and
- maximum of approximately 12 hours on watch per day per MMO.

MMO teams will consist of trained Inupiat and field biologist observers. An experienced field crew leader will be a member of every MMO team aboard the drillship and each support vessel during the drilling program. The total number of MMOs aboard may decrease later in the season as the duration of daylight decreases assuming NMFS does not require continuous nighttime monitoring. Inupiat MMOs will also function as Native language communicators with hunters and whaling crews and with the Communications and Call Centers (Com Centers) in Native villages along the Chukchi Sea coast.

Crew Rotation

Shell anticipates that there will be provision for crew rotation at least every three to six weeks to avoid observer fatigue. During crew rotations detailed hand-over notes will be provided to the incoming crew leader by the outgoing leader. Other communications such as email, fax, and/or phone communication between the current and oncoming crew leaders during each rotation will also occur when possible. In the event of an unexpected crew change Shell will facilitate such communications to insure monitoring consistency among shifts.

Observer Qualifications and Training

Crew leaders and most other biologists serving as observers in 2012 will be individuals with experience as observers during one or more of the 2006–2010 monitoring projects for Shell or recent experience with other operators in Alaska or the Canadian Beaufort.

Biologist-observers will have previous marine mammal observation experience, and field crew leaders will be highly experienced with previous vessel-based marine mammal monitoring projects. Resumés for those individuals will be provided to NMFS so that NMFS (and USFWS if so stipulated) can review and accept their qualifications. All observers will be trained and familiar with the marine mammals of the area. A MMO handbook, adapted for the specifics of the planned Shell drilling program will be prepared and distributed beforehand to all MMOs (see below).

Most observers will also complete a two-day training and refresher session on marine mammal monitoring, to be conducted shortly before the anticipated start of the 2012 drilling season. Any exceptions will have or receive equivalent experience or training. The training session(s) will be conducted by marine mammalogists with extensive crew-leader experience during previous vessel-based seismic monitoring programs.

Primary objectives of the training include:

- review of the marine mammal monitoring plan for this project, including any amendments adopted, or specified by NMFS or USFWS in the IHA or LOA, by BOEMRE, or other agreements in which Shell may elect to participate;
- review of marine mammal sighting, identification, (photographs and videos) and distance estimation methods, including any amendments specified by NMFS or USFWS in the 2012 IHA or LOA;
- review of operation of specialized equipment (reticle binoculars, night vision devices, and global positioning system [GPS] system);
- review of, and classroom practice with, data recording and data entry systems, including procedures for recording data on mammal sightings, drilling and monitoring operations, environmental conditions, and entry error control. These procedures will be implemented through use of a customized computer database and laptop computers; and
- review of specific tasks of the Inupiat communicator.

MMO Handbook

A MMO Handbook will be prepared for Shell’s monitoring program. The Handbook will contain maps, illustrations, and photographs as well as copies of important documents and descriptive text and are intended to provide guidance and reference information to trained individuals who will participate as MMOs. The following topics will be covered in the MMO Handbook:

- summary overview descriptions of the project, marine mammals and underwater sound energy, the 4MP (vessel-based, aerial, acoustic measurements, special studies), the NMFS IHA and USFWS LOA and other regulations/permits/agencies, the Marine Mammal Protection Act (MMPA);
- monitoring and mitigation objectives and procedures, including initial safety radii,

- responsibilities of staff and crew regarding the 4MP;
- instructions for ship crew regarding the 4MP;
- data recording procedures: codes and coding instructions, common coding mistakes, electronic database; navigational, marine physical, and drilling data recording, field data sheet;
- use of specialized field equipment: reticle binoculars, Big-eye binoculars, night vision devices (NVDs), laser rangefinders;
- reticle binocular distance scale;
- table of wind speed, Beaufort wind force, and sea state codes;
- data storage and backup procedures;
- list of species that might be encountered: identification, natural history;
- safety precautions while onboard;
- crew and/or personnel discord; conflict resolution among MMOs and crew;
- drug and alcohol policy and testing;
- scheduling of cruises and watches;
- communications;
- list of field gear provided;
- suggested list of personal items to pack;
- suggested literature, or literature cited; and
- copies of the NMFS IHA and USFWS LOA will be made available.

Monitoring Methodology

The observer(s) will watch for marine mammals from the best available vantage point on the drillship and support vessels. Ideally this vantage point is an elevated stable platform from which the MMO has an unobstructed 360-degree view of the water. The observer(s) will scan systematically with the naked eye and 7 × 50 reticle binoculars, supplemented with Big-eye binoculars and night-vision equipment when needed (see below). Personnel on the bridge will assist the MMO(s) in watching for pinnipeds and whales. New or inexperienced MMOs will be paired with an experienced MMO or experienced field biologist so that the quality of marine mammal observations and data recording is kept consistent.

Information to be recorded by MMOs will include the same types of information that were recorded during previous monitoring projects (e.g., Moulton and Lawson 2002). When a mammal sighting is made, the following information about the sighting will be carefully and accurately recorded:

- species, group size, age/size/sex categories (if determinable);
- physical description of features that were observed or determined not to be present in the case of unknown or unidentified animals;
- behavior when first sighted and after initial sighting;
- heading (if consistent), bearing and distance from observer;

- apparent reaction to activities (e.g., none, avoidance, approach, paralleling, etc.);
- closest point of approach and behavioral pace;
- time, location, speed, and activity of the vessel, sea state, ice cover, visibility, and sun glare; and
- positions of other vessel(s) in the vicinity of the observer location.

The ship's position, speed, water depth, sea state, ice cover, visibility, and sun glare will also be recorded at the start and end of each observation watch, every 30 minutes during a watch, and whenever there is a change in any of those variables.

Distances to nearby marine mammals will be estimated with binoculars (Fujinon 7×50 binoculars) containing a reticle to measure the vertical angle of the line of sight to the animal relative to the horizon.

Observers may use a laser rangefinder to test and improve their abilities for visually estimating distances to objects in the water. However, previous experience showed that a Class 1 eye-safe device was not able to measure distances to seals more than about 230 ft (70 m) away. The device was very useful in improving the distance estimation abilities of the observers at distances up to about 1,968 ft (600 m)—the maximum range at which the device could measure distances to highly reflective objects such as other vessels. Humans observing objects of more-or-less known size via a standard observation protocol, in this case from a standard height above water, quickly become able to estimate distances within about ±20 percent when given immediate feedback about actual distances during training.

Monitoring At Night and In Poor Visibility

Night-vision equipment (“Generation 3” binocular image intensifiers, or equivalent units) will be available for use when needed. However, past experience with NVDs in the Beaufort Sea and elsewhere indicates that NVDs are not nearly as effective as visual observation during daylight hours (e.g., Harris et al. 1997, 1998; Moulton and Lawson 2002).

Specialized Field Equipment

Shell will provide or arrange for the following specialized field equipment for use by the onboard MMOs: reticle binoculars, Big-eye binoculars, GPS unit, laptop computers, night vision binoculars, and possibly digital still and digital video cameras.

Field Data-Recording, Verification, Handling, and Security

The observers on the drillship and support vessels will record their observations onto datasheets or directly into handheld computers. During periods between watches and periods when operations are suspended, those data will be entered into a laptop computer running a custom computer database. The accuracy of the data entry will be verified in the field by computerized validity checks as the data are entered, and by subsequent manual checking of the database printouts. These procedures will allow initial summaries of data to be prepared during and shortly after the field season, and will facilitate transfer of the data to statistical, graphical or other programs for further processing. Quality control of the data will be facilitated by (1) the start-of-

season training session, (2) subsequent supervision by the onboard field crew leader, and (3) ongoing data checks during the field season.

The data will be backed up regularly onto compact discs (CDs) and/or universal serial bus (USB) disks, and stored at separate locations on the vessel. If possible, data sheets will be photocopied daily during the field season. Data will be secured further by having data sheets and backup data CDs carried back to the Anchorage office during crew rotations.

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

Field Reports

Throughout the drilling program, the observers will prepare a report each day or at such other interval as required summarizing the recent results of the monitoring program. The reports will summarize the species and numbers of marine mammals sighted. These reports will be provided to NMFS, USFWS, BOEMRE, and Shell as required.

Reporting

The results of the 2012 vessel-based monitoring, including estimates of “take by harassment”, will be presented in the 90-day and final technical report(s). Reporting will address the requirements established by NMFS in the IHA, and USFWS in the LOA (if so stipulated).

The technical report(s) will include:

- summaries of monitoring effort: total hours, total distances, and distribution of marine mammals through study period for sea state, and other factors affecting visibility and detectability of marine mammals;
- analyses of the effects of various factors influencing detectability of marine mammals: sea state, number of observers, and fog/glare;
- species composition, occurrence, and distribution of marine mammal sightings including date, water depth, numbers, age/size/gender categories, group sizes, and ice cover; and
- analyses of the effects of drilling operations:
 - sighting rates of marine mammals versus drilling activities (and other variables that could affect detectability),
 - initial sighting distances versus drilling state,
 - closest point of approach versus drilling state,
 - observed behaviors and types of movements versus drilling state,
 - numbers of sightings/individuals seen versus drilling state,
 - distribution around the drillship and support vessels versus drilling state, and
 - estimates of “take by harassment”.

Shell will consider requests for data collected during the marine mammal monitoring only after the data have been put through a quality control/quality assurance program. Such requests may include incorporating the data with other companies' data and/or integrating the raw data with data from other marine mammal studies.

ACOUSTIC MONITORING PLAN

Drilling Sound Measurements

Objectives

Drilling sounds are expected to vary significantly with time due to variations in the level of operations and the different types of equipment used at different times onboard the drillship. The goals of these measurements are:

- to quantify the absolute sound levels produced by drilling and to monitor their variations with time, distance and direction from the drillship.
- to measure the sound levels produced by vessels operating in support of drilling operations. These vessels will include crew change vessels, tugs, ice-management vessels, and spill response vessels.
- to measure the sound levels produced by an end-of-hole ZVSP survey using a stationary sound source.

Equipment

The drillship, support vessels, and ZVSP sound measurements will be performed using one of two methods, both of which involve real-time monitoring. The first method would involve use of bottom-founded hydrophones cabled back to the drillship (Figure 1). These hydrophones weigh approximately 88 lb (40 kilograms) with a footprint of approximately 2.7 ft² (0.25 m²) and would be positioned between 1,640 ft (500 m) and 3,281 ft (1,000 m) from the drillship, depending on the final positions of the anchors used to hold the drillship in place. Hydrophone cables would be fed to real-time digitization systems on board. In addition to the cabled system, a separate set of bottom-founded hydrophones (Figure 2) may be deployed at various distances from the drilling operation for storage of acoustic data to be retrieved and processed at a later date.

As an alternative to the cabled hydrophone system (and possible inclusion of separate bottom-founded hydrophones), the second (or alternative) monitoring method would involve a radio buoy approach deploying four sparbuoys 4-5 mi (6-8 km) from the drillship. Additional hydrophones may be deployed closer to the drillship if necessary to better determine sound source levels. Monitoring personnel and recording/receiving equipment would be onboard one of the support vessels with 24-hour monitoring capacity. The system would allow for collection and processing of real-time data similar to that provided by the cabled system but from a wider range of locations. Processing would provide real-time localization of sound sources including seals and whales.

Sound level monitoring with either method will occur on a continuous basis throughout all drilling activities. Both types of systems will be set to record digital acoustic data at sample rate

32 kilohertz (kHz), providing useful acoustic bandwidth to at least 15 kHz. Both the hydrophone systems use Reson TC4032 hydrophones with sensitivity -170 dB re V/ μ Pa. These systems are capable of measuring absolute broadband sound levels between 90 and 180 dB re μ Pa. The long duration recordings will capture many different operations performed from the drillship. Retrieval of these systems will occur following completion of the drilling activities.

The deployment of drilling sound monitoring equipment will occur as soon as possible once the drillship is on site at any of the prospects where Shell intends to drill an exploration well. Retrieval of these systems will occur following completion of the drilling activities. The long duration recordings will capture many different operations performed at the drillship. Accurate activity logs of drilling operations and nearby vessel activities will be maintained to correlate with these acoustic measurements.

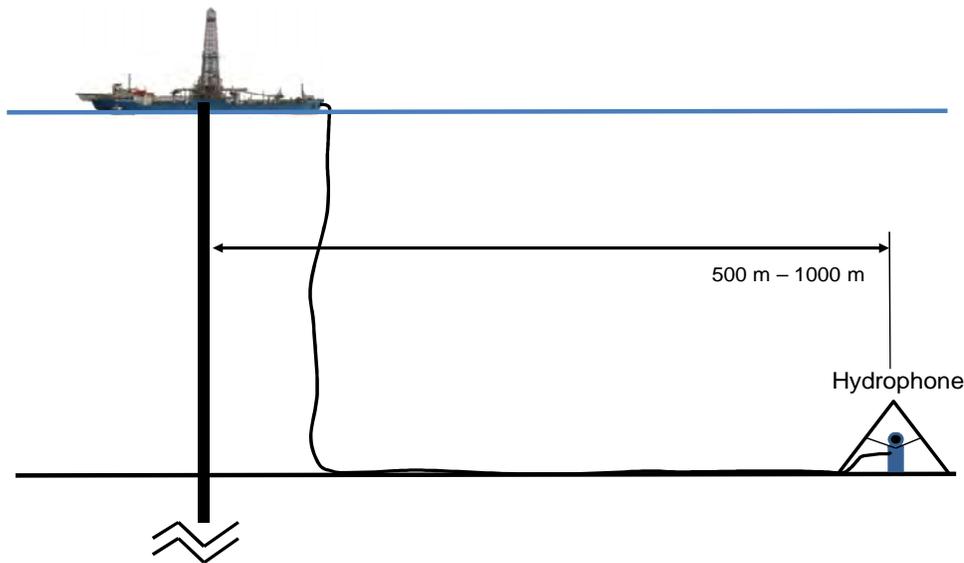


Figure 1: Cabled hydrophone method for real time monitoring of drilling sound energy.



Figure 2: Hydrophone recording system being deployed at sea. The hydrophone system is an autonomous recorder with very high recording resolution. Acoustic data is stored internally on a hard-drive.

Vessel Sounds Monitoring

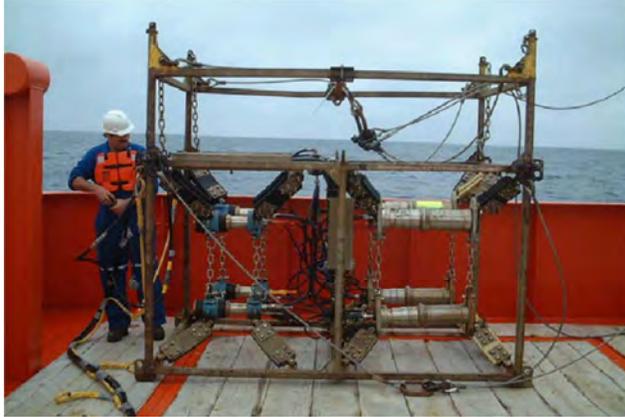
Sound produced by the vessels supporting drilling operations will be recorded by the drilling sounds monitoring equipment. Logs of vessel position and activity will be used to determine the time varying contribution of each vessel to the overall sound level measurements. Additional dedicated measurements of vessel source levels will be obtained by having the vessels perform sail-pasts of the monitoring locations. These dedicated measurements will provide sound level versus distance from the respective vessels and will also be processed to compute source levels in 1/3-octave bands referenced to 3 ft (1.0 m) range.

Zero Offset Vertical Seismic Profiling Sounds Monitoring

Sounds produced by the ZVSP survey at, or near the end of each well will be recorded using the drilling sounds monitoring equipment. During ZVSP surveys, an airgun array, which is typically much smaller than those used for routine seismic surveys, is deployed at a location near or adjacent to the drillship, while receivers are placed (temporarily anchored) in the wellbore. The sound source (airgun array) is fired repeatedly, and the reflected sonic waves are recorded by receivers (geophones) located in the wellbore. The geophones, typically in a string, are then raised up to the next interval in the wellbore and the process is repeated until the entire wellbore has been surveyed. The purpose of the ZVSP is to gather geophysical information at various depths, which can then be used to tie-in or ground-truth geophysical information from the previous seismic surveys with geological data collected within the wellbore.

During the ZVSP, the sound source is maintained at a constant location near the wellbore (Figure 3). A typical sound source that likely would be used by Shell in 2012 is the ITAGA eight-airgun array, which consists of four 150-in.³ (2,458-cm³) airguns and four 4-in.³ (66-cm³) airguns. These airguns can be activated in any combination and Shell would utilize the minimum airgun volume required to obtain an acceptable signal. Current specifications of the array are provided in Table 1. The airgun array is depicted within its frame or sled, which is approximately 6 x 5 x 10 ft (2 x 1.5 x 3 m), in the photograph below. Typical receivers would consist of a

Schlumberger wireline four level vertical seismic imager (VSI) tool, which has four receivers 50-ft (15.2-m) apart.



Photograph of ITAGA 8-airgun Array in Sled

Table 1 Typical Sound Source (Airgun Array) Specifications for ZVSP Surveys

Source Type	Number of Sources	Max Total Chamber Size	Pressure	Source Depth	Calibrated Peak-Peak Vertical Amplitude	Zero-Peak Sound Pressure Level ¹
ITAGA Sleeve Array	8 airguns (4) 150 in. ³ (2458 cm ³) (4) 40 in. ³ (655 cm ³)	760 in. ³ 12,454 cm ³	2,000 psi 138 bar	9.8 ft / 3.0 m 16.4 ft / 5.0 m	16 bar @1m 23 bar @1m	238 dB 241 dB

¹ dB re1μPa @1m

A ZVSP survey is normally conducted at each well after total depth is reached but may be conducted at a shallower depth. For each survey, Shell would deploy the sound source (airgun array) over the side of the drillship *Discoverer* with a crane (sound source will be 50-200 ft / 15-61 m from the wellhead depending on crane location), to a depth of approximately 10-23 ft (3-7 m) below the water surface. The VSI with its four receivers will be temporarily anchored in the wellbore at depth. The sound source will be pressured up to 2,000 psi (138 bar), and activated 5-7 times at approximately 20-second intervals. The VSI will then be moved to the next interval of the wellbore and re-anchored, after which the airgun array will again be activated 5-7 times. This process will be repeated until the entire wellbore is surveyed in this manner. The interval between anchor points for the VSI is usually between 200-300 ft (61-91 m). A normal ZVSP survey is conducted over a period of about 10-14 hours depending on the depth of the well and the number of anchoring points.

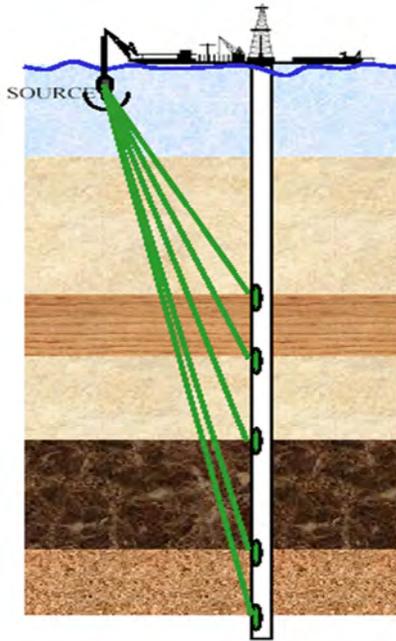


Figure 3. Schematic of ZVSP

Acoustic Data Analyses

Drilling sound data will be analyzed to extract a record of the frequency-dependent sound levels as a function of time. Figure 4 shows the results of this type of analysis. These results are useful also for correlating measured sound energy events with specific survey operations and capturing marine mammal vocalizations. The analysis provides absolute sound levels in finite frequency bands that can be tailored to match the highest-sensitivity hearing ranges for species of interest. For example, bowhead hearing is thought to be most acute in the 100–1,000 Hz frequency range that corresponds with the blue dotted line in the upper plot of Figure 4.

The analyses will also consider sound level integrated through 1-hour durations (referred to as sound energy equivalent level L_{eq} (1-hour)). Figure 5 (upper) shows an example of a L_{eq} analysis of hydrophone data. Similar graphs for long time periods will be generated as part of the data analysis performed for indicating drilling sound variation with time in selected frequency bands.

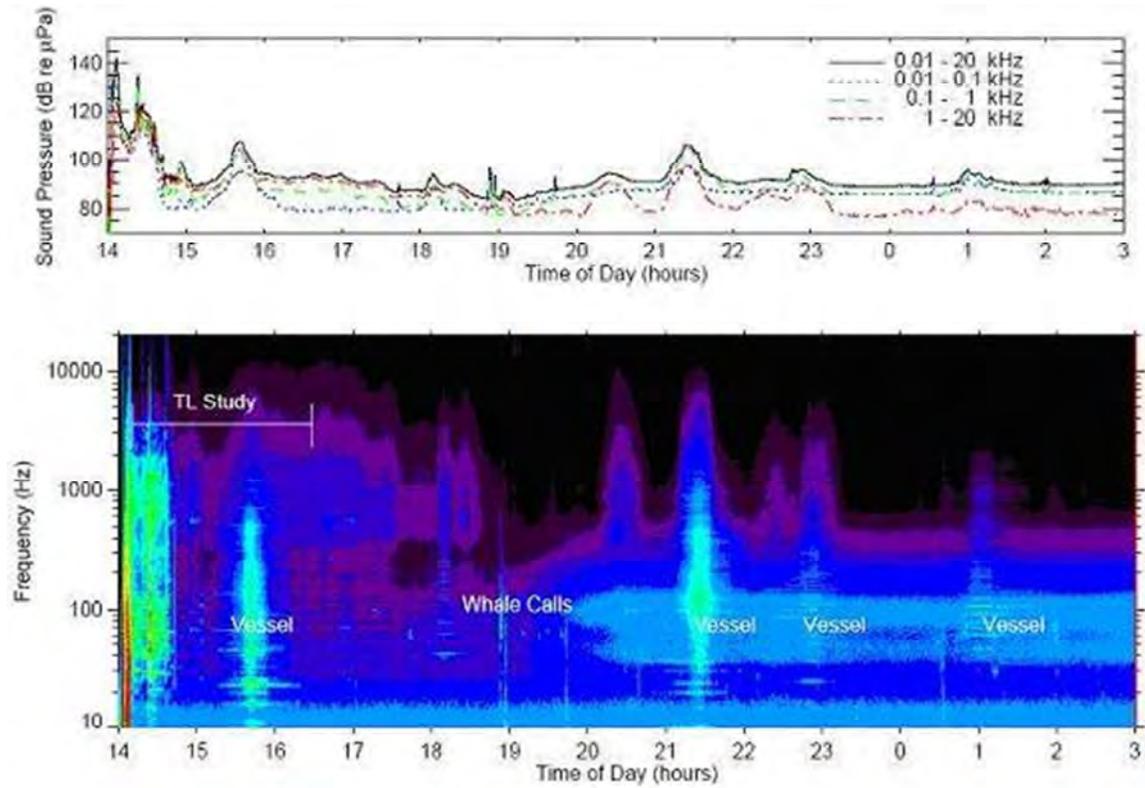


Figure 4. Lower: spectrogram of sound level measurements obtained from a hydrophone recording system. Upper: broadband and selected band level variation with time.

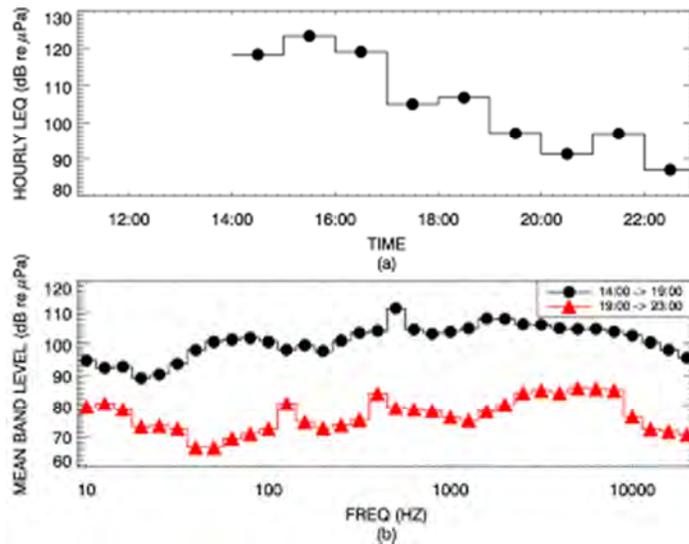


Figure 5. Upper: 1-hour Leq levels that will be calculated from acoustic measurements for use in correlating with bowhead whale deflection data.

Reporting of Results

Acoustic sound level results will be reported in the 90-day and comprehensive reports for this program. The results reported will include:

- sound source levels for the drillship and all drilling support vessels;
- spectrogram and band level versus time plots computed from the continuous recordings obtained from the hydrophone systems;
- hourly sound energy equivalent (Leq) levels at the hydrophone locations; and
- correlation of drilling source levels with the type of drilling operation being performed. These results will be obtained by observing differences in drilling sound associated with differences in the drill rig activity as indicated in detailed drillship logs.

JOINT MONITORING PROGRAM

This section describes studies that were undertaken in the Chukchi Sea from 2006 through 2010, will be undertaken again in 2011, and will be conducted during drilling operations in 2012. Shell plans to conduct aerial surveys consistent with the previous 2006–2008 and 2010 programs along the Chukchi Sea coast. Additionally, an acoustic net array similar to the one deployed in 2010 is planned for 2011 and 2012 will be used to monitor industry and marine mammal sounds across the Chukchi Sea and along coast. Additional recorders will be deployed in the area around prospects where Shell intends to drill.

Chukchi Sea Coastal Aerial Survey

Nearshore aerial surveys of marine mammals in the Chukchi Sea were conducted over coastal areas to approximately 23 mi (37 km) offshore in 2006–2008 and 2010 in support of Shell's open-water marine survey exploration activities. These surveys provided data on the distribution and abundance of marine mammals in nearshore waters of the Chukchi Sea. Shell plans to conduct an aerial survey program in the Chukchi Sea in 2012 that will be similar to the previous programs.

Alaskan Natives from villages along the east coast of the Chukchi Sea hunt marine mammals during the summer and Native communities are concerned that offshore oil and gas exploration activities may negatively impact their ability to harvest marine mammals. Of particular concern are potential impacts on the beluga harvest at Point Lay and on future bowhead harvests at Point Hope, Point Lay, Wainwright and Barrow. Other species of concern in the Chukchi Sea include the gray whale, bearded, ringed, and spotted seals, and walrus. Gray whale and harbor porpoise are expected to be the most numerous cetacean species encountered during the proposed aerial survey, although harbor porpoise are difficult to detect from aircraft. Beluga whales may occur in high numbers early in the season. The ringed seal is likely to be the most abundant pinniped species. The current aerial survey program will be designed to collect distribution data on cetaceans but will be limited in its ability to collect similar data on pinnipeds.

Objectives

The aerial survey program objectives in 2012 will be:

- to collect data on the distribution and abundance of marine mammals in coastal areas of the eastern Chukchi Sea; and
- to collect and report data on the distribution, numbers, orientation and behavior of marine mammals, particularly beluga whales, near traditional hunting areas in the eastern Chukchi Sea.

Survey Considerations

With agreement from hunters in the coastal villages, aerial surveys of coastal areas to approximately 23 mi (37 km) offshore between Point Hope and Point Barrow will begin in early to mid-July and will continue until drilling operations in the Chukchi Sea are completed. Weather and equipment permitting, surveys will be conducted twice per week during this time period. In addition, during the 2012 drilling season, aerial surveys will be coordinated in cooperation with the aerial surveys funded by BOEMRE and conducted by NMFS and any other groups conducting surveys in the region.

Survey Procedures

Transects will be flown in a saw-toothed pattern between the shore and 23 mi (37 km) offshore as well as along the coast from Point Barrow to Point Hope (Figure 6). This design will permit completion of the survey in one to two days and will provide representative coverage of the nearshore region. Saw-tooth transects were designed by placing transect start/end points every 34 mi (55 km) along the offshore boundary of this 23 mi (37 km) wide nearshore zone, and at midpoints between those points along the coast. The transect line start/end points will be shifted along both the coast and the offshore boundary for each survey based upon a randomized starting location, but overall survey distance will not vary substantially. The coastline transect will simply follow the coastline or barrier islands. As with past surveys of the Chukchi Sea coast, coordination with coastal villages to avoid disturbance of the beluga whale subsistence hunt will be extremely important. “No-fly” zones around coastal villages or other hunting areas established during communications with village representatives will be in place until the end of the hunting season.

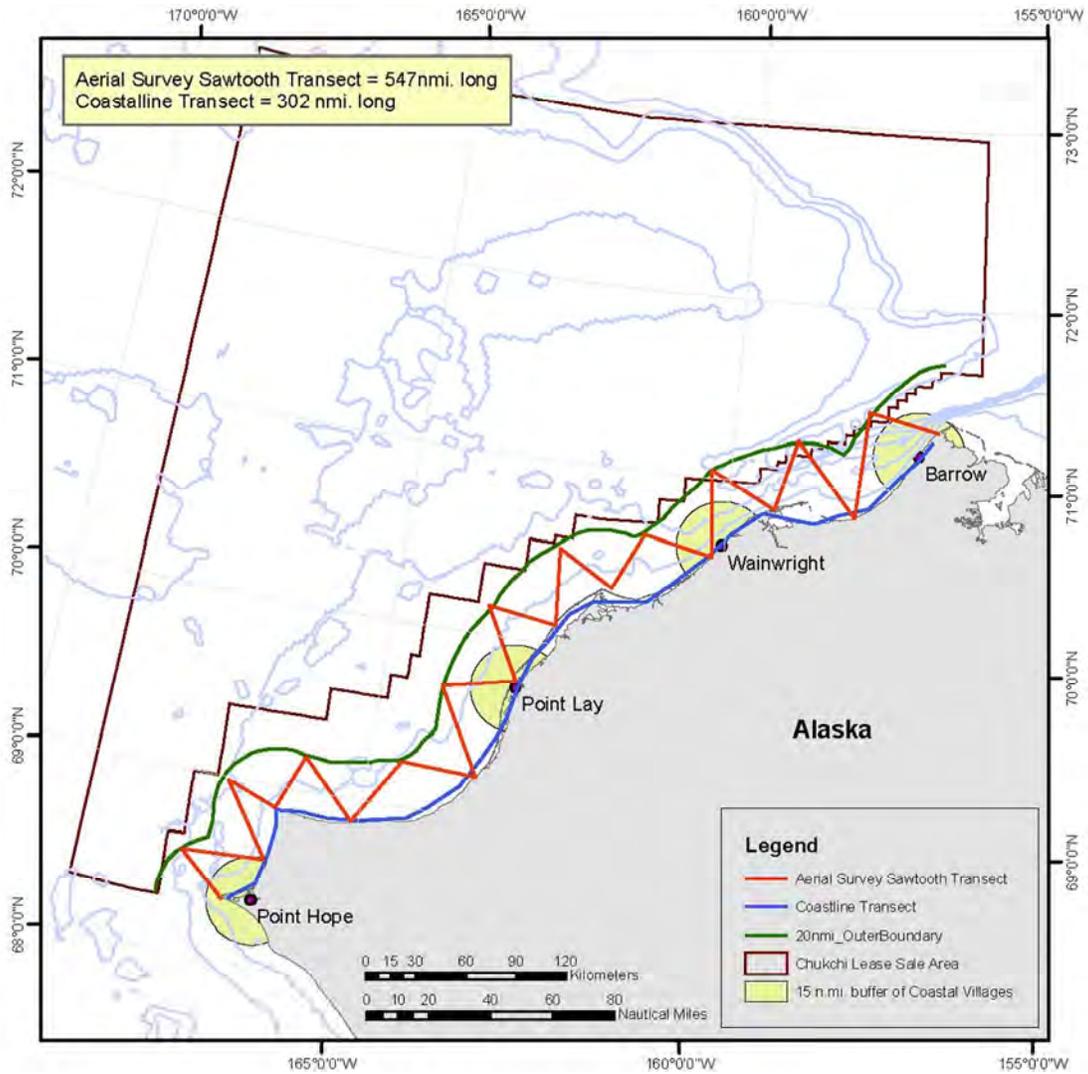


Figure 6. Aerial survey transects location and general pattern for the eastern Chukchi Sea, 2012. Specific transect start-/end-points will be altered randomly from survey to survey, and hunting areas will be avoided when hunting is occurring.

Standard aerial survey procedures used in previous marine mammal projects (by Shell as well as by others) will be followed. This will facilitate comparisons and (as appropriate) pooling with other data, and will minimize controversy about the chosen survey procedures. The aircraft will be flown at 110–120 knots ground speed and usually at an altitude of 1,000 ft (305 m). In accordance with anticipated stipulations in the LOA, survey aircraft will be flown at 1,500 ft (457 m) over the Ledyard Bay spectacled eider habitat after 1 July. Aerial surveys at an altitude of 1,000 ft (305 m) do not provide much information about seals but are suitable for bowhead, beluga, and gray whales. The need for a 1,000+ ft (305+ m) cloud ceiling will limit the dates and times when surveys can be flown. Selection of a higher altitude for surveys would result in a significant reduction in the number of days during which surveys would be possible, impairing the ability of the aerial program to meet its objectives.

The surveyed area will include waters where belugas are normally available to subsistence hunters. If large concentrations of belugas are encountered during the survey, the survey may be interrupted to photograph the groups to obtain better counts of the number of animals present. If whales are photographed in lagoons or other shallow-water concentration areas, the aircraft will climb to ~10,000 ft (3,048 m) altitude to avoid disturbing the whales and causing them to leave the area. If whales are in offshore areas, the aircraft will climb high enough to include all whales within a single photograph; typically about 3,000 ft (914 m) altitude. When in shallow water, belugas and other marine mammals are more sensitive to aircraft overflights and other forms of disturbance than when they are offshore (see Richardson et al. 1995 for a review). They frequently leave shallow estuaries when over flown at altitudes of 2,000–3,000 ft (610-904 m), whereas they rarely react to aircraft at 1,500 ft (457 m) when offshore in deeper water. Additionally, if large groups of other marine mammals are encountered on the surveys, such as the large aggregations of walrus seen in 2007 and 2010, we will attempt to photograph the animals and provide location information to interested stakeholders.

Three MMOs will be aboard the aircraft during surveys. Two observers will be looking for marine mammals within 1.6 mi (2.5 km) of the survey track line; one each at bubble windows on either side of the aircraft. The third person will record data. When sightings are made, observers will notify the data recorder of the species or species class of the animal(s) sighted, the number of animals present, and the lateral distance (inclinometer angle) of the animals from the flight path of the aircraft. This information, along with time and location data from an onboard GPS, will be entered into a database.

At the start of each transect, the primary observer will record the transect start time and position, ceiling height (ft), cloud cover (in 10ths), wind speed (knots), wind direction (degrees True North [$^{\circ}$ T]) and outside air temperature (degrees Celsius [$^{\circ}$ C]). In addition, each observer will record the time, visibility (subjectively classified as excellent, good, moderately impaired, seriously impaired or impossible), sea state (Beaufort wind force), ice cover (in 10ths) and sun glare (none, moderate, severe) at the start and end of each transect, and at 2-minute intervals along the transect. This will provide data in units suitable for statistical summaries and analyses of effects of these variables on the probability of detecting animals (see Davis et al. 1982; Miller et al. 1999; Thomas et al. 2002, Manly et al. 2004).

The data logger will automatically record time and aircraft position (latitude and longitude) for sightings and transect waypoints, and at pre-selected intervals along the transects. The primary data logger will be a laptop computer with Garmin Mapsource (ver 6.9) GPS software. Mapsource automatically stores the time and aircraft position at pre-selected intervals (typically at 6 seconds for straight-line transect surveys) and stores the records to a file as they are obtained.

Coordination with Other Aerial Surveys

The BOEMRE, the NMFS, the NSB, or other organizations may also conduct aerial surveys in the Chukchi Sea during the drilling season. Shell will consult with any groups or organizations conducting aerial surveys along the eastern Chukchi Sea coast regarding coordination during the drilling season. The objectives will be:

- to ensure aircraft separation when both crews conduct surveys in the same general region;

- to coordinate the 2012 aerial survey projects in order to maximize consistency and minimize duplication; and
- to maximize consistency with previous years' efforts insofar as feasible.

Analysis of Aerial Survey Data

During the field program, preliminary maps and summaries of the daily surveys will be provided to NMFS as normally required by the terms of the IHA. While in the field data will be checked for entry errors and files will be backed up to CDs or portable memory drives. Reporting of results will focus on the distribution of the observed species along the coast and the seasonal timing (if any) of the observed species.

Acoustic “Net” Array in Chukchi Sea

Background and Objectives

The acoustic “net” array used during the 2006–2010 field seasons is again proposed for 2011 and 2012 in the Chukchi Sea was designed to accomplish two main objectives. The first was to collect information on the occurrence and distribution of marine mammals (including beluga whale, bowhead whale, and walrus) that may be available to subsistence hunters near villages located on the Chukchi Sea coast and to document their relative abundance, habitat use, and migratory patterns. The second objective was to measure the ambient soundscape throughout the eastern Chukchi Sea and to record received levels of sounds from industry and other activities further offshore in the Chukchi Sea.

Technical Approach

The net array configuration used in 2007–2010 is again proposed for 2011 and 2012. The basic components of this effort consist of 30 hydrophone systems placed widely across the U.S. Chukchi Sea and a prospect specific array of 12 hydrophones capable of localization of mammal calls. The net array configuration will include hydrophone systems distributed at each of the four primary transect locations: Cape Lisburne, Point Hope, Wainwright and Barrow. The systems comprising the regional array will be placed at locations shown in Figure 7. These offshore systems will capture exploration drilling sounds, if present, over large distances to help characterize the sound transmission properties in the Chukchi Sea. They will also provide a large amount of information related to marine mammals in the Chukchi Sea.

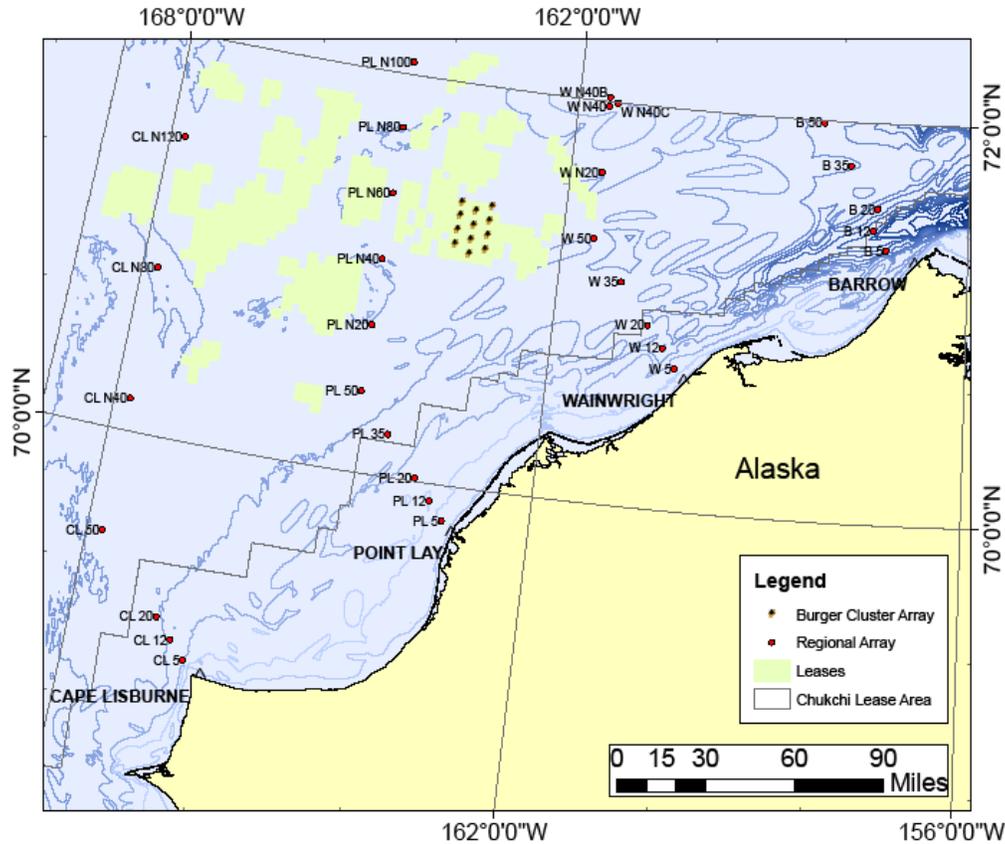


Figure 7. Deployment locations of Hydrophones in acoustic arrays in the eastern Chukchi Sea, Alaska 2012. Depiction of hydrophone array at Burger is not scaled correctly based on description below (12 km by 18 km)

The regional acoustic monitoring program, will be augmented in 2012 by an array of additional acoustic recorders to be deployed on a grid pattern over a 7.2 mi (12 km) by 10.8 mi (17.4 km) area extending over several of Shell's lease blocks near locations of highest interest for drilling in 2012. The cluster array will operate at a sampling frequency of 16 kHz, which is sufficient to capture vocalizations from bowhead, beluga, walrus, gray whale, fin whale, humpback, killer whale and most other marine mammals known to be present in the Chukchi Sea. The cluster deployment configuration was defined to allow tracking of vocalizing animals that pass through the immediate area of these lease blocks. Maximum separation between adjacent recorders is 3.6 mi (5.8 km). At this spacing we expect that individual whale calls will be detected on at least 3 different recorders when the calling animals are within the boundary of the deployment pattern. Bowhead and other mysticete calls should be detectable simultaneously on more than 3 recorders due to their relatively higher sound source levels compared to other marine mammals. In calm weather conditions, when ambient underwater sound levels are low, we expect to have detection of most other marine mammal calls on more than three recorders. The goal of simultaneous detection on multiple recorders is to allow for triangulation of the call positions, which also requires accurate time synchronization of the recorders. When small numbers of whales are vocalizing Shell hopes to be able to identify and track the movements of specific individuals within the deployment area. It will not be possible to track individual whales if many whales are

calling due to abundant overlapping calls. In this case analyses will show the general distribution of calls in the vicinity of the recorders.

Analysis and Reporting

The Chukchi Net Arrays and Cluster Array, deployed for up to 3 months, will produce an extremely large dataset comprising several Terabytes of acoustic data. The analyses of these data require identification of marine mammal vocalizations. Because of the very large amount of data to be processed, the analysis methods will incorporate automated vocalization detection algorithms. While the hydrophones used in the net array are not directional, and therefore not capable of accurate localization of detections, the number of vocalizations detected on each of the sensors may provide a measure of the relative spatial distribution of some marine mammal species, assuming that vocalization patterns are consistent within a species across the spatial and geographic distribution of the hydrophone array. These results may therefore provide information such as timing of migrations and routes of migration for belugas and bowheads.

A second purpose of the Chukchi net array is to monitor the amplitude of drilling sounds reaching the near-shore region. It is expected that sounds from drilling activities will be detectable on hydrophone systems when ambient sound energy conditions are low. The drilling sound levels at recorder locations will be quantified and reported.

Analysis of all acoustic data will be prioritized to address the primary questions. The primary data analysis questions are to (a) determine when, where, and what species of animals are acoustically detected on each recorder (b) analyze data as a whole to determine offshore distributions as a function of time, (c) quantify spatial and temporal variability in the ambient sound energy, and (d) measure received levels of drilling survey events and drillship activities. The detection data will be used to develop spatial and temporal animal detection distributions. Statistical analyses will be used to test for changes in animal detections and distributions as a function of different variables (e.g., time of day, season, environmental conditions, ambient sound energy, and drilling or vessel sound levels).

COMPREHENSIVE REPORT ON INDUSTRY ACTIVITIES AND MARINE MAMMAL MONITORING EFFORTS IN THE BEAUFORT AND CHUKCHI SEAS

Following the 2012 drilling season a comprehensive report describing the acoustic, vessel-based, and aerial monitoring programs will be prepared. The comprehensive report will describe the methods, results, conclusions and limitations of each of the individual data sets in detail. The report will also integrate (to the extent possible) the studies into a broad based assessment of industry activities and their impacts on marine mammals in the Chukchi Sea. The report will help to establish long term data sets that can assist with the evaluation of changes in the Chukchi Sea ecosystems. The report will attempt to provide a regional synthesis of available data on industry activity in offshore areas of northern Alaska that may influence marine mammal density, distribution and behavior.

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Attachment C
Bear Avoidance and Encounter Procedures

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Attachment C

Bear Avoidance and Encounter Procedures

All personnel should understand and follow the procedures listed below to detect the presence of bears in work areas and avoid human/ bear encounters.

If your work assignment requires you to be outside of areas that are secure from bears (buildings, heavy equipment cabs, etc.) check directly with your supervisor for the latest report from the designated representative Bear Guard to find out whether bears or bear sign were reported. Potential at-risk situations are walking between enclosed structures at the shore base, outside vehicles and at various work locations.

Arrange with your crew foreman to maintain radio or visual contact with the designated Bear Guard so that you can be alerted immediately to select a secure place if a bear is sighted. Plan the best route in advance to reach safe locations at the shore base or on a vessel from your work area.

Be especially alert in dark conditions and areas of poor visibility outside where most pedestrian areas are illuminated.

Do NOT take food with you. If it is necessary to eat away from the vessel galley or shore base mess unit, make sure that all food is safely stored inside containers aboard ship or inside secure vehicles.

Do NOT leave food wastes or other material that may attract bears outside.

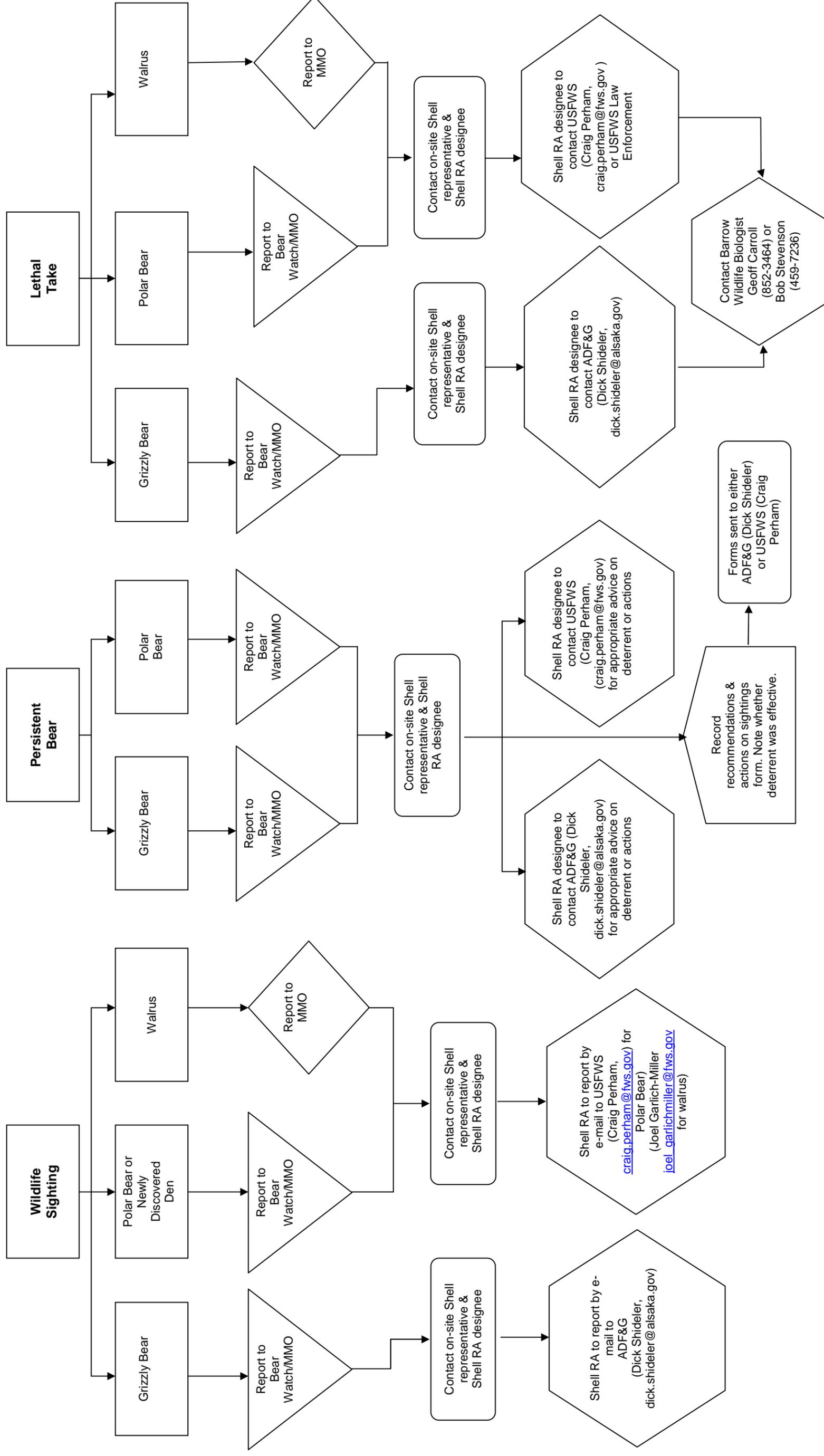
Report all bear sightings (including sign and tracks) immediately to the designated Shell representative when you are in a secure location. Do not expose yourself to look at the bear. Do not try to photograph a bear unless you are in a secure location. Early bear detection is essential to limit human/ bear encounters.

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Attachment D
Wildlife Notification Flow Chart

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WILDLIFE NOTIFICATION FLOW CHART



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Attachment E
Polar Bear Sighting Report

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. Tudor Road
Anchorage, Alaska 99503-6199

POLAR BEAR SIGHTING REPORT

Date: Observer name:
Time: Contact number/email:

Location:

Latitude: Longitude Datum:

Weather conditions: Fog Snow Rain Clear Temperature F/C

Wind speed mph/kts
Wind direction
Visibility: Poor Fair Good Excellent

Number of bears:
Adult M/F
Sub-adult
Unknown
Sow/cub(s)
Sow/yearling(s)
Sow/2YO(s)

Estimated distance of bear(s) from personnel (meters) and facility (meters)
(closest point) (closest point)

Bear behavior (Initial Contact):

Bear behavior (After Contact):

Description of encounter:

Duration of encounter: Possible attractants present:

Deterrents used/distance:
Crackershell
Vehicle
Rubber bullet
Bean bag
Horn/siren
Spotlight/Headlight
Other

Agency/Contacts:
USFWS_Craig Perham (786-3810) (FAX: 786-
3816) Time Date
ADF&G_Dick Shideler (459-7283) (FAX: 456-
3091) Time Date

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Attachment F
Grizzly Bear Observation Form

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Bear 10# ____ (ADF&G only)

GRIZZLY BEAR OBSERVATION FORM

Observer: _____ **Company / Agency:** _____

Observation Date: _____ **Time: Start** _____ **Stop** _____

Observation from: Vehicle Ground Building Other _____

Observer's distance from bear: _____ meters

General Location: Barrow Wainright Point Lay Pt Hope Endicott

Milne Point Lisburne Point McIntyre TAPS (MP#): _____

Other (latitude/longitude if known): _____

Specific Location: _____ meters _____ (direction) of _____ (facility name)

Dumpster present: Yes No Unknown

Weather: _____ °F Clear / Partly Cloudy Rain Fog Snow

Direction of wind: _____ at _____ mph

Bear Identification: Earflag color: _____ Right _____ Left _____

(Note: "right" / "left" of bear, not observer)

Natural Markings (scars, torn ear, etc.): _____

Other Bears Present: None Cubs: # of cubs _____ # of yearlings _____ # of other _____

Bear Activity: When 1st seen, the bear was: Resting Feeding (natural food)

Feeding (garbage) Feeding/Traveling Traveling

Other: _____

Bear's reaction to Observer: Ignore Approach Avoid

Were other people in area (i.e. not with observer): Yes No Unknown

Bear's reaction to other people: Ignore Approach Avoid

Comments: _____

Deterrence Action Taken: Yes No If "Yes", did you use:

Horn Siren Plastic Slugs Cracker Shell Firecracker

Birdshot Other: _____

Bear Reaction: Ignore Approach Withdraw

Additional Remarks: _____

Please return to: Dick Shideler, Alaska Department of Fish & Game
1300 College Road, Fairbanks, Alaska 99701
Phone: 907-459-7283, FAX: 907-459-3091

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Attachment G
Walrus Sighting Report

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

1011 E. Tudor Road

Anchorage, Alaska 99503-6199

WALRUS SIGHTING REPORT

Date: _____

Time: _____

Location: (include GPS coordinates if possible) _____

Observer name: _____

Weather conditions: Fog____ Snow____ Rain____ Clear____ Approx. temperature_____

Wind speed_____ Wind direction_____

Total number of walrus: Adult____ Sub-adult____ Unknown____

Estimated distance of walrus from personnel/facility: _____

Possible attractants present: _____

Walrus behavior: Curious____ Aggressive____ Predatory____ Other_____

Description of encounter: _____

Duration of encounter: _____

Deterrents used/distance: Vehicle____ Noise-maker____ Firearms____ Other_____

Injuries sustained: Personnel: _____

Walrus: _____

Agency/Contacts:

USFWS _____ Time _____ Date _____

ADF&G _____ Time _____ Date _____

CLIENT _____ Time _____ Date _____

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Attachment H
Plan of Cooperation Addendum

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**Plan of Cooperation Addendum
Revised Chukchi Sea Exploration Plan
OCS Lease Sale 193
Chukchi Sea, Alaska**

May 2011

Prepared by

**Shell Gulf of Mexico Inc.
3601 C Street, Suite 1000
Anchorage, AK 99503**

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- Attachment B Communication and Consultation with North Slope Subsistence Stakeholders
- Attachment C Chukchi Sea Communication Plan

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ACRONYMS & ABBREVIATIONS

4MP	Marine Mammal Monitoring and Mitigation Plan
AEWC	Alaska Eskimo Whaling Commission
ASRC	Arctic Slope Regional Corporation
bbl	barrel(s)
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BOP	blowout preventer
CAA	Conflict Avoidance Agreement
CFR	Code of Federal Regulations
COCP	Critical Operations and Curtailment Plan
Com Centers	Communication and Call Centers
<i>Discoverer</i>	drillship M/V <i>Noble Discoverer</i>
dB	decibel(s)
EA	Environmental Assessment
EIA	Environment Impact Assessment
EP	Exploration Plan
EWC	Eskimo Walrus Commission
FONSI	Finding of No Significant Impact
ft	foot/feet
ICAS	Inupiat Community of the Arctic Slope
IHA	Incidental Harassment Authorization
IMP	Ice Management Plan
km	kilometers
LCMF	LCMF Incorporated, a division of Ukpeagvik Iñupiat Corporation
LOA	Letter of Authorization
m	meter/meters
MAWP	Maximum anticipated wellhead pressure
mi	mile(s)
min	minutes
MMO	Marine Mammal Observer
MMS	Department of the Interior, Minerals Management Service
M/V	Motor Vessel
NMFS	National Marine Fisheries Service
NSB	North Slope Borough

NSBSD	North Slope Borough School District
NWAB	Northwest Arctic Borough
OCS	Outer Continental Shelf
ODPCP	Oil Discharge Prevention and Contingency Plan
POC	Plan of Cooperation
revised Chukchi Sea EP	Revised Chukchi Sea Exploration Plan, OCS Lease Sale 193, Chukchi Alaska
ROV	remotely operated vehicle
SA	subsistence advisor
Shell	Shell Gulf of Mexico Inc.
UIC	Ukpeagvik Iñupiat Corporation
USFWS	United States Fish and Wildlife Service

1.0 INTRODUCTION

Shell Gulf of Mexico Inc. (Shell) seeks to revise its Chukchi Sea Exploration Plan (EP). The initial Chukchi Sea EP was submitted to the former U.S. Department of the Interior, Minerals Management Service (MMS) now Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) in May of 2009. In this initial EP, Shell identified seven blocks (Posey Area Blocks 6713, 6714, 6763, 6764, 6912 and Karo Area Blocks 6864 and 7007) of interest in three prospects (Burger, Southwest Shoebill, and Crackerjack), that contained five potential drill sites (Burger C, F, J, Southwest Shoebill C, and Crackerjack C). The initial Chukchi Sea EP consisted of an exploration drilling program, which would have been conducted during the 2010 drilling season, and included the drilling of an exploration well at up to three of the above-referenced five potential drill sites during the 2010 drilling season using the drillship *Frontier Discoverer* now known as the Motor Vessel (M/V) *Noble Discoverer* (*Discoverer*).

The initial Chukchi Sea EP was deemed submitted by BOEMRE on 20 October 2009. BOEMRE subsequently prepared and distributed an Environmental Assessment (EA) of the proposed exploration drilling program as detailed in the EP, issued a Finding of No Significant Impact National Environmental Policy Act (FONSI), and approved the Chukchi Sea EP on 7 December 2009. Shell was not able to conduct the exploration drilling program in 2010 or 2011 since the exploration drilling activities were postponed when BOEMRE suspended all exploration drilling activities in the Arctic following the Deepwater Horizon incident in the Gulf of Mexico. Pursuant to an initial Chukchi Sea EP, Shell plans to conduct an exploration drilling program beginning in the summer of 2012 at some of the same drill sites within some of the same prospects using the same drillship. Shell has prepared a Revised Chukchi Sea Exploration Plan, OCS Lease Sale 193, Chukchi Alaska (revised Chukchi Sea EP) accordingly and has submitted it to BOEMRE for approval.

BOEMRE Lease Sale Stipulation No. 5 (see Attachment A), requires that all exploration operations be conducted in a manner that prevents unreasonable conflicts between oil and gas exploration activities and subsistence resources and activities. This stipulation also requires adherence to United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) regulations, which require an operator to implement a Plan of Cooperation (POC) to mitigate the potential for conflicts between the proposed activity and traditional subsistence activities (50 Code of Federal Regulations [CFR] § 18.124(c)(4) and 50 CFR § 216.104(a)(12)). A POC was prepared and was submitted with the initial Chukchi Sea EP. The following POC Addendum updates the POC with information regarding proposed changes in the proposed exploration drilling program, and documentation of meetings undertaken to inform the stakeholders of the revised exploration drilling program. The POC Addendum builds upon the previous POC.

The POC Addendum identifies the measures that Shell has developed in consultation with North Slope communities and subsistence user groups and will implement during its planned Chukchi Sea exploration drilling program to minimize any adverse effects on the availability of marine mammals for subsistence uses. In addition, the POC details Shell's communications and consultations with local communities concerning its proposed revised Chukchi Sea EP exploration drilling program beginning in the summer of 2012, potential conflicts with subsistence activities, and means of resolving any such conflicts (50 CFR § 18.128(d) and 50 CFR § 216.104(a) (12) (i), (ii), (iv)). Shell has documented its contacts with the North Slope communities, as well as the substance of its communications with subsistence stakeholder groups. Tables summarizing Shell's communications, and responses thereto, are included in Attachment B. This POC Addendum may be further supplemented, as appropriate, to reflect additional engagements with local subsistence users and any additional or revised mitigation measures that are adopted as a result of those engagements.

Shell's Chukchi Sea exploration drilling program, which is planned for the Burger Prospect in the Chukchi Sea (Figure 1), is set-out in detail in the revised Chukchi Sea EP and the impacts of the project, as well as the measures Shell will implement to mitigate those impacts, are analyzed in the Environmental Impact Analysis, Revised Chukchi Sea Exploration Plan, OCS Lease Sale 193, Chukchi Alaska (EIA). Shell will implement this POC, and the mitigation measures set-forth herein, for its Chukchi Sea exploration drilling program.

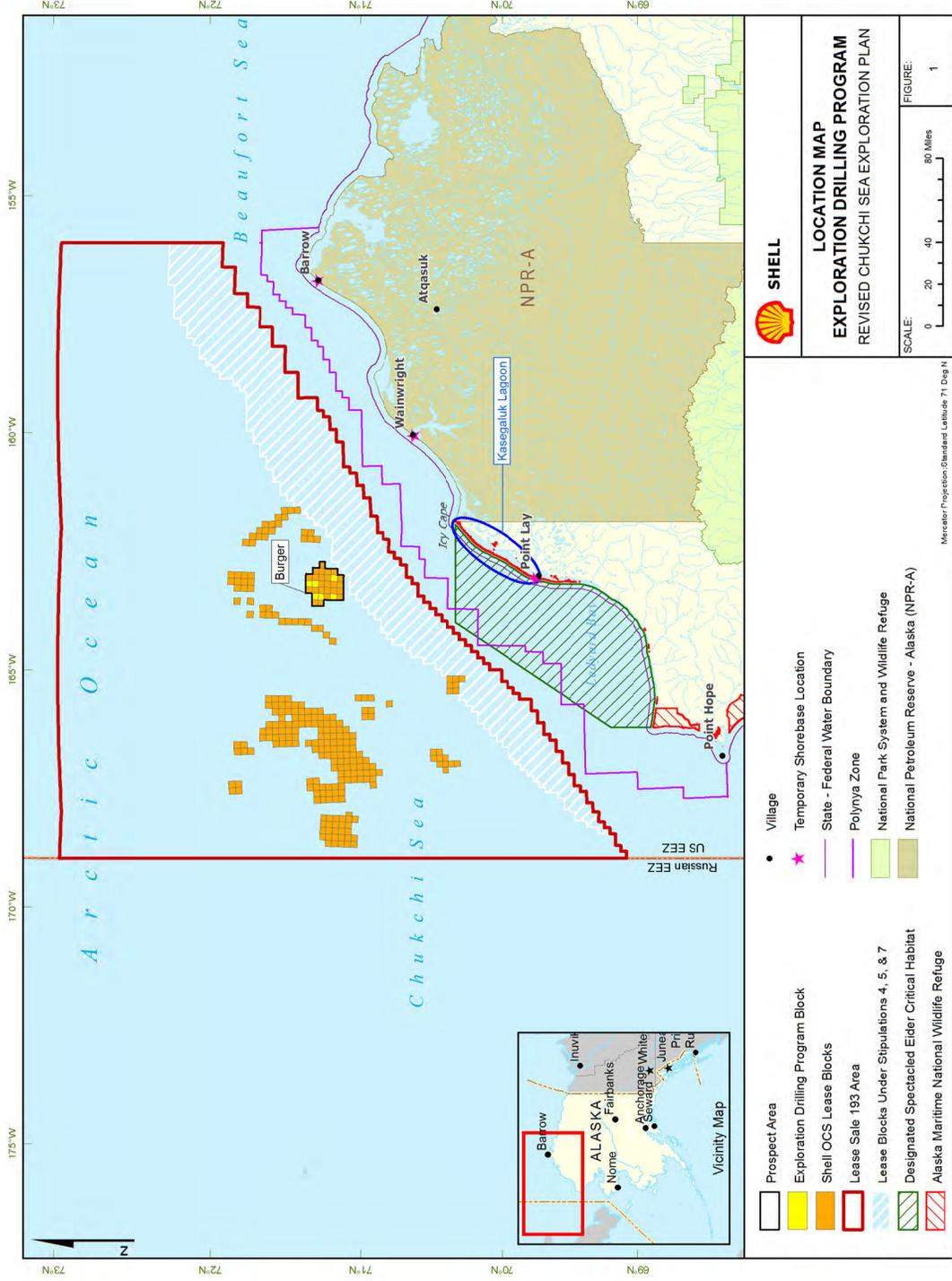
2.0 POC LEASE STIPULATION AND REGULATORY REQUIREMENTS

BOEMRE Lease Sale Stipulation No. 5 (in Attachment A) requires that all exploration operations be conducted in a manner that prevents unreasonable conflicts between oil and gas activities, and subsistence resources and activities of the residents of the North Slope. Specifically, Stipulation No. 5 requires the operator to consult directly with potentially affected North Slope subsistence communities, the North Slope Borough (NSB), the Alaska Eskimo Whaling Commission (AEWC), and co-management groups including the Alaska Beluga Whale Committee (ABWC), Alaska Eskimo Walrus Commission (EWC), Ice Seal Commission, and Nanuuq Commission.

Consultation is needed "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." Stipulation No. 5 also requires the operator to document its contacts and the substance of its communications with subsistence stakeholder groups during the operator's consultation process.

The requirements of Stipulation No. 5 parallel requirements for receipt of a USFWS Letter of Authorization (LOA) and a NMFS Incidental Harassment Authorization (IHA). The LOA and IHA provide authorization for the nonlethal harassment of species protected by the Marine Mammal Protection Act. Both the USFWS and NMFS require an applicant to implement a POC to mitigate the potential for conflicts between the proposed activity and traditional subsistence activities (50 CFR § 18.124(c)(4) and 50 CFR § 216.104(a)(12)). The POC must identify the measures that will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses. In addition, both USFWS and NMFS require an applicant to communicate and consult with local subsistence communities concerning the proposed activity, potential conflicts with subsistence activities, and means of resolving any such conflicts (50 CFR § 18.128(d) and 50 CFR § 216.104(a) (12) (i), (ii), (iv)).

Figure 1 Location Map Exploration Drilling Program



3.0 MEASURES IN PLACE

The following mitigation measures, plans and programs, are integral to this POC and were developed during consultation with potentially affected subsistence groups, communities, and the NSB. These measures, plans, and programs will be implemented by Shell during its exploration drilling operations in the Chukchi Sea to monitor and mitigate potential impacts to subsistence users and resources. These measures are documented in the following sections:

- Revised Chukchi Sea EP Mitigation Measures
- Exploration Drilling Marine Mammal Monitoring and Mitigation Program (4MP)
- Interaction and Avoidance Plan for Polar Bear and Pacific Walrus

3.1 *Revised Chukchi Sea EP Mitigation Measures*

The mitigation measures Shell has adopted and will implement during its revised Chukchi Sea EP exploration drilling operations are listed and discussed below. These mitigation measures reflect Shell's experience conducting exploration activities in Alaska since 2006 and its ongoing consultations with local subsistence communities to better understand their concerns and develop appropriate and effective mitigation measures to address those concerns. Shell's planned mitigation measures have been presented to community leaders and subsistence user groups starting in 2009 and have evolved since in response to comments and concerns expressed during the consultation process. Some mitigation measures appear under more than one sub-heading below, since they are pertinent to more than one "category" of mitigation measures.

3.1.1 Subsistence Mitigation Measures

To minimize any cultural or resources impacts to subsistence beluga whaling or walrus hunting activities from its operations, exploration drilling activities will not take place in the Chukchi Sea until on or about July 4, in each drilling season. Shell will implement the following measures to ensure coordination of its activities with local subsistence users and to minimize further the risk of impacting marine mammals and interfering with the subsistence hunt.

Communication, Vessel and Aircraft Travel:

- To minimize impacts on marine mammals and subsistence hunting activities, the drillship and support vessels traversing north through the Bering Strait will transit through the Chukchi Sea along a route that lies offshore of the polynya zone. In the event the transit outside of the polynya zone results in Shell having to break ice (as opposed to managing ice by pushing it out of the way), the drillship and support vessels will enter into the polynya zone far enough so that ice breaking is not necessary. If it is necessary to move into the polynya zone, Shell will notify the local communities of the change in the transit route through the Communication and Call Centers (Com Centers). As soon as the fleet transits past the ice, it will exit the polynya zone and continue in the open sea toward the Chukchi Sea drill sites.
- Vessels underway will alter course to avoid impacts to marine mammals including possible collisions, stampeding, and exclusion from access to critical resources.
- There will be no transit before July 1 in the Bering Strait to minimize effects on spring and early summer bowhead whale hunting.
- Shell has developed a Communication Plan (see Attachment C) and will implement it before initiating exploration drilling operations to coordinate activities with local subsistence users as

well as Village Whaling Associations in order to minimize the risk of interfering with subsistence hunting activities, and keep current as to the timing and status of the bowhead whale migration, as well as the timing and status of other subsistence hunts. The Communication Plan includes procedures for coordination with Com Centers to be located in coastal villages along the Chukchi and Beaufort Seas during Shell's proposed activities.

- Shell will fund the operation of Com Centers in the coastal villages to enable communications between Shell operations and vessels, local subsistence users, and Subsistence Advisors (SAs), thereby notifying the subsistence community of any vessel transit route changes and avoiding conflicts with subsistence activities.
- Shell will employ local SAs from the Beaufort Sea and Chukchi Sea villages to provide consultation and guidance regarding the whale migration and subsistence hunt. The SAs will use local knowledge (Traditional Knowledge) to gather data on subsistence lifestyle within the community and provide advice on ways to minimize and mitigate potential negative impacts to subsistence resources during the drilling season. Responsibilities include reporting any subsistence concerns or conflicts; coordinating with subsistence users; reporting subsistence-related comments, concerns, and information; and advising how to avoid subsistence conflicts. They will work approximately 8 hours per day and 40-hour weeks through each drilling season. SAs must be from a native village located on the North Slope, speak and understand Inupiaq and must have knowledge of subsistence practices for the area. After the initial recruitment and selection of potential candidates, the hiring process will consist of a two-part interview. During the first interview a full description of the job will be given including the schedule, type of work, conditions, and requirements (including drug testing, orientation, and specialized training). The second interview will assess the candidate's previous employment, subsistence hunting experience, communication skills and ensure they have good social skills. Each SA will be based out of their home village and will be given a SA handbook. The SA handbook will give an overview of the program, program objectives, discusses recruitment, hiring, and certification, and details the SAs responsibilities. The handbook will also include several forms that the SA will be using along with a Traditional Knowledge Questionnaire and subsistence use maps. The handbook will provide the SA with: the information needed to identify situation they are to be alert for, their responsibilities and their authorities.
- Aircraft shall not operate below 1,500 feet (ft) (457 meters [m]) unless the aircraft is engaged in marine mammal monitoring, approaching, landing or taking off, or unless engaged in providing assistance to a whaler or in poor weather (low ceilings) or any other emergency situations. Aircraft engaged in marine mammal monitoring shall not operate below 1,500 ft (457 m) in areas of active whaling; such areas to be identified through communications with the Com Centers.
- Shell will also implement non-marine mammal observer (MMO) flight restrictions prohibiting aircraft from flying below 1,500 ft (457 m) altitude (except during takeoffs and landings or in emergency situations) while over land or sea. This flight will also help avoid disturbance of and collisions with birds.

Drilling Operations:

- Drilling muds will be recycled (used from one well to the next) to the extent practicable based on operational considerations (e.g., whether mud properties have deteriorated to the point where they cannot be used further), to reduce discharges from the operations. At the end of the season, excess water based fluids, approximately 1,500 barrels (bbl), will be pre-diluted to a 30:1 ratio with seawater and then discharged.

- Drilling muds will be cooled to mitigate any potential permafrost thawing or thermal dissociation of any methane hydrates encountered during exploration drilling if such materials are present at the drill site.
- Lighting on the drillship will be shaded and has been replaced with ClearSky lighting. ClearSky lighting is designed to minimize the disorientation and attraction of birds to the lighted drillship to reduce the possibility of a bird collision (Bird Strike Avoidance and Lighting Plan in Appendix I of the revised Chukchi Sea EP).

3.1.2 Marine Mammal Mitigation Measures

Marine mammal mitigation measures will focus on the utilization of MMOs to ensure that exploration drilling and support vessel activities do not disturb marine mammal resources and avoid unreasonable interference with the subsistence hunt of those resources. MMOs will be stationed on all exploration drilling and support vessels to monitor the exclusion zone (areas within isopleths of certain sound levels for different species) for marine mammals. For vessels in transit, if a marine mammal is sighted from a vessel within its respective safety radius, the Shell vessel will reduce activity (e.g., reduce speed and/or change course) and noise level to ensure that the animal is not exposed to sound above their respective safety levels. Full activity will not be resumed until all marine mammals are outside of the exclusion zone and there are no other marine mammals likely to enter the exclusion zone. Regular overflight surveys and support vessel surveys for marine mammals will be conducted to further monitor prospect areas. Shell will also implement flight restrictions prohibiting aircraft from flying below 1,500 ft (457 m) altitude (except during takeoffs and landings, in emergency situations, or for MMO overflights), further reducing the likelihood of impacts.

Anchored vessels will remain at anchor and continue ongoing operations if approached by a marine mammal. An approaching animal, not exhibiting avoidance behavior, is likely curious and not regarded as harassed. The anchored vessel will remain in place and continue ongoing operations to avoid possibly causing avoidance behavior by suddenly changing noise conditions.

For complete MMO protocol refer to the 4MP for Exploration Drilling of Selected Lease Areas in the Alaskan Chukchi Sea (revised Chukchi Sea EP, Appendix D).

In addition to the use of MMOs, Shell will implement the following measures to avoid disturbances to marine mammals that potentially could rise to the level of incidental take, and ensure coordination of its activities with local subsistence users to minimize further the risk of impacting marine mammals and interfering with the subsistence hunt:

Vessel and Aircraft Travel:

- 4MP protocol;
- Aircraft will not operate within 1,500 ft (457 m) of whale groups;
- Aircraft and vessels will not operate within 0.5 miles (mi) (.8 kilometers [km]) of walrus or polar bears when observed on land or ice;
- When within 900 ft (274 m) of marine mammals, vessels will reduce speed, avoid separating members from a group and avoid multiple course changes;
- Vessel speed to be reduced during inclement weather conditions in order to avoid collisions with marine mammals;

- Aircraft shall not operate below 1,500 ft (457 m) unless the aircraft is engaged in marine mammal monitoring, approaching, landing or taking off, in poor weather (fog or low ceilings) in an emergency situation. Aircraft engaged in marine mammal monitoring shall not operate below 1,500 ft (457 m) in areas of active whaling; such areas to be identified through communications with the Com Centers. Except for airplanes engaged in marine mammal monitoring, aircraft shall use a flight path that keeps the aircraft at least 5 mi (8 km) inland until the aircraft is south of its offshore destination, then at that point it shall fly directly to its destination;
- Aircraft and vessels will not operate within 0.5 mi (0.8 km) of walrus or polar bears when observed on land or ice;
- Shell will also implement non-MMO flight restrictions prohibiting aircraft from flying within 1,000 ft (300 m) of marine mammals or below 1,500 ft (457 m) altitude (except during takeoffs and landings or in emergency situations) while over land or sea. This flight will also help avoid disturbance of and collisions with birds;
- The *Discoverer* and support vessels will enter the Chukchi Sea through the Bering Strait on or after July 1, minimizing effects on marine mammals and birds that frequent open leads and minimizing effects on spring and early summer bowhead whale hunting. All transit will be coordinated and collaborated with Com Centers as practicable.

Drilling Operations:

- During zero-offset vertical seismic profiles (Section 2.4 of EIA, Appendix F, revised Chukchi Sea EP), airgun arrays will be ramped up slowly to warn cetaceans and pinnipeds in the vicinity of the airguns and provide time for them to leave the area and avoid potential injury or impairment of their hearing abilities. A ramp up to the required level will not begin until there has been a minimum of 30 minutes (min) of observation of the safety zone by MMOs to assure that no marine mammals are present. The safety zone is the extent of the 180 decibel (dB) radius for cetaceans and 190 dB for pinnipeds. The entire safety zone must be visible during the 30-min lead-in to an array ramp up. If a marine mammal(s) is sighted within the safety zone during the 30-min watch prior to ramp up, ramp up will be delayed until the marine mammal(s) is sighted outside of the safety zone or the animal(s) is not sighted for at least 15-30 min: 15 min for small odontocetes and pinnipeds, or 30 min for baleen whales and large odontocete.

3.1.3 Mitigation Measures for Operations and Oil Spill Prevention and Response

BOEMRE has concluded that the probability of a large oil spill occurring during an exploration drilling project is extremely remote. Nevertheless, as required by both federal and state regulations, Shell has developed and will implement a comprehensive Oil Discharge Prevention and Contingency Plan (ODPCP) during its exploration drilling operations, in addition to other operations plans including the Ice Management Plan (IMP) and Critical Operations and Curtailment Plan (COCP). The ODPCP will be reviewed and approved by both state and federal regulators to ensure that Shell has the spill response resources necessary to respond to any spill that might occur. While the probability of a spill is very remote, Shell will dedicate all necessary resources to respond to any spill that might occur. In addition to the maintenance and implementation of its ODPCP, Shell will implement the following additional measures to further minimize the risk of a spill that might impact marine mammals and interfere with the subsistence hunt:

- Shell has established and will follow transit routes that avoid known fragile ecosystems and critical habitat areas and will include coordination through Com Centers.
- Shell has developed and will implement an IMP to ensure real-time ice and weather forecasting to identify conditions that might put operations at risk and modify its activities accordingly. The IMP also contains ice threat classification levels depending on the time available to suspend exploration drilling operations, secure the well and escape from advancing hazardous ice (IMP, revised Chukchi Sea EP, Appendix K).
- Ice management will involve preferentially redirecting, rather than breaking, ice floes while the floes are well away from the drill site (IMP, revised Chukchi Sea EP, Appendix K).
- Real time ice and weather forecasting will be from the Shell SIWAC.
- Shell has developed and will implement a COCP, which establishes protocols to be followed in the event potential hazards, including ice, are identified in the vicinity of the exploration drilling operations (e.g., ice floes, inclement weather, etc.). Like the IMP, the COCP threat classifications are based on the time available to prepare the well and escape the location. The COCP also contains provisions for not initiating certain critical operations if there is insufficient time available before the arrival of the hazard at the drill site (see the COCP Appendix J of the revised Chukchi Sea EP).
- Shell has engineered each of its exploration wells (including hole sizing, mud program, casing design, casing cementing depth, hole sizing, and wellhead equipment, etc.) specifically to minimize the risk of uncontrolled flows from the wellbore due to casing or other equipment failures.
- Shell will deploy an OSR fleet that is capable of collecting oil on the water up to the WCD planning scenario which is greater than the calculated WCD flowrate of a blowout in the unlikely event that one should occur. The primary OSR vessel will be on standby when drilling into zones containing oil to ensure that oil spill response capability is available within one hour, if needed. The remainder of the OSR fleet will be fully engaged within 72 hours.
- The primary OSR vessel will be on standby at all times when drilling into zones containing oil to ensure that oil spill response capability is available within one hour, if needed..
- The blowout prevention program will be enhanced through the use of two sets of blind/shear rams, increased frequency of blowout preventer (BOP) performance tests from 14 to 7 days, a remotely operated vehicle (ROV) control panel on the seafloor with sufficient pressured water-based fluid to operate the BOP, a containment system that includes both capping equipment and treatment and flaring capabilities, a fully-designed relief well drilling plan and provisions for a second drilling vessel, the CDU *Kulluk* (*Kulluk*) to be available to drill the relief well if the primary drilling vessel is disabled and not capable of drilling its own relief well.
- In addition to the OSR fleet, oil spill containment equipment will be available for use in the unlikely event of a blowout. The barge will be centrally located in the Beaufort Sea and supported by an Invader Class Tug and possibly an anchor handler. The containment equipment will be designed for conditions found in the Arctic including ice and cold temperatures. This equipment will also be designed for maximum reliability, ease of operation, flexibility and robustness so it could be used for a variety of blowout situations.
- Capping stack equipment will be stored as equipment aboard one of the ice management vessels and will be available for immediate deployment in the unlikely event of a blowout. Capping Stack equipment consist of subsea devices assembled to provide direct surface intervention capability with the following priorities:

- Attaching a device or series of devices to the well to affect a seal capable of withstanding the maximum anticipated wellhead pressure (MAWP) and closing the assembly to completely seal the well against further flows (commonly called “capping and killing”)
- Attaching a device or series of devices to the well and diverting flow to surface vessel(s) equipped for separation and disposal of hydrocarbons (commonly called “capping and diverting”)
- A polar bear culvert trap has been constructed in anticipation of OSR needs and will be available prior to commencing the exploration drilling operations.
- Pre-booming is required for all fuel transfers between vessels (the Fuel Transfer Plan is located in Appendix M of the revised Chukchi Sea EP).

3.2 Exploration Drilling Marine Mammal Monitoring and Mitigation Program

Under 50 CFR 218.108, NMFS requires any holder of an IHA in Arctic waters to complete monitoring and reporting requirements established in the IHA and published regulations. Additionally, the USFWS requires all applicants for LOAs to conduct monitoring under 50 CFR 18.128. To meet these requirements, a 4MP was developed for the exploration drilling program as detailed in the revised Chukchi Sea EP. The 4MP is designed to avoid, minimize, and mitigate potential adverse impacts to marine mammal subsistence resources that may result from offshore activities. The 4MP is available from NMFS and is included in Appendix D of the revised Chukchi Sea EP. The 4MP for the exploration drilling program includes the following provisions:

- MMOs will be required to support the transit and operations in the Chukchi Sea. The shipboard MMO program is designed to provide real time observations of marine mammals by trained observers from individual vessels to document exposure to industrial activities. MMOs will be present on vessels to monitor for the presence of marine mammals, assist maintenance of marine mammal safety radii around vessels, monitor and record avoidance or exposure behaviors, and communicate with the Com Centers and local subsistence hunters by marine radio. The experience and abilities of the NSB residents in sighting and identifying marine mammals during Shell’s exploration programs contributed significantly to the success of Shell’s previous monitoring and mitigation program.
- Manned Aerial Program – aerial surveys to collect information in the Chukchi Sea regarding distribution and abundance of bowhead whales and other marine mammals.
- Acoustic Recorders – a combination of recorder technology, such as pop-up or Directional Autonomous Seafloor Acoustic Recorder buoys, to monitor wide area distribution of marine mammals, specifically bowhead whales, in relation to Shell’s proposed activities.
- Sound Modeling – of vessels utilized for seismic and exploration drilling activities.
- Sound Source Verification – field measurement sound propagation profiles for the drillship and support vessels utilized by Shell in the planned exploration drilling program in the Chukchi Sea.

3.3 Interaction and Avoidance Plan for Polar Bear and Pacific Walrus

Shell has prepared an interaction and avoidance plan for polar bear and Pacific walrus to meet the requirements of 50 CFR 18.128 for holders of LOAs issued by the USFWS. The plan outlines procedures

for mitigating potential impacts to polar bear and Pacific walrus, as well as monitoring program requirements. A copy of the plan for Shell's exploration drilling activities outlined in the EP has been sent to the USFWS. Measures in the plan, which cover all Shell activities associated with the revised Chukchi Sea EP are summarized below.

- New polar bear dens, identified by industry, local residents, and regulatory agencies are reported annually and will be incorporated into project plans to ensure both bear and worker safety. Bear dens discovered during operations will be reported to the designated USFWS representatives.
- Trash will be collected and separated so that all food-associated waste is placed in an appropriate bear-resistant dumpster.
- Hazardous wastes, if generated, would be transported off-site for disposal at an approved facility.
- Employees will be prohibited from directly feeding animals or deliberately leaving food for polar bears and other animals.
- If a polar bear is observed, all on-site personnel will be alerted so that work activities can be altered or stopped to avoid interactions. Personnel will contact the designated USFWS representative whenever a polar bear is sighted. Depending on the distance between the polar bear and the activities this may mean retreating to the safety of vehicles, emergency shelter, temporary buildings, or other safe haven.
- When a polar bear is observed, a designated bear watcher will be assigned to ensure continuous monitoring of the bear's movements. The On-Scene Shell Supervisor will be contacted before any bear hazing activities. Trained polar bear hazers and bear guards will support field operations.
- Exploration drilling and support vessels will observe a 0.5 mi (.8 km) exclusion zone around any bear observed on land or ice during transit.
- Aircraft will maintain 1,500 ft (457 m) minimum altitude within, 0.5 mi (.8 km) of a hauled-out polar bear or Pacific walrus.
- Ice management mitigation measures, such as "ice scouting," will use radar, satellite imagery, observations from support vessels by trained Ice Specialists, and reconnaissance flights to monitor ice movement in areas near the prospect area prior to and during exploration drilling operations. These measures will provide an early warning of bears in the vicinity so appropriate measures can be taken to limit polar bear/human interference.
- Polar bear monitoring, reporting, and survey activities will be conducted in accordance with those outlined in 73 Federal Register 33212.
- Exploration drilling and support vessels will observe a 0.5 mi (.8 km) exclusion zone around Pacific walrus observed on land or ice during transit.

4.0 AFFECTED SUBSISTENCE COMMUNITY MEETINGS

Affected subsistence communities that were consulted regarding Shell's revised Chukchi Sea EP include: Barrow, Wainwright, Point Lay and Point Hope. Kotzebue, Kivalina, and Kiana were also visited by Shell to communicate planned offshore activities beginning in the summer of 2012. Additionally, Shell met with subsistence groups including the AEWG, the Nanuuq Commission, the Eskimo Walrus Committee, the Beluga Commission, the Ice Seal Commission, and the Native Village of Barrow, and presented information regarding the proposed activities to the NSB and Northwest Arctic Borough

(NWAB) Assemblies, and NSB and NWAB Planning Commissions. Several one-on-one meetings were also held throughout the villages.

4.1 Consultation with Community Leaders

Beginning in early January 2009, Shell held one-on-one meetings with representatives from the NSB and NWAB, subsistence-user group leadership, the Inupiat Community of the Arctic Slope (ICAS) and Village Whaling Captain Association representatives. These meetings took place at the convenience of the community leaders and in various venues. Meetings were held starting on 12 January 2009 and have continued to date. Shell's primary purpose in holding individual meetings was to inform key leaders, prior to the public meetings, so that they would be prepared to give appropriate feedback on planned activities.

4.2 Community Meeting Summaries

Table 4.2-1 provides a list of public meetings attended by Shell while developing this POC beginning in 2009 through 2011. Attachment B presents sign-in sheets and presentation materials used at the POC meetings held in 2011 to present the revised Chukchi Sea EP. Comment analysis tables for numerous meetings held during 2011 summarize feedback from the communities on Shell planned activities beginning in the summer of 2012. These comments analysis tables, with responses from Shell and corresponding mitigation measures pertinent to the comment are included in Attachment B.

Table 4.2-1 Meeting Dates and Locations

2009	Meeting Location	Meeting Attendees – Position
12-13 January	Barrow	Harry Brower – Whaling Captain, AEWG Chairman and Assistant Director of the NSB Wildlife Department Edward Itta – Whaling Captain and Mayor of the NSB Eugene Brower – Whaling Captain, ASRC Board Member and President of the NSB Assembly Anthony Edwardson – Whaling Captain and President of UIC Andy Mack – NSB Assistant to the Mayor Harold Curran – NSB Chief Administrative Officer Robert Suydam – NSB Wildlife Department Biologist Cheryl Rosa – NSB Wildlife Department Research Biologist Craig George – NSB Wildlife Department Biologist
21 January	Point Hope	Steve Oomittuk - Mayor of Point Hope
21 January	Barrow	Charlie Hopson – Whaling Captain, LCMF employee, and AEWG alternate commissioner in Barrow Adeline Hopson – NSB Assembly Member Deano Oleuman – NSB Assembly Member
21 January	Barrow	Ray Koonuk – AEWG Commissioner and Point Hope Whaling Captain
21 January	Barrow	George Edwardson – ICAS President Juanita Smith – ICAS Natural Resource Director
21 January	Point Hope	Rex Rock Sr. – NSB Assembly Member and Tikigag Corporation President
27 January	Kotzebue	Jackie Hill – Maniilaq Association Representative
27 January	Kotzebue	Martha Whiting – Mayor of the NWAB
27 January	Kotzebue	NWAB Assembly Meeting
27 January	Kotzebue	Chuck Greene, EJ Doll Garoutte, Walter Sampson, Gladys Pungowiyi - NANA Representatives
2 February	Barrow	NSB Assembly Workshop
2 February	Barrow	Plan of Cooperation Public Meeting
3 February	Barrow	Janice Meadows – AEWG Executive Director
3 February	Barrow	Vera Williams – Native Village of Barrow Realty Director Joseph Sage – Native Village of Barrow Wildlife Director
4-5 March	Anchorage	AEWG 2009 CAA Negotiations
24 March	Point Hope	Plan of Cooperation Public Meeting

Table 4.2-1 Meeting Dates and Locations

25 March	Kotzebue	Plan of Cooperation Public Meeting
25 March	Kotzebue	NSB/NWAB Joint Planning Commission Meeting
26 March	Wainwright	Plan of Cooperation Public Meeting
2 April	Barrow	ICAS Monthly Meeting
20 April	Barrow	Native Village of Barrow Meeting
22 April	Point Lay	Plan of Cooperation Public Meeting
23 April	Kivalina	Community Meeting
2010	Meeting Location	Meeting Attendees – Position
14 January	Barrow	ICAS Monthly Meeting
15 January	Anchorage	Eugene Brower – Barrow Whaling Captains Association President
22 January	Anchorage	George Oleuman – Deputy Mayor Eugene Brower – NSB Assembly President Taquilik Hepa – NSB Wildlife Director Bessie O'Rourke – NSB Law Department Marvin Olson – NSB Director Public Works Dan Forster – NSB Planning Director
24 February	Barrow	Plan of Cooperation Public Meeting
25 February	Point Hope	Plan of Cooperation Public Meeting
26 February	Barrow	Edward Itta – Mayor of the NSB
1 March	Wainwright	Plan of Cooperation Public Meeting
2 March	Kotzebue	Community Meeting
5 March	Point Hope	Plan of Cooperation Public Meeting
1 April	Point Lay	Plan of Cooperation Public Meeting
8 April	Barrow	Martha Whiting – Mayor of the NWAB Walter Sampson – NWAB Assembly President
30 April	Barrow	Edward Itta – Mayor of the NSB
1 June	Barrow	NSB Assembly Meeting
1 June	Point Lay	Point Lay Community Meeting
2 June	Barrow	Barrow Community Meeting
8 June	Barrow	Utqiaġvik Agviqsuqtit Aganangich Meeting
8 June	Barrow	Barrow Whaling Captains Association Meeting
24 June	Barrow	NWAB/NSB Joint Planning Commission Meeting
19 July	Barrow	Edward Itta – Mayor of the NSB
30 July	Kotzebue	NWAB Assembly Meeting
3 August	Barrow	NSB Assembly Meeting
7 September	Barrow	NSB Assembly Meeting
24 September	Barrow	Plan of Cooperation Public Meeting
8 November	Anchorage	Alaska Beluga Whale Committee Meeting
6 December	Anchorage	Alaska Beluga Whale Committee Members Ice Seal Committee Members Alaska Nanuuq Commission Members Eskimo Walrus Commission Members
2011	Meeting Location	Meeting Attendees – Position
27 January	Barrow	Barrow Whaling Captains Association Meeting
27 February – 2 March	Dutch Harbor	Edith Vorderstrasse – UIC UMIAQ General Manager Ray Koonuk, Sr. – Whaling Captain Christopher Oktolik – Whaling Captain John Long, Jr. – Native Village of Point Hope Council Member Joseph Frankson – Whaling Captain Franklin Sage – Native Village of Point Hope Council Member Caroline Cannon – Native Village of Point Hope President Luke Koonook, Sr. – Elder and Whaling Captain Alzred Oomittuk – City of Point Hope Council Member Bessie Kowunna – Shell Point Hope Community Liaison, Tikigaq Board Member, and City Council Member Theodore Frankson – Native Village of Point Hope Staff Aaron Oktolik – AEWK Commissioner for Point Hope and Whaling Captain Carl Brower – Whaling Captain Dora Leavitt – City of Nuiqsut Council Member

Table 4.2-1 Meeting Dates and Locations

		Thomas Napageak – City of Nuiqsut Mayor and Whaling Captain Edgar Kagak – Wainwright Health Board Oliver Peetook – City of Wainwright Vice Mayor Sandra Peetook – City of Wainwright Council Member Joseph Kaleak – AEWK Commissioner for Kaktovik and Whaling Captain George Tagarook – NSB Fire Department Fire Chief and Whaling Captain
28 February – 3 March	Dutch Harbor	William Tracey, Sr. – NSB Planning Commissioner and Point Lay Fire Chief Marie Tracey – NSB Village Liaison Emma Ahvakana – NWAB Assembly Member Enoch Mitchell – Noatak IRA President Ronald Moto, Sr. – Nana Board Member and City of Deering Mayor Cole Schaeffer – Kikiktagruk Inupiat Corporation President & CEO Nellie Wesley – NWAB Planning Commission EPA Assistant Anthony Edwardsen – UIC President/CEO Troy Izat – Tikigaq Corporation COO Susan Harvey – Harvey Consulting, LLC and Consultant to the NSB Thomas Nageak – Barrow Whaling Captain and NSB Cultural Resource Specialist Roy Nageak Jr. – Native Village of Barrow Natural Resource Technician Michael Shults – Barrow City Council Mary Sage – NSBSD School Board Member, Iisagvik College Board Member, and Native Village of Barrow Council Member Robert Suydam – NSB Wildlife Biologist Qaiyaan Opie – ICAS Environmental Director Lloyd Leavitt – City of Barrow Council Member Robert Nageak – City of Barrow Council Member Johnny Aiken – AEWK Executive Director Harry Brower, Jr. – AEWK Chairman
7-8 March	Anchorage	Arctic Open Water Meeting
21 March	Barrow	Plan of Cooperation Public Meeting
23 March	Wainwright	Plan of Cooperation Public Meeting
23 March	Wainwright	Rossmann Peetok – AEWK Commissioner for Wainwright Jason Ahmaogak – Wainwright Whaling Captain
25 March	Point Lay	Plan of Cooperation Public Meeting
28 March	Point Hope	Plan of Cooperation Public Meeting
29 March	Kiana	Community Meeting
30 March	Kotzebue	Community Meeting
31 March	Kivalina	Community Meeting
2 April	Nome	Vera Metcalf – Eskimo Walrus Commission Charlie Johnson – Alaska Nanuq Commission
5 April	Barrow	NSB Assembly Meeting
7 April	Kotzebue/ Anchorage (Teleconference)	Willie Goodwin – Alaska Beluga Whale Committee
8 April	Anchorage	John Goodwin – Ice Seal Committee
15 April	Anchorage	Vera Metcalf – Eskimo Walrus Commission
25 April	Savoonga	Community Meeting
26 April	Shishmaref	Community Meeting
27 April	Gambell	Community Meeting

Notes:

ASRC = Arctic Slope Regional Corporation
CAA = Conflict Avoidance Agreement
ICAS = Inupiat Community of the Arctic Slope
LCMF = LCMF Incorporated, A subsidiary of Ukpeagvik Inupiat Corporation
NSBSD = North Slope Borough School District
UIC = Ukpeagvik Inupiat Corporation

4.3 Project Information and Presentation Materials

To present consistent and concise information regarding the planned exploration drilling program as detailed in the revised Chukchi Sea EP, Shell prepared presentation materials (listed below and attached in Attachment B) for meetings with stakeholders across the North Slope.

Revised Chukchi Sea EP Exploration Drilling Presentation Summary

- Summary of Shell's Science Accomplishments
- Summary and explanation of Shell's Proposed 2012-13 EP
- Summary of Shell's proposed drill sites for the revised Chukchi Sea EP

4.4 Meeting Process

Prior to Shell's public meetings, communities were contacted to determine an optimal meeting date and subsequently notified by public advertising. Meeting notices and flyers were sent to each city council and Native council for public posting well in advance of the meeting dates. Public notices were also published in the *Arctic Sounder*, the local paper that serves most of the North Slope region, and announcements were made on the local radio station KBRW 680 AM and KOTZ 720 AM.

Community meetings are designed to allow the public to voice their concerns and speak one-on-one with project experts. Kiosks manned by subject matter experts were set-up in communities where this form of communication is deemed acceptable to facilitate direct communications and comment cards supplied for each station. Comment cards with a Shell return address were left with the communities and a toll free phone number and e-mail address were provided in case questions arose after the meeting. Food was provided and door prizes were given out to create a friendly environment and encourage attendance. Every effort was made to ensure the maximum amount of feedback was received and that all questions were addressed and answered to the fullest extent possible.

After each meeting, comment cards were gathered and compiled in a comment analysis table. A separate comment analysis table was completed for each POC meeting, the NSB Assembly Meeting, and each community meeting. These tables are included in Attachment B.

5.0 CONCLUSION

As discussed in Section 4, and detailed in the documents attached here, stakeholders have been provided information relevant to the project and have been invited to offer input on potential environmental, social, and health impacts, as well as and proposed mitigation and conflict avoidance measures. Shell is seeking alignment with stakeholders and, where appropriate and feasible, will incorporate the recommendations of stakeholders into project planning.

As required by applicable lease sale stipulations, as well as anticipated IHA and LOA stipulations, Shell will continue to meet with the affected subsistence communities and users to resolve conflicts and to notify the communities of any changes in its planned operations. The POC may be supplemented, as appropriate, to reflect additional engagements with local subsistence users and any additional or revised mitigation measures that are adopted as a result of those engagements. Shell respectfully submits that this POC meets its obligations under Stipulation No. 5, as well as the POC requirements established by applicable USF&WS and NMFS regulations (50 CFR 216.104, 50 CFR 18.124 and 128).

Attachment A
OCS Lease Sale 193 Stipulations

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Leasing Activities Information



U.S. Department of the Interior
Minerals Management Service
Alaska OCS Region

Final Lease Stipulations Oil and Gas Lease Sale 193 Chukchi Sea February 6, 2008

- Stipulation 1. Protection of Biological Resources
- Stipulation 2. Orientation Program
- Stipulation 3. Transportation of Hydrocarbons
- Stipulation 4. Industry Site-Specific Monitoring Program for Marine Mammal Subsistence Resources
- Stipulation 5. Conflict Avoidance Mechanisms to Protect Subsistence Whaling and Other Marine Mammal Subsistence-Harvesting Activities
- Stipulation 6. Pre-Booming Requirements for Fuel Transfers
- Stipulation 7. Measures to Minimize Effects to Spectacled and Steller's Eiders During Exploration Activities

Stipulation No. 1. Protection of Biological Resources. If previously unidentified 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 finding 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.

Stipulation No. 2. Orientation Program. The lessee shall include in any exploration plan (EP) or development and production plan (DPP) submitted under 30 CFR 250.211 and 250.241 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 RS/FO. 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 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 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 RS/FO.

Stipulation No. 4. Industry Site-Specific Monitoring Program for Marine Mammal Subsistence Resources. A lessee proposing to conduct exploration operations, including ancillary seismic surveys, on a lease within the blocks identified below during periods of subsistence use related to bowhead whales, beluga whales, ice seals, walruses, and polar bears will be required to conduct a site-specific monitoring program approved by the RS/FO, unless, based on the size, timing, duration, and scope of the proposed operations, the RS/FO, in consultation with appropriate agencies and co-management organizations, determines that a monitoring program is not necessary. Organizations currently recognized by the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) for the co-management of the marine mammals resources are the Alaska Eskimo Whaling Commission, the Alaska Beluga Whale Committee, the Alaska Eskimo Walrus Commission, the Ice Seal Commission, and the Nanuk Commission. The RS/FO will provide the appropriate agencies and co-management organizations a minimum of 30 calendar days, but no longer than 60 calendar days, to review and comment on a proposed monitoring program prior to Minerals Management Service (MMS) 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 and beluga whales, ice seals, walruses, and polar bears are present in the vicinity of lease operations and the extent of behavioral effects on these marine mammals due to these operations. In designing the program, the lessee must consider the potential scope and extent of effects that the type of operation could have on these marine mammals. Experiences relayed by subsistence hunters indicate that, depending on the type of operations, some whales demonstrate avoidance behavior at distances of up to 35 miles. The program must also provide for the following:

- (1) Recording and reporting information on sighting of the marine mammals of concern and the extent of behavioral effects due to operations;
- (2) Coordinating the monitoring logistics beforehand with the MMS Bowhead Whale Aerial Survey Project and other mandated aerial monitoring programs;
- (3) Inviting a local representative, to be determined by consensus of the appropriate co-management organizations, to participate as an observer in the monitoring program;
- (4) Submitting daily monitoring results to the RS/FO;
- (5) Submitting a draft report on the results of the monitoring program to the RS/FO within 90 days following the completion of the operation. The RS/FO will distribute this draft report to the appropriate agencies and co-management organizations;
- (6) Allowing 30 days for independent peer review of the draft monitoring report; and
- (7) Submitting a final report on the results of the monitoring program to the RS/FO within 30 days after the completion of the independent peer review. 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 appropriate agencies and co-management organizations.

The RS/FO may extend the report review and submittal timelines if the RS/FO determines such an extension is warranted to accommodate extenuating circumstances.

The lessee 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 for bowhead whales. The lessee may be required to fund an independent peer review of a proposed monitoring plan and the draft report on the results of the monitoring program for other co-managed marine mammal resources. 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 appropriate agencies and co-management resource organizations. The results of these peer reviews will be provided to the RS/FO for consideration in final MMS approval of the monitoring program and the final report, with copies to the appropriate agencies and co-management organizations.

In the event the lessee is seeking a Letter of Authorization (LOA) or Incidental Harassment Authorization (IHA) for incidental take from NMFS and/or FWS, the monitoring program and review process required under the LOA or IHA may satisfy the requirements of this stipulation. The lessee must advise the RS/FO when it is seeking an LOA or IHA in lieu of meeting the requirements of this stipulation and must provide the RS/FO with copies of all pertinent submittals and resulting correspondence. The RS/FO will coordinate with the NMFS and/or FWS and will advise the lessee if the LOA or IHA will meet these requirements.

The MMS, NMFS, and FWS will establish procedures to coordinate results from site-specific surveys required by this stipulation and the LOA's or IHA's to determine if further modification to lease operations are necessary.

This stipulation applies to the following blocks:

NR02-06, Chukchi Sea:

6624, 6625, 6674, 6675, 6723-6725, 6773-6775, 6822, 6823, 6872

NR03-02, Posey:

6872, 6873, 6918-6923, 6967-6973, 7016-7023, 7063-7073, 7112-7123

NR03-03, Colbert

6674, 6723, 6724, 6771-6774, 6820-6824, 6869-6874, 6918-6924, 6966-6974, 7015-7024, 7064-7074, 7113-7124

NR03-04, Solivik Island

6011-6023, 6060-6073, 6109-6122, 6157-6171, 6206-6219, 6255-6268, 6305-6317, 6354-6365, 6403-6414, 6453-6462, 6502-6511, 6552-6560, 6601-6609, 6651-6658, 6701-6707, 6751-6756, 6801-6805, 6851-6854, 6901-6903, 6951, 6952, 7001

NR03-05, Point Lay West

6014-6024, 6062-6073, 6111-6122, 6160-6171, 6209-6221, 6258-6269, 6307-6317, 6356-6365, 6406-6414, 6455-6462, 6503-6510, 6552-6558, 6602-6606, 6652-6655, 6702, 6703

NR04-01, Hanna Shoal

6223, 6267-6273, 6315-6323, 6363-6373, 6411-6423, 6459-6473, 6507-6523, 6556-6573, 6605-6623, 6654-6671, 6703-6721, 6752-6771, 6801-6819, 6851-6868, 6901-6916, 6951-6964, 7001-7010, 7051-7059, 7101-7107

NR04-02, Barrow

6003-6022, 6052-6068, 6102-6118, 6151-6164, 6201-6214, 6251-6262, 6301-6312, 6351-6359, 6401-6409, 6451-6456, 6501-6506, 6551, 6552, 6601, 6602

NR04-03, Wainwright

6002-6006, 6052, 6053

NS04-08, (Unnamed)

6816-6822, 6861-6872, 6910-6922, 6958-6972, 7007-7022, 7055-7072, 7104-7122

This stipulation applies during the time periods for subsistence-harvesting described below for each community.

Subsistence Whaling and Marine Mammal Hunting Activities by Community

Barrow: Spring bowhead whaling occurs from April to June; Barrow hunters hunt from ice leads from Point Barrow southwestward along the Chukchi Sea coast to the Skull Cliff area. Fall whaling occurs from August to October in an area extending from approximately 10 miles west of Barrow to the east side of Dease Inlet. Beluga whaling occurs from April to June in the spring leads between Point Barrow and Skull Cliff; later in the season, belugas are hunted in open water around the barrier islands off Elson Lagoon. Walrus are harvested from June to September from west of Barrow southwestward to Peard Bay. Polar bear are hunted from October to June generally in the same vicinity used to hunt walrus. Seal hunting occurs mostly in winter, but some open-water sealing is done from the Chukchi coastline east as far as Dease Inlet and Admiralty Bay in the Beaufort Sea.

Wainwright: Bowhead whaling occurs from April to June in the spring leads offshore of Wainwright, with whaling camps sometimes as far as 10 to 15 miles from shore. Wainwright hunters hunt beluga whales in the spring lead system from April to June but only if no bowheads are in the area. Later in the summer, from July to August, belugas can be hunted along the coastal lagoon systems. Walrus hunting occurs from July to August at the southern edge of the retreating pack ice. From August to September, walrus can be hunted at local haulouts with the focal area from Milliktagvik north to Point Franklin. Polar bear hunting occurs primarily in the fall and winter around Icy Cape, at the headland from Point Belcher to Point Franklin, and at Seahorse Island.

Point Lay: Because Point Lay's location renders it unsuitable for bowhead whaling, beluga whaling is the primary whaling pursuit. Beluga whales are harvested from the middle of June to the middle of July. The hunt is concentrated in Naokak and Kukpowruk Passes south of Point Lay where hunters use boats to herd the whales into the shallow waters of Kasegaluk Lagoon where they are hunted. If the July hunt is

unsuccessful, hunters can travel as far north as Utukok Pass and as far south as Cape Beaufort in search of whales. When ice conditions are favorable, Point Lay residents hunt walrus from June to August along the entire length of Kasegaluk Lagoon, south of Icy Cape, and as far as 20 miles offshore. Polar bear are hunted from September to April along the coast, rarely more than 2 miles offshore.

Point Hope: Bowhead whales are hunted from March to June from whaling camps along the ice edge south and southeast of the point. The pack-ice lead is rarely more than 6 to 7 miles offshore. Beluga whales are harvested from March to June in the same area used for the bowhead whale hunt. Beluga whales can also be hunted in the open water later in the summer from July to August near the southern shore of Point Hope close to the beaches, as well as areas north of the point as far as Cape Dyer. Walruses are harvested from May to July along the southern shore of the point from Point Hope to Akoviknak Lagoon. Point Hope residents hunt polar bears primarily from January to April and occasionally from October to January in the area south of the point and as far out as 10 miles from shore.

This stipulation will remain in effect until termination or modification by the Department of the Interior after consultation with appropriate agencies.

Stipulation No. 5. Conflict Avoidance Mechanisms to Protect Subsistence Whaling and Other Marine Mammal Subsistence-Harvesting 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. This stipulation applies to exploration, development, and production operations on a lease within the blocks identified below during periods of subsistence use related to bowhead whales, beluga whales, ice seals, walruses, and polar bears. The stipulation also applies to support activities, such as vessel and aircraft traffic, that traverse the blocks listed below or Federal waters landward of the sale during periods of subsistence use regardless of lease location. Transit for human safety emergency situations shall not require adherence to this stipulation.

This stipulation applies to the following blocks:

NR02-06, Chukchi Sea:

6624, 6625, 6674, 6675, 6723-6725, 6773-6775, 6822, 6823, 6872

NR03-02, Posey:

6872, 6873, 6918-6923, 6967-6973, 7016-7023, 7063-7073, 7112-7123

NR03-03, Colbert

6674, 6723, 6724, 6771-6774, 6820-6824, 6869-6874, 6918-6924, 6966-6974, 7015-7024, 7064-7074, 7113-7124

NR03-04, Solivik Island

6011-6023, 6060-6073, 6109-6122, 6157-6171, 6206-6219, 6255-6268, 6305-6317, 6354-6365, 6403-6414, 6453-6462, 6502-6511, 6552-6560, 6601-6609, 6651-6658, 6701-6707, 6751-6756, 6801-6805, 6851-6854, 6901-6903, 6951, 6952, 7001

NR03-05, Point Lay West

6014-6024, 6062-6073, 6111-6122, 6160-6171, 6209-6221, 6258-6269, 6307-6317, 6356-6365, 6406-6414, 6455-6462, 6503-6510, 6552-6558, 6602-6606, 6652-6655, 6702, 6703

NR04-01, Hanna Shoal

6223, 6267-6273, 6315-6323, 6363-6373, 6411-6423, 6459-6473, 6507-6523, 6556-6573, 6605-6623, 6654-6671, 6703-6721, 6752-6771, 6801-6819, 6851-6868, 6901-6916, 6951-6964, 7001-7010, 7051-7059, 7101-7107

NR04-02, Barrow

6003-6022, 6052-6068, 6102-6118, 6151-6164, 6201-6214, 6251-6262, 6301-6312, 6351-6359, 6401-6409, 6451-6456, 6501-6506, 6551, 6552, 6601, 6602

NR04-03, Wainwright

6002-6006, 6052, 6053

NS04-08, (Unnamed)

6816-6822, 6861-6872, 6910-6922, 6958-6972, 7007-7022, 7055-7072, 7104-7122

Prior to submitting an exploration plan or development and production plan (including associated oil-spill response plans) to the MMS for activities proposed during subsistence-use critical times and locations described below for bowhead whale and other marine mammals, the lessee shall consult with the North Slope Borough, and with directly affected subsistence communities (Barrow, Point Lay, Point Hope, or Wainwright) and co-management organizations to discuss potential conflicts with the siting, timing, and methods of proposed operations and safeguards or mitigating measures that could be implemented by the operator to prevent unreasonable conflicts. Organizations currently recognized by the NMFS and the FWS for the co-management of the marine mammals resources are the Alaska Eskimo Whaling Commission, the Alaska Beluga Whale Committee, the Alaska Eskimo Walrus Commission, the Ice Seal Commission, and the Nanuk Commission. Through this consultation, the lessee shall make every reasonable effort, including such mechanisms as a conflict avoidance agreement, to assure that exploration, development, and production activities are compatible with whaling and other marine mammal 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 its activities, in combination with other activities in the area, will be scheduled and located to prevent unreasonable conflicts with subsistence activities. The lessee 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 response plans) to the directly affected communities and the appropriate co-management organizations at the time the plans 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, NMFS, FWS, the appropriate co-management organizations, and any communities that could be directly affected by the proposed activity may request that the RS/FO assemble a group consisting of representatives from the parties to specifically address the conflict and attempt to resolve the issues. The RS/FO will invite appropriate parties to a meeting if the RS/FO determines such a meeting is warranted and relevant 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. Activities on a lease may be restricted if 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.

Subsistence-harvesting activities occur generally in the areas and time periods listed below.

Subsistence Whaling and Marine Mammal Hunting Activities by Community

Barrow: Spring bowhead whaling occurs from April to June; Barrow hunters hunt from ice leads from Point Barrow southwestward along the Chukchi Sea coast to the Skull Cliff area; fall whaling occurs from August to October in an area extending from approximately 10 miles west of Barrow to the east side of Dease Inlet. Beluga whaling occurs from April to June in the spring leads between Point Barrow and Skull Cliff; later in the season, belugas are hunted in open water around the barrier islands off Elson Lagoon. Walrus are harvested from June to September from west of Barrow southwestward to Peard Bay. Polar bear are hunted from October to June generally in the same vicinity used to hunt walruses. Seal hunting occurs mostly in winter, but some open-water sealing is done from the Chukchi coastline east as far as Dease Inlet and Admiralty Bay in the Beaufort Sea.

Wainwright: Bowhead whaling occurs from April to June in the spring leads offshore of Wainwright, with whaling camps sometimes as far as 10 to 15 miles from shore. Wainwright hunters hunt beluga whales in the spring lead system from April to June but only if no bowheads are in the area. Later in the summer, from July to August, belugas can be hunted along the coastal lagoon systems. Walrus hunting occurs from July to August at the southern edge of the retreating pack ice. From August to September, walruses can be hunted at local haulouts with the focal area from Milliktagvik north to Point Franklin. Polar bear hunting occurs primarily in the fall and winter around Icy Cape, at the headland from Point Belcher to Point Franklin, and at Seahorse Island.

Point Lay: Because Point Lay's location renders it unsuitable for bowhead whaling, beluga whaling is the primary whaling pursuit. Beluga whales are harvested from the middle of June to the middle of July. The hunt is concentrated in Naokak and Kukpowruk Passes south of Point Lay where hunters use boats to herd the whales into the shallow waters of Kasegaluk Lagoon where they are hunted. If the July hunt is

unsuccessful, hunters can travel as far north as Utukok Pass and as far south as Cape Beaufort in search of whales. When ice conditions are favorable, Point Lay residents hunt walrus from June to August along the entire length of Kasegaluk Lagoon, south of Icy Cape, and as far as 20 miles offshore. Polar bears are hunted from September to April along the coast, rarely more than 2 miles offshore.

Point Hope: Bowhead whales are hunted from March to June from whaling camps along the ice edge south and southeast of the point. The pack-ice lead is rarely more than 6 to 7 miles offshore. Beluga whales are harvested from March to June in the same area used for the bowhead whale hunt. Beluga whales can also be hunted in the open water later in the summer from July to August near the southern shore of Point Hope close to the beaches, as well as areas north of the point as far as Cape Dyer. Walrus are harvested from May to July along the southern shore of the point from Point Hope to Akoviknak Lagoon. Point Hope residents hunt polar bears primarily from January to April and occasionally from October to January in the area south of the point and as far out as 10 miles from shore.

Stipulation No. 6. Pre-Booming Requirements for Fuel Transfers. Fuel transfers (excluding gasoline transfers) of 100 barrels or more will require pre-booming of the fuel barge(s). The fuel barge must be surrounded by an oil-spill-containment boom during the entire transfer operation to help reduce any adverse effects from a fuel spill. The lessee's oil spill response plans must include procedures for the pre-transfer booming of the fuel barge(s).

Stipulation No. 7. Measures to Minimize Effects to Spectacled and Steller's Eiders During Exploration Activities. This stipulation will minimize the likelihood that spectacled and Steller's eiders will strike drilling structures or vessels. The stipulation also provides additional protection to eiders within the blocks listed below and Federal waters landward of the sale area, including the Ledyard Bay Critical Habitat Area, during times when eiders are present.

(A) General conditions: The following conditions apply to all exploration activities.

(1) An EP must include a plan for recording and reporting bird strikes. All bird collisions (with vessels, aircraft, or drilling structures) shall be documented and reported within 3 days to MMS. Minimum information will include species, date/time, location, weather, identification of the vessel, and aircraft or drilling structure involved and its operational status when the strike occurred. Bird photographs are not required, but would be helpful in verifying species. Lessees are advised that the FWS does not recommend recovery or transport of dead or injured birds due to avian influenza concerns.

(2) The following conditions apply to operations conducted in support of exploratory and delineation drilling.

(a) Surface vessels (e.g., boats, barges) associated with exploration and delineation drilling operations should avoid operating within or traversing the listed blocks or Federal waters between the listed blocks and the coastline between April 15 and June 10, to the maximum extent practicable. If surface vessels must traverse this area during this period, the surface vessel operator will have ready access to wildlife hazing equipment (including at least three *Breco* buoys or similar devices) and

personnel trained in its use; hazing equipment may located onboard the vessel or on a nearby oil spill response vessel, or in Point Lay or Wainwright. Lessees are required to provide information regarding their operations within the area upon request of MMS. The MMS may request information regarding number of vessels and their dates of operation within the area.

(b) Except for emergencies or human/navigation safety, surface vessels associated with exploration and delineation drilling operations will avoid travel within the Ledyard Bay Critical Habitat Area between July 1 and November 15. Vessel travel within the Ledyard Bay Critical Habitat Area for emergencies or human/navigation safety shall be reported within 24 hours to MMS.

(c) Aircraft supporting drilling operations will avoid operating below 1,500 feet above sea level over the listed blocks or Federal waters between the listed blocks and the coastline between April 15 and June 10, or the Ledyard Bay Critical Habitat Area between July 1 and November 15, to the maximum extent practicable. If weather prevents attaining this altitude, aircraft will use pre-designated flight routes. Pre-designated flight routes will be established by the lessee and MMS, in collaboration with the FWS, during review of the EP. Route or altitude deviations for emergencies or human safety shall be reported within 24 hours to MMS.

(B) Lighting Protocols. The following lighting requirements apply to activities conducted between April 15 and November 15 of each year.

(1) Drilling Structures: Lessees must adhere to lighting requirements for all exploration or delineation drilling structures so as to minimize the likelihood that migrating marine and coastal birds will strike these structures. Lessees are required to implement lighting requirements aimed at minimizing the radiation of light outward from exploration or delineation drilling structures to minimize the likelihood that birds will strike those structures. These requirements establish a coordinated process for a performance-based objective rather than pre-determined prescriptive requirements. The performance-based objective is to minimize the radiation of light outward from exploration/delineation structures while operating on a lease or if staged within nearshore Federal waters pending lease deployment.

Measures to be considered include but need not be limited to the following:

- Shading and/or light fixture placement to direct light inward and downward to living and work structures while minimizing light radiating upward and outward;
- Types of lights;
- Adjustment of the number and intensity of lights as needed during specific activities;
- Dark paint colors for selected surfaces;
- Low-reflecting finishes or coverings for selected surfaces; and
- Facility or equipment configuration.

Lessees are encouraged to consider other technical, operational, and management approaches that could be applied to their specific facilities and operations to reduce

outward light radiation. Lessees must provide MMS with a written statement of measures that will be or have been taken to meet the lighting objective, and must submit this information with an EP when it is submitted for regulatory review and approval pursuant to 30 CFR 250.203.

(2) Support Vessels: Surface support vessels will minimize the use of high-intensity work lights, especially when traversing the listed blocks and federal waters between the listed blocks and the coastline. Exterior lights will be used only as necessary to illuminate active, on-deck work areas during periods of darkness or inclement weather (such as rain or fog), otherwise they will be turned off. Interior lights and lights used during navigation could remain on for safety.

For the purpose of this stipulation, the listed blocks are as follows:

NR02-06, Chukchi Sea:

6624, 6625, 6674, 6675, 6723-6725, 6773-6775, 6822, 6823, 6872

NR03-02, Posey:

6872, 6873, 6918-6923, 6967-6973, 7016-7023, 7063-7073, 7112-7123

NR03-03, Colbert

6674, 6723, 6724, 6771-6774, 6820-6824, 6869-6874, 6918-6924, 6966-6974, 7015-7024, 7064-7074, 7113-7124

NR03-04, Solivik Island

6011-6023, 6060-6073, 6109-6122, 6157-6171, 6206-6219, 6255-6268, 6305-6317, 6354-6365, 6403-6414, 6453-6462, 6502-6511, 6552-6560, 6601-6609, 6651-6658, 6701-6707, 6751-6756, 6801-6805, 6851-6854, 6901-6903, 6951, 6952, 7001

NR03-05, Point Lay West

6014-6024, 6062-6073, 6111-6122, 6160-6171, 6209-6221, 6258-6269, 6307-6317, 6356-6365, 6406-6414, 6455-6462, 6503-6510, 6552-6558, 6602-6606, 6652-6655, 6702, 6703

NR04-01, Hanna Shoal

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NS04-08, (Unnamed)

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Nothing in this stipulation is intended to reduce personnel safety or prevent compliance with other regulatory requirements (e.g., U.S. Coast Guard or Occupational Safety and Health Administration) for marking or lighting of equipment and work areas.

Attachment B
Communication and Consultation with North Slope Subsistence Stakeholders

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Issues	Comments	Shell Response	Mitigation Measures*
Credible Science: Baseline Studies	You mentioned the word catastrophe, what's the closest fault line?	There are not active faults in this area but it is a requirement of the BOEMRE that we conduct shallow hazard surveys to ensure that we do not drill through a fault. All of the planned wells are located a good distance away from all faults in the area, and each of those faults is dormant. They have not moved in several million years.	N/A
Baseline Studies	I want to see that-90 foot drop, that hole in the ocean floor. I read a lot of literature of Shell and it's not all exactly what you guys say.	That's why we are having these discussions.	N/A
Biological Environment	What's the polynya zone?	It's an area near the shore where there are open leads along the Chukchi Sea coast with currents where there is a lot of food. The whales follow these currents in the open areas to get their food source.	N/A
Traditional Knowledge	Some large blocks of ice blocked ice from moving from Greenland some time ago.		I
Operational Impacts: Discharge	Can you explain "Cutting after 20" casing"? What is casing?	Casing is the pipe that transmits the cuttings to the surface and keeps the hole from caving in. Cuttings are small chips of rock that the bit grinds up. We capture the cuttings and drilling mud in containers instead of discharging them into the sea. We transport those out of the Arctic for disposal.	K
Drilling	Because of that the amount of drilling, does Shell feel like the expert now because of that?	Shell doesn't just rely on our own internal expertise, we work with people all over the world. We work with all kinds of people even those in communities and with Subsistence Advisors, etc.	E and L
Health & Safety	If one does encounter an emergency will there be Search and Rescue equipment?	Yes. We will have a dedicated helicopter stationed in Barrow to perform search and rescue and evacuation operations.	J

Issues	Comments	Shell Response	Mitigation Measures*
Health & Safety	Can you describe what kind of infrastructure you envision for those programs?	We have a big white hangar in Barrow you may have seen. We will be using this for our air operations for the Chukchi Sea and for search and rescue operations. In Deadhorse, we have a base that is associated with the other infrastructure there for supporting operations in Prudhoe Bay. In the Chukchi Sea we will have a small marine operations station in Wainwright.	J
Health & Safety	What are the minimum guidelines for Shell flying helicopters here? My point is that there were people doing impact contract, due to fog and the minimum safety reason, since you say you're going to have the SAR and with these kinds of deadlines, you will not be able to monitor the ice.	We use the same acronyms for two things. SAR for Synthetic Aperture Radar and for Search and Rescue. We are required to follow the FAA guidelines for aircraft operations including not flying if conditions are below flight minimums. It is no different for our air operations than for anyone else.	J
Ice Management and Monitoring	What is your plan if ice is coming suddenly?	We have a Critical Operations and Curtailment Plan, that includes ice. We have the real time satellite imaging, radar and ice management vessels doing real time ice reconnaissance. The main ice management vessel works from 3-25 miles away from the drill site. The anchor handler works from the drilling vessel to about 5 miles out so we have far and near ice information. If they think we will not be able to manage the ice we will stop drilling, secure the well to make it leak-proof, recover the moorings and move offsite.	I
Ice Management and Monitoring	Has Shell monitored Ellesmere Island ice? It was in the news quite a few years back.	Our ice monitoring is in the area we are operating. We also use the NOAA Ice Center and they are tracking it on a more global basis. Our monitoring is more intensive during our season. The dominant currents in the Arctic tend to move ice toward the ice. If large floes of multi-year ice are entering our area of operation we will be able to track them in a highly detailed manner for several days before they would impact us.	I

Issues	Comments	Shell Response	Mitigation Measures*
Ice Management and Monitoring	BP documented some ice that got stuck in shallow areas a couple years ago.	We are evaluating ice gouging in our lease areas on a yearly basis. This information is really important for development. Our platform must be able to resist the ice and maintain position in the ice all the time we are drilling and producing wells. It is evident that ice frequently grounds on shallow areas like Hanna Shoal and remains there well into the season. These are substantial pieces of ice. We survey the ice by airplane prior to the season and track ice on a daily basis during operations.	I
Ice Management and Monitoring	I have concerns about ice slamming against the platform.	The way we've developed our platforms are conical. They shear the ice and the ice goes around them.	I
Ice Management and Monitoring	The ice that we have up here and the broken pieces that are underneath the water surface will affect you. Your anchor points and your structure underneath. You need to study the glacier ice. There are big pieces of ice that you can't see.	The way we've developed our platforms are conical. They shear the ice and the ice goes around them.	I
Ice Management and Monitoring	I would like to see your plan in place to understand when and how the decisions are made to pack up and move. I want to see on paper who will make the call and it would be very important to get that together. Some days the ice is flat and over night there could be a lot of ridges.	It has to be on paper. We will resubmit our Ice management plan from previous submissions. We are required by the BOEMRE to submit what is called the Critical Operations and Curtailment Plan. Part of this involves hazardous ice that could threaten the drilling vessel. This Ice Management Plan outlines our procedures, and both the state and BOEMRE must approve it before we can drill.	I and L
Ice Management and Monitoring	Do you consider State of Alaska and Federal Government to be experts? If an iceberg came and knocked off the blow out preventer below the seafloor, what would you do? Based on his questions, there is ice that looks invisible and it could come	We must submit our plans to the state and the federal government for approval and issuing permits. They do have expertise in dealing with arctic operations. Shell has also operated in the Arctic for a long time, and we are experts in drilling oil and gas wells in the Arctic. We also need input from the local residents along the coast since you know more about this specific area than anyone. That's one of the reasons we're here: to get your input. The color of the ice is irrelevant to the	I and L

Issues	Comments	Shell Response	Mitigation Measures*
	and cause a problem.	radars that we use for mapping.	
Ice Management and Monitoring	Can you see the thickness of the ice with the satellite? What kind of danger if you can't determine the thickness of the ice?	No, but there are characteristics that tell us when it is multi-year ice and single-year ice. The multi-year ice is constantly tracked. You can tell by the density of it, but we are tracking and we look at subsequent images the direction of the movement.	I
Ice Management and Monitoring	Taking pictures of the water and the currents, if the wells start producing, they will be under the ice seven months out of the year and that's my concern. We need to know which way the currents are going during that time of the season. There is somewhere the currents are going and it will help you track oil, so we can catch it. Especially in the areas where you are.	We have been studying currents for many years, and the trends for oil slick migration (sometimes, toward Russia far offshore in the Chukchi Sea) are important as we plan for response options, anticipate tracking needs, stage shoreline protection equipment, etc.	H and I
Ice Management and Monitoring	There's a different signal that comes back with high-density ice with your ice monitoring methods?	Yes. We can tell from the return radar signals whether it is more dense, meaning multi-year ice, and less dense, meaning first-year ice.	I
Ice Management and Monitoring	On the eastern side of the Beaufort, the ice was all on your tracts. Can you explain that?	There are some heavy ice years, if we can't get out there we can't drill. We have the history of ice accumulations in previous years, and we are aware that there have been years when the ice was very severe. If it is that bad, we simply will not be able to drill that year. That's part of the risk of doing exploration drilling in the Arctic and we accept that risk.	I
Ice Management and Monitoring	Interested in Marine Mammal Observer data from last year. Made point when looking at ice maps that historically there was much more ice than what we are seeing today.	We have the history of ice accumulations in previous years, and we are aware that there have been years when the ice was very severe. If it is that bad, we simply will not be able to drill that year. That's part of the risk of doing exploration well drilling in the Arctic and we accept that risk.	I

Issues	Comments	Shell Response	Mitigation Measures*
Ice Management and Monitoring	I've never seen the ice in the Beaufort Sea that big. I think mother nature was trying to communicate to us. That we have to be very cautious. That ice will keep coming back.	If that is the case we will not get out there to drill. That is a risk we just have to understand and accept.	I
Oil Spill Prevention & Response	At any given time will they have oil spill containment?	We will have an oil spill barge and additional vessel very near the drilling vessel so that we can respond to a spill within 1 hour. There will also be an arctic tanker and a containment vessel that can reach the drilling vessel in a matter of a few days with capping and containment capability.	H and L
Oil Spill Prevention & Response	How often will you be changing your pipes (casing)? Cause that's what caused the GOM spill.	It had to do with a BOP and riser. New regulations require that we have to fully inspect and recertify the entire BOP stack every three to five years.	L
Oil Spill Prevention & Response	What year was your boom manufactured? Are they obsolete? How often do you replace them?	Most of the booms were designed in the last ten to fifteen years. They don't really become obsolete. In the GOM you heard of booms failing. Some of the booms, especially in the shoreline protection mode, were not used properly. The first ones were developed in the early 1970s. They evolved over the last 30-40 years. The life expectancy of a boom depends on how they are being used, and under what kind of conditions. They can get punctured or damaged if used around heavy debris, floating branches, etc.	H
Oil Spill Prevention & Response	That 21-foot Packman boat – is that a standard vessel?	Yes, and it is very reliable for shallow-water transport of equipment, boom handling and anchoring, etc.	H
Oil Spill Prevention & Response	Are those booms made for different types of water, like cold or hot water and ice conditions and so on?	There are different kinds of booms for very specific needs – open ocean, shallow-water, shoreline, river/stream, etc. They are constructed for different purposes, different currents, different degrees	H

Issues	Comments	Shell Response	Mitigation Measures*
		of ice exposure, etc.	
Oil Spill Prevention & Response	Do you have booms that can recover oil under ice? Do boats tow the booms? How will oil be recovered in ice?	It would not be practical to use booms under ice as they could get snagged under the ice, miss oil trapped in the cavities of the under-ice surface, etc. We have other tactics for dealing with oil under ice, including the possible exposure of the oil with vessels, tipping of ice cakes to encourage flow to surrounding water, allowing oil to become entrained within the ice and then accessed later on, etc.	H
Oil Spill Prevention & Response	Do you monitor currents for the boom?	Yes. We are doing a lot of scientific studies on currents right now. There are instruments that are deployed, like upward looking sonar buoys sitting on the sea floor that map the water and currents by sending a sonar signal upward and collecting the reflected data that show currents, temperature differences and salinity. There's a lot of information being gathered in research and traditional knowledge.	H and I
Oil Spill Prevention & Response	Based on the GOM, the boom had water nearshore that went over the top and the waves were not even that big. What is the height of the boom?	Some of the booms in the GOM were used inappropriately in the nearshore/shoreline environment where breaking waves could splash oil over and under the boom. They should be used in relatively quiet water areas - that's what small shoreline protection booms are intended for. All booms have limitations for effective containment when the wind and seas become excessive.	H
Oil Spill Prevention & Response	Will the containment and capping system be ready by 2012?	Yes, it's being developed now and it will be deployed and ready to go for May, 2012.	L
Oil Spill Prevention & Response	The part where the three yellow caps, what kind of suction device will it be using for the containment (containment system slide)?	Our first option would allow for us to latch back onto the wellhead and shut off the flow like what happened on the BP Macondo blowout in the Gulf of Mexico. That's how BP shut off the flow in that well – by capping. The second option, if that connection wasn't available, would be to use one of those domes to collect the oil underwater and pipe it aboard the vessel. Each dome has a pump that will push the oil into separation vessels on the containment vessel where the oil, water and gas will be pulled off. The gas will be flared. The oil will either be collected and offloaded into the tanker or incinerated. The water will be released back into the sea.	L

Issues	Comments	Shell Response	Mitigation Measures*
Oil Spill Prevention & Response	In the 80's when you went out and I wasn't aware and I was actually shocked. We have to tend to those old wells.	Those wells were fully capped.	N/A
Vessel Logistics	Are you constructing a large icebreaker?	Yes, it's a hundred feet longer than the Nanuq. The Nanuq will be in the Chukchi and the new vessel called Hull 247 will be in the Beaufort Sea.	N/A
Vessel Logistics	Between the two drilling locations, will there be traffic between the two locations? Will there be ships going back and forth regularly?	Each drillship will come with its own assets and shouldn't require any transport unless there is an emergency. We will have a shore base in each area with an air operations base between the two seas in Barrow.	A, B, C, D, E, and J
Vessel Logistics	Will there be maritime infrastructure?	No. We will utilize West Dock only. We will have no other marine operations bases in the Beaufort Sea.	N/A
Permits: Process	Offshore development must be done in a way that benefits the local people; in sense of caring for the resources and communities. They are being asked to take the risks but not necessarily getting the benefits. At what point does tribal sovereignty play a role in relation to federal government? How far offshore does this reach? The state is limited to 3 miles, so does sovereignty extend as far as federal?	Thank you for your comment.	N/A
Quality	Based on the fact that there was some secret drilling out there before. How do we trust you people? That drilling that took place.	We have to get permits and we are here. I am not sure what the regulatory regime was at that time in the mid-1980s and early-1990s. We are here in Barrow talking about our plans to be sure you know what we are planning to do. This question was a follow on to a comment that was made that we drilled in the 1980s and 1990s and people in Pt. Hope had no memory of that drilling. This historic drilling	N/A

Issues	Comments	Shell Response	Mitigation Measures*
		was not secret. It was subject to similar permitting and public disclosure and discussion that we have today. The point of the original comment is that the drilling in the 1980s and 1990s did not leave lasting memories of problems or damage.	
Quality of Engagement: Positive/Feedback	Very impressed by Kulluk Visit. 120 photos taken. Copied to CD (got a copy).	Thank you for your comment.	N/A
Positive/Feedback	Just hired on at UMIAQ for spill response, big supporter	Thank you for your comment.	H
Value Proposition: Jobs	I would enjoy joining an oil response team in near future for offshore drilling		N/A

Notes:

*Mitigation Measures are only assigned to applicable comments.

"Not applicable" (N/A) is used to designate comments that do not require mitigation measures as a course of action. See [Mitigation Measures Index](#) definitions according to assigned letter.

2011 Proposed Mitigation Measures

- A-Communication Plan for avoiding conflicts with subsistence users.
- B-Collaboration and Communication with Whaling Associations
- C-Plan of Cooperation (will work to obtain a CAA)
- D-Will honor 2010 Camden blackout dates for Nuiqsut and Kaktovik whaling.
- E-Subsistence Advisors based in Chukchi and Beaufort Sea Villages and Kotzebue
- F-Marine Mammal Observers
- G-Robust Marine Mammal Monitoring Protocol
- H-Oil Spill Response Fleet on standby 24/7 near drilling location
- I-Real time Ice and Weather Forecasting
- J-Crew change by helicopter and collaboration on routes to and from shore base
- K-Zero discharge of: drilling fluids and cuttings after the 26-in casing; gray and treated black waters; bilge and ballast waters
- L-Enhanced blowout prevention and mitigation measures (i.e., second set of blind shear rams, increased frequency of BOP testing, redundant ROV hot stab panel, capping stack and containment system, and relief well plan with designated standby relief well drilling unit).



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SIGN-IN SHEET – Barrow Plan of Cooperation Community Open House Meeting
Inupiat Heritage Center, Barrow, Alaska
March 21, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
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CRAWFORD PAKKATAK					
Pearl Brower					
Lucy in Alaska					
Wayne Matthews					
John Brower					
Mike Foster					
Olive Brower					
Ellie Brown					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
DANAS-LEE Brower					
Brad Weyionanna Michelle Weyionarra					
LEANDRA DE SOUSA					
Yvonne Saffen					
Geary Olemson					
Renee Powell					
John Howell					
Rachel Edvardson					
Emma Koonsalua					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Dave Rice					
Lindi S.					
Kathleen H.					
Johnny Adams					
Margie Fischer					
BERTHALEE LEAVITT					
Leonard Peetod					
S McCumber Susan					
Myron McCumber					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Charles Brown					
Marilyn Arington					
Richard Shepard					
RICKL RICE					
Shobley BA					
Cindy Skults					
David Sargent					
Thomas Brower					
Edith Noyech					



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MIKE SHULTS					
Anthony E. Edwards					
Dobby Edwards					
Bradley Thompson					
Beverly Fayett Hugo					
Michael Riley					
Francine Goodwin					
DAN FORSTER					



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Della					
Robert Ehlers					
Patricia M. Aweoyanna					
Walter Akpik					
KATHY LEARY					
Glenn H. Siedak					
Jerry Alyka					
Doreen Brown					
Ka Alynbrown					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Johnnie Brower					
Myrna Loy & George Sarren					
May Akpik					
Tony Kaliss					
David Ongley					
Nellie Gomer					
Larrisa Eskide					
EVELYN Rubottom					
Sara Buen					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Mary Sage					
Robert Lisburn					
Bob Saganis					
Bruce G. Rexford					
MARY K. RICE					
ABRAHAM STINE					
MAX ADAMS					
JLONK KEMP					
Perry Marmen					



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March 21, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
George Sulu					
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Issues	Comments	Shell Response	Mitigation Measures*
Credible Science: Baseline Studies	Will the North Slope Science Agreement be affected by the next NSB Mayoral election?	No, it will not. It is separate from politics and is managed by the Wildlife Department. Mayor Itta signed the original document, but the initiative will not be run by the mayor's office. The Wildlife Department will.	N/A
Operational Impacts: Discharge	How will the mitigation (zero discharge) in the Chukchi Sea, will it be comparable to the Beaufort Sea too?	We have chosen zero discharge in the Beaufort because our operations are so much closer to shore. The Chukchi program is many miles from shore unlike the Beaufort Sea well sites.	N/A
Health & Safety	Can we use your boats for whaling?	We will commit our vessels to help anyone who gets into trouble. This is a normal part of marine operations in the open ocean. If you get in trouble during whaling we will be available to help. You can get in touch with our vessels through the Com Centers.	A and B
Oil Spill Prevention & Response	Can you clean oil in broken ice?	Yes, we have had opportunities to clean up oil during small spills and field trials in ice; however, because we have never had a significant spill in the Arctic, we have not tested our large recovery systems under such conditions.	H and K
Oil Spill Prevention & Response	How many times have you cleaned oil on ice?	Numerous times. I have personally cleaned oil in ice 15-18 times over the past 25 to 30 years; but these experiences have, once again, been of relatively small size. Thankfully, we have not had to experience such spill events, and therefore depend upon controlled field trials and tank tests. Generally, efficiencies with some of the latest skimmer designs show efficiencies that are in the 70-80% range. It all comes down to our ability to access the oil when it is mixed with ice.	H and K
Oil Spill Prevention & Response	Will you have a shut-off valve below the surface to stop a flow?	Yes. We have blow out preventers that are located in a mudline cellar below the seafloor. (In a meeting following the presentation, Michael and others were shown a video animation of how the mudline cellar is constructed and how the BOP stack is protected to prevent damage to these valves so they are available to shut off flow from the well if necessary).	K
Oil Spill Prevention & Response	How long will it take to connect the containment system?	It won't be immediate. If you remember the Macando incident, there were damaged risers in the way and had to be removed. It took nearly a month for that debris to be cleared. We will have a crane on site for that purpose so it will probably take 2-3 days maximum to get the	H and K

Issues	Comments	Shell Response	Mitigation Measures*
		capping device in place.	
Oil Spill Prevention & Response	In the meantime will you have equipment to contain the oil in the water?	Yes, we will. We will have skimmers and booms to start gathering to pick it up.	H and K
Oil Spill Prevention & Response	How many oil spill response boats will you have?	We'll have at least six vessels with advanced skimming capability offshore, and many smaller boats that could assist with nearshore and shoreline containment/recovery operations.	H
Oil Spill Prevention & Response	Has this equipment been tested in ice conditions?	Yes, both in actual spills, controlled field trials, and large tank tests with oil.	H and K
Oil Spill Prevention & Response	Are you able to contain the lighter oil that comes up from a spill?	Yes, we have skimmers that can handle a range of oil viscosities from very light low viscosity material to oil and emulsions that could take on the consistency of mayonnaise to something almost as viscous as peanut butter.	H and K
Vessel Logistics	The platform you showed us in ice – does that come in pieces?	Probably 2 pieces with the production and drilling equipment in one piece called “topsides” that sits on top of a base called a “jacket.”	N/A
Permits: Process	Obama just announced that he was going to allow drilling in the Arctic. Can that happen without anyone in the communities knowing about it?	We cannot drill without permits and part of those requirements are that we come to the communities and talk about our plans and incorporate those comments into our Exploration Plans.	C
Quality of Engagement: Positive/Feedback	Know that the captain whaler are getting mad not get much whale this year. So that we young elder stand up and let you get the answer. So that why lot's of items pass on. And we take over. So be happy. We young elder take over the oldest Elder, and God bless you all and keep on praying or read bible John 3:16 from: Sister in Christ.	Thank you for your comment.	N/A

Issues	Comments	Shell Response	Mitigation Measures*
Positive/Feedback	In favor of oil drilling. Running out of oil and need more.	Thank you for your comment.	N/A
Threat to Subsistence: Marine Mammals	The whales run 60-70 miles offshore there too.	There are some that migrate out there, but for the most part the whale migration expands once the whales pass Barrow. One group goes to the north and ends up in Russian water. Others scatter throughout the Chukchi Sea. In the Beaufort Sea, the entire bowhead whale population travels closer to shore in a corridor that is about 10 miles wide. It turns out that our drilling operations there are very close to the center of that corridor. The whale hunters there have asked that we suspend operations to avoid disruptions to their fall hunts. We will be so far from the shoreline in the Chukchi Sea that we should not impact many whales at all.	A, G, C, D, E, F, and G
Value Proposition: Jobs	Will the money from the Science Program create any temporary jobs?	It is possible – we will get direction from the steering committee and some of the projects may involve local residents participating in field work.	N/A
Jobs	If you have an oil spill will you hire local people?	Yes. Most spills that I've ever worked on have included a heavy reliance upon the expertise and knowledge of the local community.	H
Jobs	Do local oil spill responders need special certification?	Not, necessarily "certification"; however, they do need some training like HAZWOPER. It might be the 40-hour course or it might be as little as 24 hours depending on what the duty of the individual is during the response.	H
Jobs	Do local oil spill responders have to pass a drug test?	Yes.	N/A

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SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Wainwright Plan of Cooperation Community Open House Meeting
Alak School Community Center, Wainwright, Alaska
March 23, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
<i>Melvin H. Shavins</i>					
<i>Andrew Ekak</i>					
<i>Thomas Akpik</i>					
<i>Herbert S. Sood</i>					
<i>Leo S. Sood</i>					
<i>Michael Tagarok</i>					
<i>Charles A. Skak</i>					
<i>Terry Tagarok</i>	S				
<i>Bonfonce</i>	S				



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Raymond NEGUVANE					
Ralph AVCOGANN					
Jesse Ahmargah					
Pattilyn DRIGGS					
Geraldine Ningsah					
Joy Nayakik					
Walter WAPAKIK					
Lily Ann WAPAKIK					
GENE Agunlak					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Dennis Aueoyanna SR					
Bonnie Spencer					
Frank Bester					
Raymond Akwik					
Danny Akpik					
Renee Agwik					
Ida Panik					
Jack Panik					
Leah					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Vincent Bodfish					
Murrell V. Pauik					
Akijug Akijug					
Glenn Nayakik					
Nellie Agubik					
Elizabeth Phillips					
Nathaniel Phillips					
Cardyn Akpik					
Ellen Phillips					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Marjorie Angashuk					
Lizzie Agurluk					
Byrna Panik					
Opren Duggan					
Leanne Segevan					
Sandra Peetok					
Blair Patkotak					
Cora Akpik					
Nancy Akpik					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Olive Swan					
Sonya Paritz					
Billy Bodfish					
Lisa Keppi					
Ray Joe Atvik					
Fannie Stone					
Joel Atvik					
^{from} Fredricka Ahvonen					
Clara Ahvonen					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
<i>Racina E. Peterson</i>					
Dorcas Natchoodok					
madison Natchoodok					
Della Tukle					
ELLEN TUMIK					
LeeAnn Panik					
Fannie E. Chmaogak					
Verna Sgaur					
DAVID NINGEOK JR					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Rosellen Swan					

Issues	Comments	Shell Response	Mitigation Measures*
Operational Impacts: GOM Macondo	Why did it take so long in the GOM? Won't that happen here?	Our oil spill response fleet will be on site within an hour. BP's had to be mobilized from long distances.	H and K
GOM Macondo	How did those deaths occur and could that have been prevented?	That was a sequence of errors that broke every level of prevention.	H and K
Oil Spill Prevention & Response	Our water is much colder. How do you plan to handle that for oil spill response?	Our technology has to be designed for the service and we have practiced using this equipment in cold weather climates around the world.	H and K
Oil Spill Prevention & Response	What will the containment boom do in our currents?	In 120 feet of water the oil will come to the surface very quickly and we have learned to work with the ice, not against it.	H and I
Oil Spill Prevention & Response	How big is the rope mop skimmer?	It is 20 feet across, 20 feet above the water and has 100 feet of mop.	H
Oil Spill Prevention & Response	What if the oil is trapped under the ice?	New ice will grow and entrap the oil and then we can track it. In the spring, the ice will migrate to the surface of the ice where it can be skimmed or burned.	H and I
Oil Spill Prevention & Response	Were all the oils spills you have worked on Shell's?	No, they weren't Shell's.	H and K
Oil Spill Prevention & Response	Location of domes, quantities, how many response vessels per drilling platform.	It's not about the quantity of ships, but the quality and appropriate use of ships. We have much more storage capacity than is needed based on current understandings of potential recovery.	H and K
Oil Spill Prevention & Response	Where are you planning to drill and how far from this community?	92 miles from Pt. Lay.	NA
Permits: Process	How many companies and agencies are involved?	Coast Guard, BOEMRE, NSB, ADEC, UIC, Alaska Clean Seas.	H
Process	Do you have a permit?	Some activities have yet to happen because there isn't a permit, but many things are already in place because much planning has to be done beforehand.	H and K

Notes:

*Mitigation Measures are only assigned to applicable comments.

"Not applicable" (N/A) is used to designate comments that do not require mitigation measures as a course of action. See [Mitigation Measures Index](#) definitions according to assigned letter.

2011 Proposed Mitigation Measures

A-Communication Plan for avoiding conflicts with subsistence users.

B-Collaboration and Communication with Whaling Associations

C-Plan of Cooperation (will work to obtain a CAA)

D-Will honor 2010 Camden blackout dates for Nuiqsut and Kaktovik whaling.

E-Subsistence Advisors based in Chukchi and Beaufort Sea Villages and Kotzebue

F-Marine Mammal Observers

G-Robust Marine Mammal Monitoring Protocol

H-Oil Spill Reponse Fleet on standby 24/7 near drilling location

I-Real time Ice and Weather Forecasting

J-Crew change by helicopter and collaboration on routes to and from shore base

K-Enhanced blowout prevention and mitigation measures (i.e., second set of blind shear rams, increased frequency of BOP testing, redundant ROV hot stab panel, capping stack and containment system, and relief well plan with designated standby relief well drilling unit).



SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Point Lay Plan of Cooperation Community Open House Meeting
Point Lay Community Center, Point Lay, Alaska
March 25, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Kendra Everett					
Robert Sampson					
Marie Tracey					
Susi Neakok					
Carl F Ha					
Lily Annuskatt					
Ben Hunsaker					
Jacob Svalkar Jr					
Flora Hank					



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March 25, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Cilia Allungoruk					
Alicia Burt					
Danny K Pikok Jr					
Pearl J Neakok					
Esther Tuckfield					
Janet Lind					
Carmie P Henry					
Ron Murrell					
Keth Tracy					



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March 25, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Daniel Hunsowryall					
Gertrude Frankson					
Julius B Rexford Jr					
Julius M. Rexford Sr					
Willard Aleakok					
Carl W. Hank					
Brenton Rexford					
Maria Lisbonne					
Cassie J. Jorvick					



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March 25, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Leonard Henry					
NATHAN HENRY					
Cheryl Henry					
Sarah Bernick					
Ben Depies					
William Burt					
John Stalker					
GREGG WILBANKS					

Issues	Comments	Shell Response	Mitigation Measures*
<p>Credible Science: Baseline Studies</p>	<p>There was a question about mitigation and baseline. A seismic program that lasted nine years running from the Canadian border to the Chukchi Sea. Every square inch was analyzed. In 1989, we noticed a lot of seals were sinking from malnutrition. We didn't know what it was from. We accused Red Dog Mine. It wasn't until a couple years ago that we learned about this nine year seismic program that resulted in skinny seals. Now we are going into the third and fourth year of seismic again. There are over 5,000 environmental studies that were done. I would like to see the data and see what the rate of recovery from that data is. Our tomcod has disappeared from our ocean around us. That is what our seals eat. They partially came back last year a little bit. I believed that was mentioned before. Why don't you answer the question before? How do we deal with trying to understand the impact of seismic over the years. NMFS is trying to list them as endangered at the same time they give authorization. I'm confused. How do you take this into consideration? Have you thought about the recovery of these animals from these activities? There's another series of seismic to come. But there was no explanation from NMFS or NOAA when they have questions from years ago. That's part of our food chain, we rely on those seals and they rely on those fish. Is this part of our mitigation?</p>	<p>We do conduct a very large and significant monitoring system of marine mammals and we talk about baseline studies, that benthic, plankton, in the mud on the bottom. We are looking at all of those. For our 4MP, we have recorders that are out there as well, we have airplanes out there, MMO's on every vessel. We've learned a lot over the last three years. The animals tend to move away from activities when there are activities that make noise. They move away for a period of time. Seals react less and bowheads react more. Bowheads get quiet and when the noise stops they will vocalize again. They will move away from noise to protect themselves. They move away and then they go back. I think it's important and it's part of the reason why Shell has entered into this agreement with the NSB, to hear the concerns from the people in the villages and shape science to their concerns. We are getting better and better to reacting and understanding concern. I wasn't here in the 80's and 90's. We have Subsistence Advisors in each of the communities to hear these kinds of things too.</p>	<p>E and G</p>
<p>Baseline Studies</p>	<p>Your studies are done on the areas where you've done seismic after?</p>	<p>We've done seismic at some of these locations. In the Beaufort Sea, we did the studies before the seismic there in some of the locations. Some of the areas we've done studies. For example to answer your question, we did seismic in Burger, we did not do seismic in Hammerhead.</p>	<p>N/A</p>

Issues	Comments	Shell Response	Mitigation Measures*
Baseline Studies	That sounds like you are at least looking at it.	Thank you for your comment.	N/A
Baseline Studies	It could mean a case in 15 years?	It would mean a case in 30-50 years. Based on wells that we've drilled here we've seen 3-4 times less pressure than Macondo.	N/A
Baseline Studies	The formation out there is different than Cape Lisburne?	Some of the Lisburne. I don't know much about that and it doesn't seem to be an issue with what we're doing. There is nothing wrong or particularly difficult about where we're drilling.	N/A
Baseline Studies	Can you acknowledge what type of current is there? A whirlpool or	We've been doing several things. We've for the last three years had instruments that have been out all year round. Measuring currents even under the ice. We've deployed a met-oceanic buoy that measures the currents. We've worked Oceanic.	N/A
Baseline Studies	Have there been any fluctuations of ice in that area? I've seen publications of the National Science Foundation that we can compare with that data in the past few years.	We're required to do ice gouging studies. We're getting an understanding how frequently ice gouges occur for 15-20 and even 100's of years and looking at detail.	N/A
Baseline Studies	And you have that kind of ice gouge data available?	Yes.	N/A
Baseline Studies	How about the NS is known for having fluctuating pressures?	We don't share that opinion. There are other areas that have unknown pressures and fluctuations. Typically when you drill in an area that has been drilled before, and you can run into that. That will not be our case.	N/A
Baseline Studies	Have there been any studies on radioactive plankton?	I don't know. I'm sure there have been oceanographic studies in the 60-70's when they were doing nuclear testing.	N/A

Issues	Comments	Shell Response	Mitigation Measures*
Baseline Studies	There are 90 wells in the McKenzie Delta. How many of them were Shell's and what is your experience with them?	Not sure, that would have been operated by our Canadian Group.	N/A
Biological Environment	How deep down at the seafloor will you be drilling?	It's at 120 feet to seafloor.	N/A
Biological Environment	Is this for every hole you drill and how many will that be?	Yes. In the Chukchi Sea drill possibly three and in the Beaufort Sea it's two wells each year.	N/A
Biological Environment	Can you explain how they are the same temperature all year around?	Have you ever gone swimming and it was warm at the surface until you go deeper and you suddenly hit a layer that is cold? Water forms layers called thermoclines that may be warmer or colder and they don't tend to mix unless they are stirred by the wind. So, even if it is very cold on the surface deeper layers may not be that cold because of layering and a lack of mixing.	N/A
Biological Environment	Is there any ice on the ocean bottom?	No, not at those water depths.	N/A
Traditional Knowledge	If you're talking shallow waters in the upper part of the world, there was a lot of land before and it eroded and there is ice coming in. There is erosion along the coast of Alaska.	Thank you for your comment.	C and E
ENGO Opposition: Partnerships	(Question is directed to Earl Kingik) Who brought you here? There's a company here to talk to the community. I haven't seen you for a long time and every time there is industry here you are here. We all don't have jobs and it takes money to travel. You said you were going to follow them around.	I work for Alaska Wilderness League. I work for a Liaison Member to DC to educate our Congress and our House of Representatives to ... We cannot let people to push us around anymore. Our aunties and uncles told us to protect our way of life and culture. It was good to see someone from Point Hope go out and do a little tally and say you are invited to tonight's meeting. Maktak or money? Lots of people say maktak. We have a hard time and we want to protect our way of life. Our language is disappearing. Our culture is disappearing. I am here because I love my people.	N/A

Issues	Comments	Shell Response	Mitigation Measures*
Offshore Education: Technology	I'm concerned about Santa Barbara. How was that plugged and was that plugged at all? My understanding is that the ground tore.	1969, it was a completely different type of location. I typically know about the seeps that they had and the shallow wells. Natural seeps are found in that area of California. The Santa Barbara event drove changes in the design and hardware that is installed on wells to prevent that type of incident.	K
Technology	How would you cap that Santa Barbara well?	The Santa Barbara well was handled by the operator in coordination with the regulator.	K
Technology	Can you explain what happened to that?	Unocal was the operator, you have land movement and shifting in the area that damaged the subsea of the casing itself. It is also a heavier type oil. It was pretty close to shore. It was in 1969, lots of regulations were changed.	K
Technology	How did they stop the flow at Santa Barbara?	It required well intervention.	K
Technology	What does a formation mean?	More of a solid than a rock.	N/A
Technology	What is a rig?	It's our drilling ship.	N/A
Technology	After that you will be able to develop, for sale?	It will be 10-15 years to development. We're only doing exploration. We drill, look at the results of the wells and look at the project to see if it is supportable. From 7-10 years to develop the project from that. 10 to 15 years. It's a long time away from producing.	N/A
Operational Impacts: Discharge	I understand that the there is no pollution discharge in the Beaufort Sea, is there one in the Chukchi Sea?	Shell has committed to a zero discharge of muds and cuttings and sanitation in the Beaufort Sea. That is our choice; we have not gone to that in the Chukchi Sea. We don't have a zero-discharge policy in the Chukchi Sea today. We have a zero harmful discharge in both seas.	N/A

Issues	Comments	Shell Response	Mitigation Measures*
Discharge	Why is there zero discharge in the Beaufort Sea and zero harmful in the Chukchi Sea?	All of the discharge is not harmful. In the Beaufort Sea it is so close to the shore. It is not in the path of the migrating mammals and their food source in the Chukchi Sea.	N/A
Discharge	What is your discharge in three weeks? Zero harmful discharge is million gallons and barrels.	EPA allows 18,000 barrels a day, per well. Our discharge is less than 1% per well.	N/A
Discharge	Each day it will be 2,970 gallons per a day for three wells and it will be 30 days. That will still be a lot. Times three wells. The wells are drilled one at a time. How much discharge will you do per a day per a well? You said 180 barrels a day. It's pretty close to a million.	The way the drillrig works, it will set up in the Chukchi Sea and it will move to another well and drill. At any given time, there will not be more than one well in the Beaufort Sea. If there was more time it would.	N/A
Discharge	Are you including, the sanitation, the oil?	No oil, but treated discharge.	N/A
Discharge	When you flush it where does the drilling muds and cuttings go?	We went back to those wellsites and sampled the mud from those sites and the animals from those sites. You can tell that a well was drilled there. The main reason is because something that's used in this mud called Barite. Barite is a non-toxic agent that comes from the ground and it's put in the mud to make it heavy. Has anyone ever had a digestive tract x-ray? You drink barium, it's used medically, it's non-toxic. We've looked for toxic things in the mud and the animals and . . .	N/A
Discharge	Will you dump your mud off the ships?	There will be some residual chloride, but they will be diluted. Typically we are not dumping whole mud off of the ship. The mud that enters the water is separated on a Shell shaker, the mud gets reused and recycled and it is clinging and goes overboard.	N/A
Discharge	What did you say?	A community member is calculating the discharge total.	N/A

Issues	Comments	Shell Response	Mitigation Measures*
GOM Macondo	Keep in mind, NSB only has 3-5 miles. The ICAS could do the same thing in terms of a science agreement. Work with tribes and work together and it will be easier. Man makes mistakes. Look at Japan. I seen the GOM and how bad it is. We are not ready yet. We will not be ready when time comes. That little boy (pointing at a boy in the audience) might be in charge of oil spill response and my granddaughter might be the president of Shell Oil.	I know you were there. It was very heartbreaking. I'm from the GOM and it was hard to watch. You prevent what happens. It was human error, it could have been prevented. There are no guarantees and there are risks. There are risks to everything. We would like to show you our capping and containment systems.	K
GOM Macondo	Explain how you have ice at the bottom and the temperature is the same as the GOM.	We have instruments that are constantly recording the temperatures. When the air is really cold at the surface, but at the bottom it does not change much. The currents are coming from the Bering Sea and the Pacific Ocean. Even though you get a cold surface temperature. Ice floats, so there would not be ice on the bottom of the ocean. There could be gas hydrates, which are frozen methane because of the high pressure. Since there is no sunlight that penetrates to the deep ocean, there is nothing to warm the water, so it is very cold at deep depths but it doesn't freeze.	N/A
Ice Management and Monitoring	Can you imagine that kind of weather with a couple hundred piles of ice?	It would not happen here.	I
Ice Management and Monitoring	What kind of winds and how fast is that ice traveling (Sakhalin platform in ice video)?	That's real time.	I
Ice Management and Monitoring	What if you have had 90 foot seas?	You won't have that here. It is 15 years away at the soonest. You have to design a structure with engineers that have arctic experience.	I
Ice Management and Monitoring	I want to share a story, where we have a big storm and the ice covered the whole village of Point Hope. You should not underestimate the power of the ice flow.	Thank you for your comment.	I

Issues	Comments	Shell Response	Mitigation Measures*
Ice Management and Monitoring	Have you ever considered using NOAA for ice monitoring?	We do use NOAA resources like the MODIS information. We also use the NOAA Ice Center. But we also do a lot of processing that they don't do because we need more detail than they do. NOAA is very interested in getting the information that we have generated to improve their data set.	I
Ice Management and Monitoring	Where is T-3 it's a large piece of ice that ran ashore five years ago and it broke itself free? It's multiyear ice that has a flow station on it?	There are several ice islands that are in circulation in the Arctic. We are helping to fund drift buoys that are keeping track of where they are.	I
Ice Management and Monitoring	Can we have access to your ice monitoring? It would be very helpful to our whaling.	Yes. There will be a website.	I
Mitigation Measures	What is the meaning of mitigation? I want to know this in Inupiat?	The definition to minimize to lower or decrease any impacts that would occur because we are here.	A, B, C, D, E, F, and G
Oil Spill Prevention & Response	How long will the transit will that take. If you have an accident in the Beaufort Sea and you have to travel from the Chukchi Sea?	Three days. But there will be oil spill response vessels and equipment there with each drillship. We have very big vessels with those drillships. Some of the people in this room went to see one of the drillships and one of the oil spill response vessels.	H and K
Oil Spill Prevention & Response	Are the wells there already?	Yes, they were permanently capped.	H and K
Oil Spill Prevention & Response	You mentioned your BOP will be tested every seven days. Have you started and do you know if they will work in our arctic environment?	When the wells were drilled in the late 80's and 90's they worked fine.	K
Oil Spill Prevention & Response	What is the water temperature difference, and how do the divers dive in the winter?	We are only going to be doing it in open water. We would not be doing it when we have ice or solid ice. At the surface it is much different. In the GOM at 5,000 feet below the sea level it is only 1 degree or so different.	H and K

Issues	Comments	Shell Response	Mitigation Measures*
Oil Spill Prevention & Response	How will you handle divers in the development?	Water temperature is about one degree or so different. The BOPs work in Sakhalin and the North Sea.	K
Oil Spill Prevention & Response	We've heard about many oil spills off Norway.	The recent oil spill in Norway wasn't from drilling. It was from a cargo ship. It was fuel onboard the cargo ship.	H and K
Oil Spill Prevention & Response	That's going to the seafloor at 120 feet for the same water temperature?	Yes.	N/A
Oil Spill Prevention & Response	You are talking about drilling in 2012, how long before you get to the bottom and put out the BOP, will it be twenty days?	To get to where we put in the BOP it will be ten days.	K
Oil Spill Prevention & Response	How long after that will you finally get the oil?	Roughly twenty more days.	K
Oil Spill Prevention & Response	For five years, every time they come they keep bringing different people. Kind of a waste of our time listening to you guys coming here to talk about BOP, prevention taking place, by that time most of us will be gone. If we are a body to give you authority, we will be no less. We wouldn't be thinking about our children and grandchild, they will be observing this after we're gone. Most of us. I would never say, "Hey come and do it now." You say you have safeguards, I cannot say yes to it myself. I am more less going to kill my children and grandchildren. Industry would come and develop and I would be killing my children and grandchildren.	Thank you for your comment.	H and K

Issues	Comments	Shell Response	Mitigation Measures*
Oil Spill Prevention & Response	How do you address the rubber seal in the pipe, that for some reason was to tighten and when they pulled the pipe out it tore the seal. And it came out of the rig? How will you address that? Is there some sort of preventative measure?	They have a diverter that was capturing. The biggest reason that failed, they should have recognized that they had gas above the riser.	K
Oil Spill Prevention & Response	What do you have to detect or monitor that?	To catch that influx get into the riser. That's much easier to do in shallower water. They were in 5,000 feet of water. Shell Layers of Prevention slide. We have instrumentation that would detect that immediately to hold those formation fluids back. The third thing we have is mechanical barriers. On phase four we have a capping and containment system. Our biggest priority is to not let the influx enter the well and happen. We do not plan to get any oil out of these wells.	K
Oil Spill Prevention & Response	If it did leak and it exploded, that oil is going to move fast and it will spread. What type of mitigation or agreement is there to address Pt. Barrow? It's going to hit them before it hits us. Will they come over here to do their whaling?	We have a 25 million dollar good neighbor policy. It is administered by Wells Fargo Bank it is available for immediate use for any kind of verifiable. When you take that money it does not prevent you from taking legal action. You can still participate in a class action suit. You could still take legal action you want.	H and K
Oil Spill Prevention & Response	Where will the Barrow whalers go whaling?	You're presupposing the oil will go to Barrow. I can't do that.	A, B, C, D, E, F, and G
Oil Spill Prevention & Response	Where would the Barrow whalers go?	We don't discuss that in the CAA negotiation. It's never come up with the Barrow Whaling Captains Association.	C
Oil Spill Prevention & Response	What's going to happen to those Barrow whalers? That question was never answered. You're always welcome cousin to come, but we've never really seen it. When was that agreement signed?	We just signed another agreement February of 2011.	C

Issues	Comments	Shell Response	Mitigation Measures*
Oil Spill Prevention & Response	Don't those currents go to Barrow?	Part of it. There's a canyon off of Barrow that is like a bathtub drain. The coastal current will come along the coast and towards Barrow. What's out at Burger, the Hannah Shoal pushes the water to the east and west of it. Jack you mentioned a good point about oil in the Gulf that spread through the water column and did not come to the surface because of the extreme depths. Since our water depths are so shallow in the Chukchi and Beaufort, oil will not spread through the water column and pop in another area. It will all surface near the drilling area where our response fleet will be able to capture it. Our first line of defense is the have spill response vessels.	H and K
Oil Spill Prevention & Response	I would like to thank my Tikigagmiut. It's important for our people, our community, our whaling captains. We have to remember what our elders said. Pete, the majority of us have bad hearing, we don't know what they're really talking about. You heard that elder it has to be in place. I make a recommendation you hire a venue and we would like you to hold your meeting at the Qalgi. Our city government needs money too. I would honor what our elder said. And the meeting was just starting too. I myself, a Tikigagmiut, hunter, Qagmaktuuq. I would say "No development." You show me where those oil spill response crews will come from. They will have two ships. I don't believe it will take three days to get from the Chukchi Sea to the Beaufort Sea. It is less than that. I took a kayak trip. It's good to see you in here, trying to protect our way of life. Pete heard me many times. I speak for these people, our people, the culture that I love the most. We don't know what is going happen with radiation with animals that is contaminated from Japan. The two year Pollock, we got many more. Those adult fish spend time here and go back to Bristol Bay	Thank you for your comment	H and K

Issues	Comments	Shell Response	Mitigation Measures*
	and make more eggs. No activity until you say we can all be protected. I'm a Tikigagmi. We are having problems, we have to be ready for radiation. There might be only three people that come, but they have to make a report. This makes my heart feel. You have an interest in our way of life.		
Oil Spill Prevention & Response	You actually know if the oil is heavier or lighter? What is worse for a blowout?	It's not a function of the type of oil, it's the pressure, the depth. The deeper the water depth the more issues you have access. Working on top of a 500-foot building opposed to a 120 foot building.	H and K
Oil Spill Prevention & Response	How long would it to take to make that decision to cap your well and move offsite?	In the worst case scenario it would take approximately 30 days to drill a relief well, however the capping operation would be much less.	H and K
Oil Spill Prevention & Response	We're talking about the BOP and we're talking about both safety's not working?	Yes, that is correct, but the likelihood of that happening is extremely low.	H and K
Oil Spill Prevention & Response	What's the first safety of the BOP?	We have the levels of prevention.	H and K
Oil Spill Prevention & Response	You said you'll drill three wells in the Chukchi Sea? That's not counting Conoco and the others?	That's correct. We don't know what their plans are.	N/A
Oil Spill Prevention & Response	So will there be companies planning to drill too?	Thank you for your comment.	N/A
Oil Spill Prevention & Response	If they had a spill would your equipment be available to them too?	We are talking to the federal government. We are discussing that they should have their own equipment.	H and K

Issues	Comments	Shell Response	Mitigation Measures*
Oil Spill Prevention & Response	I would like that an oil spill response would be a huge priority. I would think that you would work together.	We've raised the bar pretty high in OSR and the other companies should follow. If they want to go to the same high quality, we would be more than likely to discuss and share with them. I cannot promise anything.	H and K
Oil Spill Prevention & Response	Why can't work with the North Slope Borough? We in other communities when don't even see any of the contracts. Are the wells earthquake resistant? Due to global warming.	Thank you for your comment.	N/A
Oil Spill Prevention & Response	If there is an oil spill would you stop an oil spill by another company?	Let's say Crowley a company delivering fuel runs aground, we would turn around and help them. In regards to stopping our drill, we would have to assess. We do pick up oil as a routine day of business.	H and K
Seismic	I noticed reference to the Sakhalin Island, they were dealing with seismic at that same time. Those animals didn't have a place to go. It's a blanket inventory. We need to see where that seismic went on, to understand. We didn't know of all the seismic activity. We don't know what the rate of recovery is from this 3-D. There are exemptions from seismic activity. They're exempted from input. There's no recourse. No slowing down or taking another look at a significant impact. There's always a no-finding-of-significant-impact. I don't think Shell was involved, but it was done. And those impacts are there. We have concern of preserving and that our freezers remain at the same level not due to a lack of our knowledge. So that our recovery can take place. We don't want you to have such a big headache. The more that we state info. the less time we have to argue about it. I don't like arguing.	Thank you for your comment.	N/A

Issues	Comments	Shell Response	Mitigation Measures*
Seismic	One question I've been wondering it has to do with the affect on plankton from seismic activity. They are probably disintegrated at impact. Will it change their eating habits or ability to reproduce? You're dragging this machine along the whole ocean, it's been brought up but it is important and we need to find out.	It has been studied in experimental situations where they have an airgun in an enclosed area. Anything within 7 feet can be impacted, but beyond 6-7 feet there is not a noticeable effect. There is a global current that comes into the Chukchi Sea from the Bering. This is one of only a few ways that water enters the Arctic. The plankton that occur in the Chukchi Sea are essentially brought in from the Bering and grow and develop there. So, there is essentially a conveyor belt of plankton constantly moving through the system. If there were impacts they would be very short term as the system replenishes itself.	N/A
Seismic	Will it affect the feeding ground near Greenland?	The waters around Greenland are a mixture of Arctic outflow that mixes with currents coming up from the south. It is very similar, in that the plankton are constantly refreshed and grow rapidly during the open water periods.	N/A
Vessel Logistics	There is going to be a ship in the Beaufort Sea and in the Chukchi Sea and they both will be drilling? And there will be a big storm and they both will get in trouble. What will you have then?	The likelihood is that it will not happen.	I
Vessel Logistics	How far is the drilling rig from shore?	204 miles from Point Hope, 78 from Wainwright and 92 from Point Lay.	N/A
Vessel Logistics	How many icebreakers do you have and will you use? Are they American or are they foreign?	Each drilling vessel has one ice management vessel that is foreign flagged.	N/A

<p>Permits: Process</p>	<p>Do you have all your permits that are required to do offshore activities? Are you sure oil spill response will work? In the past, you just went right in there and started planning without our people. You have to get an IHA, CAA, and Clean Air is a big issue. Do you have all your permits in place? The government might say no, our people might say no. I want to make sure for my people here that you have your permits.</p>	<p>One of the ways we get permits is to come talk to you. There is not a federal agency that would issue a permit, if we didn't come talk to you. We don't have all our permits. We are here because you live on the Chukchi Sea. The federal government and Shell are here to make sure we are acting appropriately.</p>	<p>A, B, C, D, E, F, G, H, I, J, and K</p>
<p>Process</p>	<p>We're having this exploration up here in Alaska, but offshore exploration is not happening on the East or West Coast of the U.S. The eastern states like Rhode Island, the west coast said no. The U.S. Government honored that. Who said yes? We said no. We see this and they honor that and they won't touch. Is it the governor, the senator, the congressman. Those states they say no, they are not drilling over there. Who is saying yes? What's going on now? What did the U.S. Government honor the governor, State of Alaska, Tribes? What's the difference? Do you understand what I'm asking?</p>	<p>First of all, why the Chukchi Sea and Beaufort Sea, the scientist in the industry and government believe there is oil there. Today we discussed onshore, I would love to drill onshore, it would be much easier. We don't want to make things difficult. If we thought it was prospective, but the oil onshore is small quantity. The USGS looked at all the prospective areas. There is no further leasing on the West coast there is oil being produced. When one looks at those areas, the amount of oil is small in comparison to what we see in Alaska. I recognize the people in Point Hope, not all people, in other villages as well. We don't always get the same reception. The people of Wainwright, they're ok with what's been said. When they do polls in Alaska, three of every four people is in favor. That's the way it's worked. It's very important to us. There will never be a time in our lives where all people will agree with us. We can be responsible and drill our wells and work in an exploration process and to development process. We will never be successful, if we don't work with the communities. We will continue to come back and explain until we get a better understanding.</p>	<p>N/A</p>
<p>Process</p>	<p>In 2008, we had a lease sale on the Chukchi Sea. I protested the lease sale cause not even one cent will go to the State of Alaska. We won't even get any money. If you will give money to the State of Alaska and NSB and will you give money to the impacted communities? You gave how many millions to the NSB and State of Alaska? Can I have a big Seattle Seahawks stadium?</p>	<p>The money given to the Borough is meant to be shared with the communities. Concerned residents come to the committee and determine science. Shell is working with congressman Young and Senators Murkowski and Begich. All Borough communities will see significant amounts of revenue through property tax. The pipelines will come onshore and we will continue to pay property tax and put money into the economy that way. We will continue to work with ASRC and Tikigaq to put money in the hands of Alaskans, the Alaskans in this room. That's what we're trying to do.</p>	<p>N/A</p>

Process	NSB can't tax federal waters?	That is correct, but the NSB gets property taxes for pipelines and other facilities onshore.	N/A
Process	Who owns the OCS?	The Federal government.	N/A
Quality	The feds and industry don't have enough scientists and they are not ready.	Thank you for your comment.	N/A
Quality of Engagement: Feedback	To the young people, I want it on the record that we do have experts. I count 5-6 elders here.	Thank you for your comment.	N/A
Insufficient	I want to make sure that you honor the elders request and redo this meeting and because of their hearing issues. Many of them have hearing issues. They don't like to be told to sit here. We respect our elders. If you come into our community you must respect our community. Do an orientation to your staff. You don't disrespect our community. I will always oppose. I say it even now. I would never risk my food I eat.	We will hold another meeting with the proper equipment.	N/A
Insufficient	Is there a recorder? Does Shell have a recorder?	No we don't have one with us, we have staff recording comments and questions.	N/A
Insufficient	I'm an elder here. I tell you all to bring the proper equipment and stuff like that when you are going to hold a meeting. I can't hear nothing. I can't hear good. I just hear mumbblings. Get prepared first and talk to us. I would like to postpone this meeting until it's done with a PC system. Nothing wrong with that. You need loud speakers and stuff like that and we want the documents before ahead of time so we can review it. We so move.	We would be happy to come back later and keep going on with the meeting.	N/A
Insufficient	You guys are rich and could come back and forth.	The next time we come we will come with speakers and microphone. Because we have people here right now.	N/A
Insufficient	This is a second meeting that I've heard this complaint. This is what was said in Dutch Harbor.	Thank you for your comment.	N/A

Insufficient	There's no deal. I said it all ready.	We apologize for not having a microphone system. The principal just notified us that their system is down. We will bring a microphone with speakers in the future. There are many people here that have questions and comments and we are going to continue with the meeting.	N/A
Insufficient	Is this part of a POC that is required for your license? What evidence do you have that was asked as questions?	We've never been asked for a recorder and we can bring a recorder. We can send you a copy of the EP that documents all of these questions, our responses and the mitigation measures.	C
Insufficient	A recorder shows what questions have been asked. What is provided to the Feds and the POC is drawn up by your employee. We don't even review what is recorded. It is indisputable. There's something wrong with this. We always hear "We will get back to you." It's time to get beyond this arguing stuff. We need to get beyond this guessing game. I just wonder why you do this time after time without a recorder? It is so simple.	Thank you for your comment.	N/A
Insufficient	Jack has a very good point. You're taking us in circles and we do need answers. I agree with him. Our elders are the ones that need to hear this, we look for guidance from them. We need microphones.	Thank you for your comment.	N/A
Insufficient	All the last meetings that I've attended with industry, we've always had this problem. We have entities with recorders and loud speakers and microphones. If they were offered to be rented, I'm sure they would let you utilize these things. I've been to meetings where people have been able to talk right into a microphone. All you have to do is pay for it and utilize it.	Thank you for your comment.	N/A
Insufficient	Bring microphone system to the next community meeting.	Thank you for your comment.	N/A

Insufficient	Bring a recorder to the next meeting and send a copy of the transcript to the residents.	Thank you for your comment.	N/A
Insufficient	Use simple words in your PowerPoint and oral presentation.	Thank you for your comment.	N/A
Insufficient	I have trouble with the long words. Simple words would give us more understanding. Next time delete it and put simple words.	I will do that.	N/A
Positive/Feedback	Thank you for being here for the community. We've always had someone from the outside protecting our way of life. I have never heard of anyone that has come to explain how you will clean up oil spills in the ocean.	Earl said is it money or is it maktak. The question is do I need to choose? Instead we want people to say "Can I have both?" We want to work with the community for economic justice, where we're supporting people in their current lifestyles. Can I have both and can I take part in this and go forward? This is what we would want you to think about.	N/A
Positive/Feedback	I would like to thank you for continuing the meeting when an elder continued to tell you to stop or end the meeting. I know that this meeting helped inform me. The more meetings to inform our people the closer it will get to begin drilling.	Thank you for your comment	N/A
Positive/Feedback	First all I would like to thank Shell for visiting our community to try and explain your future operating plans and apologize for the few single minded who cannot go beyond their beliefs to even try to understand what is more than likely inevitable for Alaska's future. I worked last summer for ASRC as a Marine Mammal Observer both for Statoil and Shell and from my experience; I believe this can and will be done safely and efficiently as long as the planning is there. I look forward to possibly working again for Shell and will most definitely be a part of the operation for the long run. Thank you.	Thank you for your comment	N/A

Positive/Feedback	We thank you for doing this and helping it come together. There are protocols and guidelines. We need to do it along with Conoco and Statoil, it's better that way. We don't like to work by ourselves either. We don't know how many wells are being done by ConocoPhillips and Statoil. I don't know.	I appreciate you saying you appreciate all the good work that Shell, Conoco and Statoil have done together. We are really proud of our science program. It will have a lot of value in understanding potential impacts and climate change. We are closer now to understanding how this ecosystem works. We have a lot of information that we can provide to you. I need to differentiate between exploration drilling and development. Exploration takes place in three months and number of years and 5,000 studies and ½ billion dollars. Development will require more work. The NSB will be a big help in incorporating the Traditional Knowledge. They will help in knowing what science we need. If we are ever successful.	N/A
Positive/Feedback	That's a good question. That's why we need these meetings to answer our questions.	Thank you for your comment.	N/A
Positive/Feedback	It's not just maktak. It's all the marine mammals in the sea.	Thank you for your comment.	N/A
Protocol	Where there any follow-ups or actions that came up from the last meeting? You should start off each meeting by going through them before with the community.	We document each of the comments and questions and they get put into tables organized in topical order with the comment/question and the response and if there is a mitigation measure that needs to take place it is recorded.	C
Threat to Subsistence: Marine Mammals	How do the animals get Barite in their system?	We've taken very detailed samples. We've gone back and looked and it was done 20 years ago. Today it is even more strict. If we discharge, we discharge much less.	N/A
Value Proposition: Development	Com Centers	Is it your preference that we build our own structure?	A
Development	No. I have no preference.	Our preference would be that we use an existing structure and pay a contract to a local organization.	N/A
Jobs	We want to be included.	Thank you for your comment.	C, E and F

Jobs	What are the Tikigaq contracts?	Waste disposal and compliance.	N/A
Revenue Sharing	When you start drilling, is there any way that Shell can set up shares for the project to the people other than the corporations? Some of the native corporations do not give back to the shareholders. If our people can get shares for the areas that are being drilled, this would be a good way to give back to our people. A lot of times, we don't see any of the money so this would be a good way to give back to the people. For those enrolled in the native village.	Thank you for your comment.	N/A

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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Crystal Hooper					
Mary Joe Attinger					
Ruby Hooper					
Henry Attinger					
Ray Dile					
Florence Oltolike					
Cherie K.					
Leona Snyder					
Mae Han					



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Jack Ler-					
Bessie Kowun					
Peter FRANK					
Ed Natof					
Henry Attagang III					
Xloreen Koonuk					
Ricky N.					
Raymond Att.					



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John Long Jr					
Aaron Oktole					
Donald Long					
Drew Dubois					
Susan Kille Henrietta Attungana					
Claudia Koonalok					
Elice Nash					



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Ned A. Weber Sr					
STEVEN LISBANE					
Dolly Ottolik					
Mike Chapman III					
Lakisha Johnson					
Rosella Stone					
Kathy Tingook					



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Kenneth Attensua					
TOMI LORD					
Eric Ussakul					
Rhoda Long					
AQQI Hank					
Morris Nashookpak					
Lydia Nashookpak					
Boris Ipabok					



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Lloyd Vn					
Leonard Wood					
Loretta Nashotepok					
Jan N. Skowronek					
Joe Frank					
Peggy Frank					
Lily Barger					



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Hazel C. Hurlie					
Diantha Okalik					
MORRIS B. QIICK					
Sally Bethel					
Minnie Johnson					
DAN MOREHEAD					
Gail Gallahorn					
JAKI S. TUNNEY					



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<i>Hannah Teayoume</i>					
<i>Diana Oletollek</i>					
<i>Jessie Annuk</i>					
<i>Lennie H. Neshookpak</i>					
<i>Shawn Stone</i>					
<i>Brett Oletollek</i>					
<i>Molly Annuk</i>					
<i>T. H. Neshookpak</i>					



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Heather Minix					
Amber Sweeney					
Kime Franceser					
George Vincent					
Joe Omnik					
Ella Omnik					



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Pearl Sage					
Abraham Kouvinan					
Art Committee					
Isaac Alluzawa					
Brittany Oksolik					

Issues	Comments	Shell Response	Mitigation Measures*
Cost/Access to Energy: Cost/Access to Energy	Does North Slope oil cost more than other places?	Yes – I can't answer why fuel prices are high in rural Alaska. There have been lots of questions about Native Alaskan populations and we want Native Alaskans to be a significant part of our operations. In Brunei, where I worked before I came here, they had 95% local hire. We call this economic justice. There is a lot of discussion about environmental justice but longer term economic justice is just as important.	N/A
Operational Impacts: GOM Macondo	How did the big spill in Mexico affect everything?	It was a catastrophe for the oil and gas industry. We were very close to drilling last year and had conducted over 450 stakeholder engagements and the more we spoke with communities, the more people felt comfortable with Shell. The president put a moratorium on offshore drilling and the fallout from that accident has continued to follow us. We have to show what we can do not just talk.	H and K
GOM Macondo	The biggest fear people have is a repeat of the GOM accident.	We hear that a lot, people are fearful of oil spill and we have a spill response program to talk about tonight. And one of the most important things is prevention.	H and K
Oil Spill Prevention & Response	Will you have a team ready in case of spill and if you do, do you provide training?	Yes all the personnel have to be trained; We sent some of our personnel from up here to work on the BP spill and they gained experience.	H and K
Oil Spill Prevention & Response	What if you have a spill at the end of the season?	Our equipment can work in a certain amount of ice. We will attempt the capping and containment first and we should be able to control the well before ice becomes too much of a problem.	H and K
Oil Spill Prevention & Response	The ice might help with containment.	Yes the ice can actually help corral the oil.	H and K
Oil Spill Prevention & Response	Are the man made islands safer than the platform?	We really can't use man made islands in water depths higher than 20 feet so when we find production we use what is called concrete gravity based structures.	H and K
Quality of Engagement: Positive/Feedback	This is an excellent presentation very thorough.	Many of the people that helped in the Gulf were from Alaska were from the NANA Region.	N/A
Threat to Subsistence: Marine Mammals	What about whaling season – are you going to stop drilling during the whaling season?	We will have blackout dates in the Beaufort Sea on August 24 th and move our drilling rig and boats far offshore and wait until whaling is finished. In the Chukchi, we will continue to work because it is very far offshore.	A, B, C, D, E, F, and G

Issues	Comments	Shell Response	Mitigation Measures*
Value Proposition: Jobs	Do you have any Native people working for you?	We don't have many jobs available because we have not been able to move our program forward, but if we have a drilling program, there will be many jobs and we want Native Alaskans to have most of them.	E and F
Revenue Sharing	Can you give a projection of how Shell's success would affect the NWAB?	There isn't revenue sharing in the OCS but we looked at impacts to the state and nation over 50 years. We found that regionally there would be 4 Billion dollars revenue from taxation and other benefits but the biggest benefit is jobs resulting in \$145 billion over that timeframe. It would also impact the whole country.	N/A
Workforce Development	One of the benefits is employment and career opportunities and professional careers. At what time does Shell imagine a project that caters to NWAB and NSB people? There should be a mechanism that kicks in that helps this region because there aren't enough people to fill these jobs. As an Alaskan, I'd like to see this benefit Alaskans first.	Shell has started a program called Avante Guard which certifies teacher's aides with UAA to give them the credentials they need to become professional teachers. We are also working with a group called Polar Pairs which is an exchange program with teachers in Aberdeen. We also support ANSEP. I took a call from Kotzebue about jobs for roustabouts and I also hope there will be jobs in engineering, geologists. We are also trying to attract Native Corporations to build capacity to work offshore. We don't have a large pie now without a drilling program but we want to provide jobs. We have identified that 5 th graders are the people that will take advantage of the jobs we will have to offer. The longer we wait, the further out that target moves.	N/A

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Leon Atouk					
TERESIA SOMLYER					
Evark Wells					
Meritha Capelle					
Sylvia Sheldon					
Lee Stachel					



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Annie Reed					
Jack Reed					
William Gooden					
Thomas W. Smith					
Elizabeth Bayou					
Ben Atoruk					
Daisy Johnson					
Leon Johnson					



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Kayana Barr					
VP SO Stewardship Louse Reed					
Nida Johnson					
Jackie Johnson					
Tom Johnson					
Trukuk Gerhardt-Cyrus					
Josie Brower					



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Isabelle GC					
Donald Sims					
Dally Smith					
Mabel Good					
Annie Barr					
Issac Jackson					
Paula Oubostin					



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Ruth Sandvik					
Jason Turk					
Nelson Walker					
Debra Reed-Thomas					
Blanche Cook					
Charmagne Reed					
Dale Stotts					



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Kristy Walton					
Naomi Harris					
Colleen Westlake					
Daniel Atoruk					
Eugene Douglas					
Ida Jackson					
Pina Atoruk					



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Pauline Seelen					
Lyla Ahwinone					
Thomas Jackson					
Arene K. Richards					
Irene Sheldon					
Aaron Westlake					



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Kiana School Gymnasium, Kiana, Alaska
March 29, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Renee Cook					
Janet Henry					
Kemberly Henry					
James L. Stalker					
Gertrude Williams					
Amy J Morris					
Rose Jackson					
Zonda Martin					
Oliver Reed					



SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Kiana Plan of Cooperation Community Open House Meeting
Kiana School Gymnasium, Kiana, Alaska
March 29, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Anna Thomas					
Vernon Atokuk					
Darryl Johnson Jr					
Michael Westlake					



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SIGN-IN SHEET – Kiana Plan of Cooperation Community Open House Meeting
Kiana School Gymnasium, Kiana, Alaska
March 29, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Juvic Reed					

Issues	Comments	Shell Response	Mitigation Measures*
Quality of Engagement: Positive/Feedback	A suggestion was made that a good time for Shell to come to Kotzebue would be the Trade Fair on the 8 th and 9 th of July which is also the Manilaaq annual meeting.	Thank you for your comment.	N/A
Positive/Feedback	Another suggestion was made for Shell to participate in the Spring Clean Up by donating bikes. Sponsors get a lot of publicity.	Thank you for your comment.	N/A

Notes:

*Mitigation Measures are only assigned to applicable comments.

"Not applicable" (N/A) is used to designate comments that do not require mitigation measures as a course of action. See [Mitigation Measures Index](#) definitions according to assigned letter.

2011 Proposed Mitigation Measures

A-Communication Plan for avoiding conflicts with subsistence users.

B-Collaboration and Communication with Whaling Associations

C-Plan of Cooperation (will work to obtain a CAA)

D-Will honor 2010 Camden blackout dates for Nuiqsut and Kaktovik whaling.

E-Subsistence Advisors based in Chukchi and Beaufort Sea Villages and Kotzebue

F-Marine Mammal Observers

G-Robust Marine Mammal Monitoring Protocol

H-Oil Spill Response Fleet on standby 24/7 near drilling location

I-Real time Ice and Weather Forecasting

J-Crew change by helicopter and collaboration on routes to and from shore base

K-Enhanced blowout prevention and mitigation measures (i.e., second set of blind shear rams, increased frequency of BOP testing, redundant ROV hot stab panel, capping stack and containment system, and relief well plan with designated standby relief well drilling unit).

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SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Kotzebue Plan of Cooperation Community Open House Meeting
Kotzebue Middle/High School Multipurpose Room, Kotzebue, Alaska
March 30, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Rich B Koutchuk					
Cara Braun					
Christian Jidar					
Frank Tyatunuk					
WALTER Stanger					
EARL KINGIK					
Cassie Norton					
William Sheldon					
Ryan West					



SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Kotzebue Plan of Cooperation Community Open House Meeting
Kotzebue Middle/High School Multipurpose Room, Kotzebue, Alaska
March 30, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
L Jennu Johnson					
Kasey KGH					
Clan Greene					
Warren stalker					
Bentley J. J. J.					
Leon Downey					
As M					
Minnie Kuback					



SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Kotzebue Plan of Cooperation Community Open House Meeting
Kotzebue Middle/High School Multipurpose Room, Kotzebue, Alaska
March 30, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Jayde Shelton					
Michelle Tungiyak					
John Kubalack Jr					
Corey W. Schaeffer					
Robert W Thompson					
Chester Fallet					
John Chase					
JAY A. DENSON					
Jerry McCall					



SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Kotzebue Plan of Cooperation Community Open House Meeting
Kotzebue Middle/High School Multipurpose Room, Kotzebue, Alaska
March 30, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
GRACE DOWNNEY					
Cora Downey					
Grant Hildreth					
Jeffrey Kowanna					
Aggie Kowanna					
Jerri Kowanna					



SHELL EXPLORATION AND PRODUCTION COMPANY
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March 30, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Vkallayseeg & Iqtuq					
Anthony Buttram					
Juan Zuriga					

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Issues	Comments	Shell Response	Mitigation Measures*
Operational Impacts: Oil Spill Prevention & Response	Have you used the capping and containment system in the Arctic?	We have used this equipment in many other places but we will fully test the equipment here before it is used.	K
Oil Spill Prevention & Response	Will you test the equipment during bad weather?	Yes we will test the equipment during all conditions we could imagine but if the weather gets too bad, we will suspend operations.	I, H, and K
Oil Spill Prevention & Response	How would you deal with an oil spill in ice?	We have equipment that is designed to operate in ice.	I, H, and K
Permits: Timing	You said there wouldn't be any activities in 2011. Is your decision related to HB 210?	No we made our decision before that bill was introduced.	N/A

Notes:

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SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Kivalina Plan of Cooperation Community Open House Meeting
McQueen School Gymnasium, Kivalina, Alaska
March 31, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
DANIEL D. FOSTER					
Mark Turner					
Ikey Hank					
MYRA ADAMS					
BERT ADAMS					
Walter Swan					
Ernie Booth					
Yonah Swan					
Seymour Tuzigalik III					



SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Kivalina Plan of Cooperation Community Open House Meeting
McQueen School Gymnasium, Kivalina, Alaska
March 31, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Manan Norton					
Frank Wedy					
Billy Stone JR					
Doreen Baldwin					
Isabelle Staker					
Amanda Dewey					
Jerry Norton Jr					
Carlos Hawley					
Ernest Hawley					



SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Kivalina Plan of Cooperation Community Open House Meeting
McQueen School Gymnasium, Kivalina, Alaska
March 31, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Chris Koores					
Shirley Staller					
Audrey Jones					
Tracey Jones					
Tanaya Jones					
Tialynn Adams					
Louise Wesley					
Paula Swa					
Carta					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Galen Swan					
Angelo Hawley					
Amos Hawley					
Loretta M. Hawley					
Gladys Adams					
Betty Swan					
Nikki Adams					
Miller Hawley					
Virgil Adams					



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Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Austin Swan					
Irene Carter					
Andrea Baldwin					
Russell Adams					
Adrian J. Adams					
Vincent					
Quinn P. Hawley					
Josh Chel					
Myra Wesley					



SHELL EXPLORATION AND PRODUCTION COMPANY
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March 31, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Stanley Hawley					
Luke Koonook Jr.					
Josephine Hawley					
Robert Hawley					
Rhonda Norton					
Stephen R. Koenig					
Albert Norton Jr.					
Brenda K Norton					



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McQueen School Gymnasium, Kivalina, Alaska
March 31, 2011.

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Lona Adams					
Calub Wesley					
Lona Sage					
Theodore Beck					
Genny Swan					
Rita Ramoth					
Danielle Knox					
Franklin Knox					
Shirley Adams					



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SIGN-IN SHEET – Kivalina Plan of Cooperation Community Open House Meeting
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March 31, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
011 070801					
Margaret Baldwin					
Tillman Adams					
Jessy Knapp					
Emma Stalker					
Jeremiah Kayulik					
Hannetta Adams					
Alexis Hawley					
Jackie					



SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Kivalina Plan of Cooperation Community Open House Meeting
McQueen School Gymnasium, Kivalina, Alaska
March 31, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Harry Norton					
Maria Koenig					



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McQueen School Gymnasium, Kivalina, Alaska
March 31, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Dolly E. Foster					
<i>Bella Lemell</i>					
Brenda Hawley					
Emeline Knox					
<i>Oran L. Knox</i>					
<i>Priscilla Soy</i>					
Lawrence Adams					
<i>Tommy Bellin</i>					



SHELL EXPLORATION AND PRODUCTION COMPANY
SIGN-IN SHEET – Kivalina Plan of Cooperation Community Open House Meeting
McQueen School Gymnasium, Kivalina, Alaska
March 31, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Sylvester Swan III					
Gloria Adams					
John Norton					
JOLENE WESLEY					
Henry Swan					



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March 31, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Lucy S. Adams					
Lucy M Swan					
Joe Loening					
Koomalook Stone					
Angela Hawes					



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March 31, 2011

Name (Please Print)	Representing	Mailing Address	Phone No.	Fax No.	Email
Danny Foster					
Oran Barger					

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Issues	Comments	Shell Response	Mitigation Measures*
Operational Impacts: Discharge	Will Shell also do the zero harmful discharge in the Chukchi where whales migrate like the Beaufort Sea?	We will not do zero volume discharge, we will be doing a zero harmful discharge of our muds and cuttings. We have looked back at the past wells from the 80's and 90's and have not found any significant change to the ocean flora, etc.	L
Quality of Engagement: Positive/Feedback	When will Shell host more meetings in Wainwright? I've been hearing back from youth there that they see the potential opportunity for careers. I would like to see Shell involved with the schools.	Shell experts would like to come out the village schools and work with youth. We would be able to do that.	N/A
Positive/Feedback	Shell is getting close to developing a partnership with NSB. I have concern about having two rigs working at the same time. There are some challenges there. I continue to see OSPR, discharge, air etc. as issues that will continue to come up in your programs.	Thank you for your comment.	K and L
Value Proposition: Workforce Development	Wants us to expand our job opportunities outside of Marine Mammal Observers and Subsistence Advisor's and Communication and Call Center Operators.	Thank you for your comment.	N/A

Notes:

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2011 Proposed Mitigation Measures

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G-Robust Marine Mammal Monitoring Protocol

H-Oil Spill Response Fleet on standby 24/7 near drilling location

I-Real time Ice and Weather Forecasting

J-Crew change by helicopter and collaboration on routes to and from shore base

K-zero discharge of: drilling fluids and cuttings after the 26-in casing; gray and treated black waters; bilge and ballast waters

L-Enhanced blowout prevention and mitigation measures (i.e., second set of blind shear rams, increased frequency of BOP testing, redundant ROV hot stab panel, capping stack and containment system, and relief well plan with designated standby relief well drilling unit).



Science Accomplishments:

Aspects of the Shell
science program that
reflect input and requests
from the North Slope
Borough



Acoustic program in both the Chukchi and Beaufort

- Initiated in 2006 with CPAI & GXT
- Continued since that date with > \$10 million expended
- Despite setbacks, this is one of the biggest acoustic monitoring programs globally
- Generated greater understanding of many marine mammal species including walrus and bowhead movements

Chukchi Sea aerial program

- 2006-2010 conducted aerial surveys within 25 miles of the Chukchi coast
- About \$10 million expended to date
- The first to document walrus haulouts on the Alaska Chukchi coast
- Documented downcoast (Barrow to Wainwright) movement of migrating bowheads

Chukchi Sea Baseline studies

- 2008- 2010 added an extensive baseline program with CPAI, COMIDA, and others
- Includes – birds, mammals, plankton, benthos, contaminants, fishes, physical parameters
- Initiated following Mayor Itta's letter asking for baseline science
- > \$15 million expended to date
- Greater clarity of the ecological drivers of the Chukchi ecosystem

Historic exploration well site evaluation

- Returned to Hammerhead (Beaufort) site in 2008
- Returned to Burger/Klondike (Chukchi) sites in 2009
- Evaluated contaminants issues and biological community structure

Cumulative impacts analysis

- Since 2006 Shell has taken the lead in documenting all industry activities and the results of all industry monitoring efforts in the offshore
- The reports have taken a multi-year/multi-activity approach reporting total ensonification areas and reporting on multiple activities.

Air monitoring stations

- 2008-2010 air monitoring stations at Reindeer Island and Wainwright



EXPLORATION PLAN



SHELL'S GOALS

To demonstrate that Shell does not cause undue or serious damage to the human, marine, or coastal environment, conforms to sound conservation practices, and is prepared to conduct exploration that is safe.



WHY PREPARE AN EXPLORATION PLAN?

To discuss and explain the various operative activities associated with drilling.

WHO REVIEWS THE EXPLORATION PLAN?

The North Slope Borough, potentially impacted communities, AEWG, marine mammal management groups, tribes, State of Alaska, and the federal government.

WHAT IS INCLUDED IN THE EXPLORATION PLAN?

- Description of drilling vessels, and associated vessels and equipment
- Location and timing of operations
- Proposed type and amount of discharges
- Oil spill prevention and response measures
- Analysis of direct and indirect environmental impacts
- Mitigation measures
- Health and safety measures
- Geologic information assessment of any hazards to drilling
- Permit applications

Exploration Plan Details

- Two EPs – Camden Bay EP in the Beaufort Sea and a Chukchi Sea EP
- Both are two year plans – starting in 2012
- Up to 2 wells per year in the Beaufort Sea
- Up to 3 wells per year in the Chukchi Sea, plus future well site work
- Noble Discoverer drillship and Conical Drilling Unit Kulluk
- Oil Spill Response capabilities on standby 24/7
- Crew change by helicopter – routes determined through coordination and communication
- Real time ice and weather forecasting
- Shorebase in Deadhorse, Barrow and Wainwright
- Robust marine mammal monitoring protocol
- Communications Plan to avoid conflicts with subsistence users
- Subsistence Advisors





SHELL'S GOALS IN ALASKA'S BEAUFORT & CHUKCHI SEAS OUTER CONTINENTAL SHELF

ENGAGEMENT PHILOSOPHY

Engage local residents and regulatory bodies to understand issues and concerns before design work is initiated

Utilize knowledge gained in design and operational feasibility studies, for example minimizing or mitigating the impact of a development.

Being a "good neighbor" to the residents of the North Slope, and all areas we operate within the state of Alaska.

COMMITMENT TO NORTH SLOPE RESIDENTS

Integrate cultural and environmental protection considerations into the planning, design, construction and operational phases of our potential oil and gas activities.

Improve communication to ensure full and meaningful dialogue with residents.

Consult with NSB and NWAB staff and village residents during the planning and design stages in order to blend traditional and contemporary local knowledge with exploration technology in an appropriate manner.

SHELL'S GOALS IN ALASKA'S NORTH SLOPE

To find and develop commercial hydrocarbon resources in the Beaufort and Chukchi OCS.

To support the community in benefiting from any potential offshore development both economically and socially.

To respect and enhance the way of life of the residents of the North Slope Borough and Northwest Arctic Borough.

OBJECTIVES

Discuss the possible infrastructure needed to make Beaufort and Chukchi OCS development a reality, should it occur.

Review the potential social and economic benefits associated with increased infrastructure and development of Shell leases in the Beaufort and Chukchi OCS.

Discuss future engagement with the residents of the North Slope Borough and Northwest Arctic Borough.

EXPERIENCE & COMMITMENT

Shell has experience in Arctic and other ice-covered offshore regions. Traditional knowledge and assistance goes a long way in helping to ensure success.

POTENTIAL BENEFITS: JOBS & CAREERS

- Direct and indirect
- Local business contracting opportunities
- Workforce development and training



POSSIBLE INFRASTRUCTURE NEEDS



Sakhalin

WHY IS OFFSHORE INFRASTRUCTURE REQUIRED?

Many leases are more than 15 miles from shore

Longest land based reach to offshore sites is approximately 8 miles

POTENTIAL BENEFITS: REVENUE

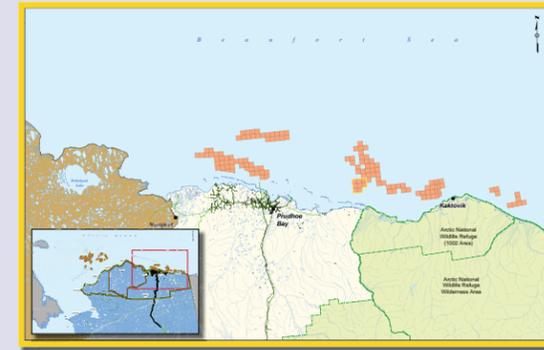
- Tax base from pipelines & support bases to address declining revenues
- Extending the life of TAPS and the pipeline tax base
- Additional infrastructure which could make other onshore fields economic and increase revenue



SOCIAL & CULTURAL INVESTMENTS

- Socio-economic studies
- Marine mammal studies
- Environmental studies
- Additional social and cultural investments

BEAUFORT SEA INFRASTRUCTURE: INITIAL DEVELOPMENT FOCUS



Camden Bay:

Initial focus is the 1985 discovery of Hammerhead/Sivulliq.

- 14 to 18 miles offshore
- Water depth 100 feet

Development of Sivulliq is dependent upon factors including:

- Seismic results
- Appraisal drilling results

CHUKCHI SEA INFRASTRUCTURE: INITIAL EXPLORATION FOCUS



The first public sale of leases in the Chukchi Sea since 1991 took place on February 6, 2008.

The Chukchi Sea Shelf is believed to hold up to 30 billion barrels (4.8x10⁹ m³) of oil and gas reserves.

- Lease blocks are more than 50 miles offshore
- Water depth 130-200 feet

ADDRESSING CHALLENGES THROUGH RESEARCH & DEVELOPMENT

Platform & vessel noise reduction to minimize impact to marine mammals

Production platform structure design to withstand ice loading

Oil spill prevention and response for development infrastructure

Vessel and platform re-supply

Offshore pipeline installation beyond landfast ice

Evacuation and rescue



FUTURE ENGAGEMENT: THE WAY FORWARD

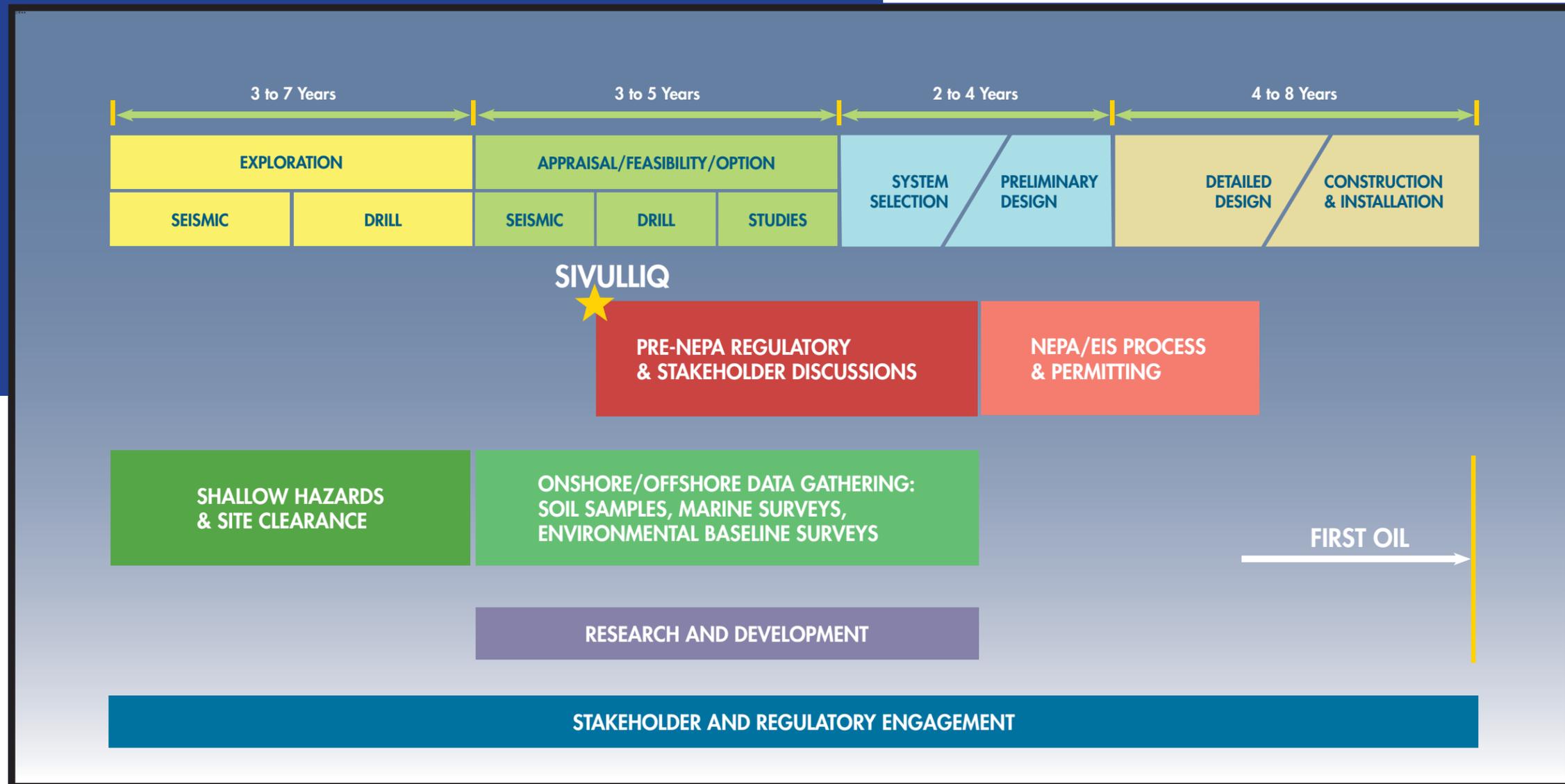
To succeed in meeting mutual goals, we must move forward together based on mutual respect and open dialogue:

- Discuss ideas on ways to engage, consult and work together;
- Validate our understanding of your concerns;
- Discuss issues, potential impacts and potential solutions & mitigation measures;
- Share ideas and feedback on economic development.

"It is clear, that substantial involvement of all potentially affected parties including Alaska Natives is a prerequisite for a successful approach to the development of Arctic OCS Oil and Gas."

—Environmental Information for Outer Continental Shelf Oil and Gas Decisions In Alaska by the National Research Council

Typical Offshore Development Timeline





Shell Camden Bay and Chukchi Sea Program Update

March 2011



Shell In Alaska

- 2011 Program
- 2012-2013 Proposed Exploration Plans



2011 Program

2011 Shell Proposed Operations

■ Shell 2011 program:

- Marine mammal monitoring to support operations
- Non Shell operated Ecological science data gathering (offshore and onshore)
- Com Centers and Subsistence
- Advisors in Coastal Villages of North Slope:
 - Point Lay, Point Hope, Wainwright, Barrow, Deadhorse, Kaktovik, Nuiqsut





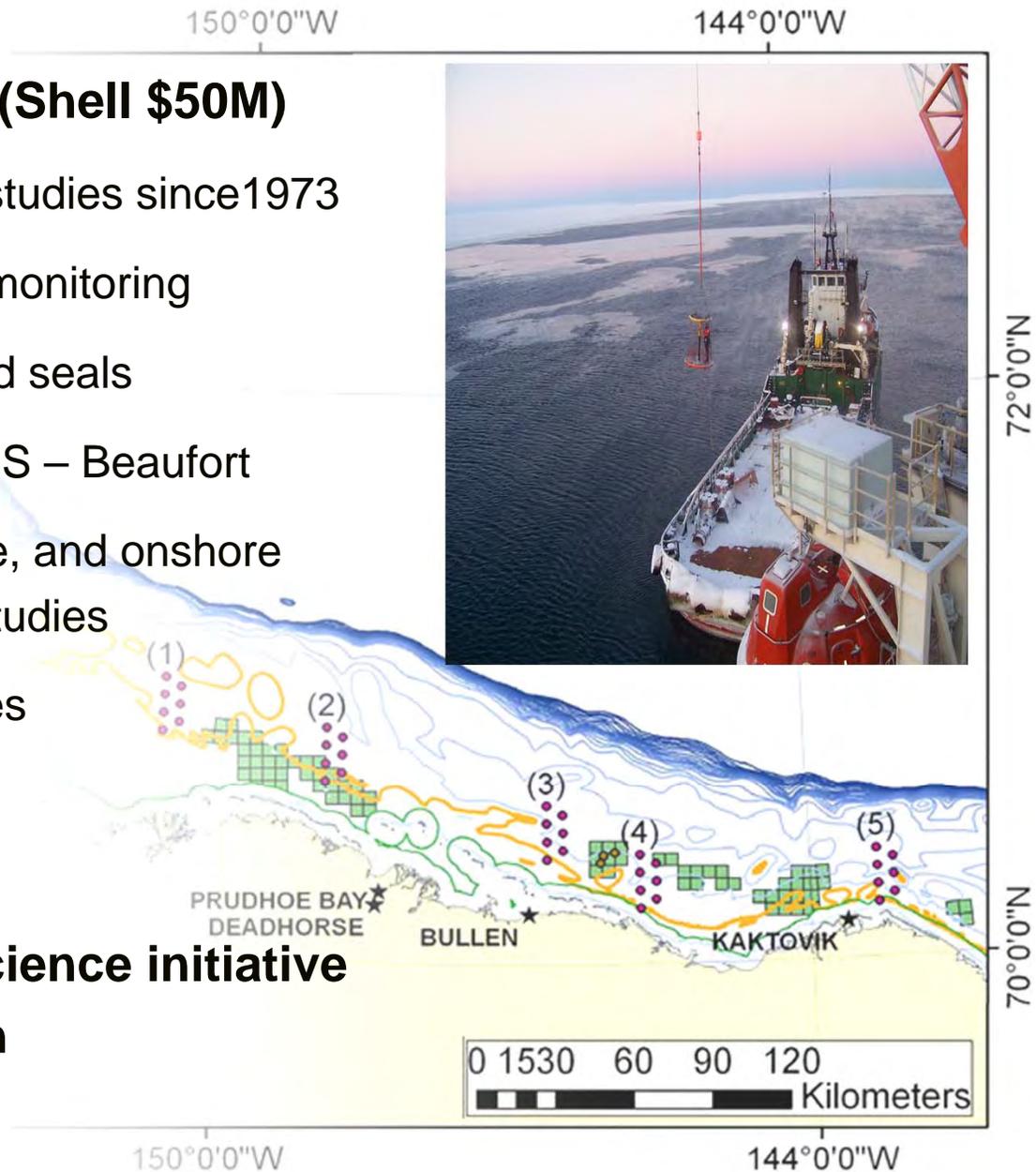
Science

Baseline Science Supports Exploration In Alaska

■ \$500 Million and growing (Shell \$50M)

- 5000 independent scientific studies since 1973
- 6 years of marine mammal monitoring
- Tagging studies – walrus and seals
- First air quality station in OCS – Beaufort
- Ongoing offshore, nearshore, and onshore ecological characterization studies
- Traditional knowledge studies
- Health impact assessments

■ Up to \$5 million annual science initiative with North Slope Borough



Offshore, nearshore, onshore studies

- Marine Mammal
- Acoustic Recorders
- Ice & Metocean Buoys
- UAV Monitoring
- Stereo Photography
- Upward Looking Sonar
- Benthic Studies
- Sediment chemistry
- Current Meter
- Hydrology & Habitat Assessment
- Coastal Stability Studies
- Traditional Knowledge
- Bird Observations
- Fisheries Sampling
- Zooplankton
- Physical Oceanography

NSB Collaborative Science Agreement

- Objective: To enable community members in coastal villages of the Chukchi and Beaufort Seas to participate and prioritize science being conducted related to the potential effects and impacts of oil and gas exploration and development in the outer continental shelf (OCS).
- Signed Sept. 24, 2010
- Funded annually by Shell for an initial term of five years, and administered by the NSB Mayor's Office
- 14-Member Steering Committee
 - Coastal Villages
 - NSB Wildlife Department and Mayor's Office
 - Independent Scientists
 - Shell





2012-13 Proposed Exploration Plans

Chukchi and Beaufort Seas



2012-13 Proposed Operations

- Drill up to three wells per year in Chukchi Seas during open water drilling season (July-October)
- Drill up to two wells per year in Beaufort Sea during open water drilling season (July-October)



- Continuation of Shell's long-term ecological characterization offshore and onshore



Mitigation

Mitigation Shell has committed to

- Communication Plan for avoiding conflicts with subsistence users
- Collaboration and Communication with Whaling Associations, Walrus, Nanuq and Seal Commissions
- Capping and Containment system
- Commitment to hire Subsistence Advisors
- Marine Mammal Observers on all vessels
- Robust Marine Mammal Monitoring Protocol
- Real time Ice and Weather Forecasting
- Crew change by helicopter and collaboration on routes to and from operations
- Deadhorse, Wainwright and Barrow shore bases
- No transiting, including within polynya zone, without communicating
- Relief rig capabilities



Prevention and Response

Commitments

- **Prevention Is the First Priority and Can Be Accomplished**
- **BOP – testing and enhancements**
 - Testing every 7 days instead of every 14 days
 - Use of second set of shear rams
 - Sub-sea remote operating panel relocation
 - ROV/Diver options on and near site
- **Arctic Cap and Containment System**
- **Full OSR capabilities for each sea**
- **Second rig relief well capability**

Alaska Arctic Cap and Containment System





New and Traditional Oil Spill Contingency Planning

Shell Oil Spill Response Goals

- Immediate Onsite Response
- Latest Technology
- Flexible Environmental Response Capability
- Sustained Response

Arctic Response Options

Offshore:

Mechanical

In-situ Burning

Dispersants

(under select conditions)



Nearshore:

Mechanical

In-situ Burning



Onshore:

Mechanical

In-situ Burning



Nanuq

- Multi-Purpose Vessel
 - Spill Response;
 - Onsite Command Center;
 - Anchor Handling;
 - Ice Management; and
 - Supply
- Ice Class A1 Vessel
- Dynamic Positioning Capability
- Full support for up to 41 crew and responders
- 2 Lamor LSC-5 Brush Skimmers & Power Packs
- Staging and Deployment of Boom-tending Work Boats
- Onboard storage: >12,000 bbl
- Rapid Transit for lightering recovered oil
- High Volume, Viscous Oil Lightering capability

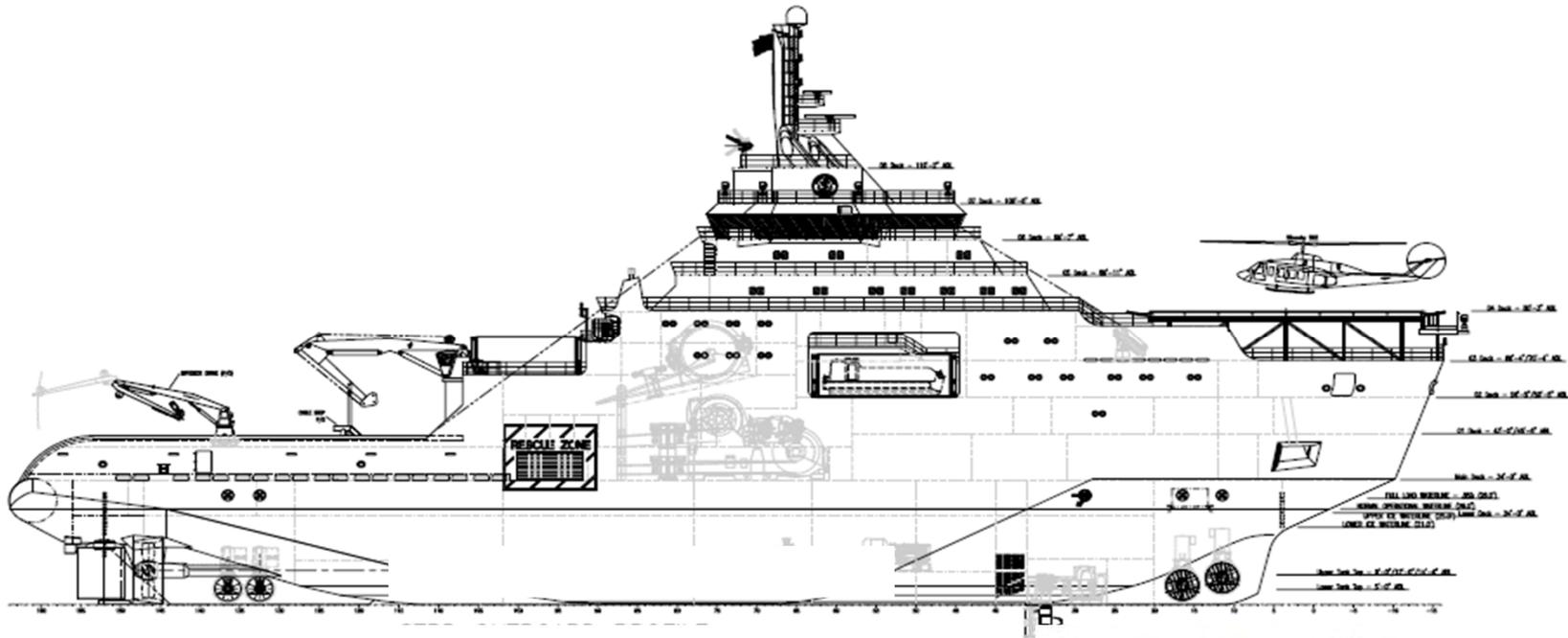


Arctic Endeavor

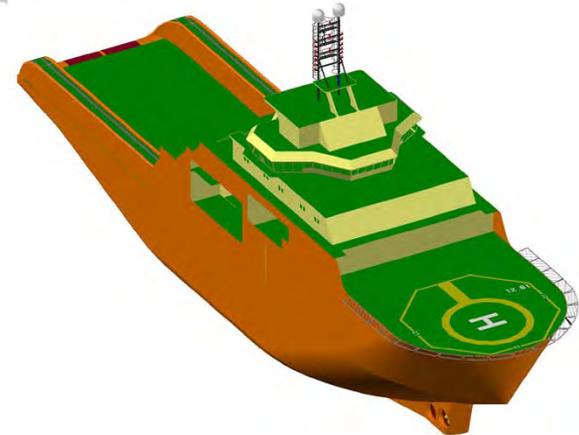
- Dedicated Oil Spill Response Barge with Tug Assist
- Ice Strengthened
- Onboard Field Command and Communications Center
- 2 Lamor LSC-5 Brush Skimmers & Power Packs
- Staging and Deployment of Boom-tending Work Boats and 249-bbl barges
- Staging and Deployment of 47' Skimmer with built-in Brush Skimmers
- Onboard storage: >18,000 bbl
- High Volume, Viscous Oil Lightering capability



Hull 247



- Length Overall – 360' (110m)
- Beam – 80' (24.4m)
- Draft – 26' (normal)
- Anchor Handling Backup
- Polar Ice Classed
- High POB for contingency response
- Storage Capacity: 8,000 bbl



Mechanical Recovery



Lamor Brush



TransRec 150



Ocean Buster



47' Kvichak w/ brush skimmer



Small Over-the-Side Skimmers



Rope Mop skimmer



Harsh Weather Operations

Brent 'B' production platform photographed in stormy weather.

The photograph shows the ferocity of the wind and waves during a storm in the North Sea. Winds of more than 100 mph produced waves reaching up to the underside of the deck which is 75 ft above sea level. Platform on calm day shown at bottom.



Ice Against Platform Legs - video



Thank You



END OF PRESENTATION



Attachment C
Chukchi Sea Communication Plan

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COMMUNICATION PLAN
EXPLORATION DRILLING PROGRAM
CHUKCHI SEA, ALASKA

The following Communication Plan will be used during each exploration drilling season to coordinate activities with local subsistence users, including the Alaska Eskimo Whaling Commission (AEWC), Alaska Eskimo Walrus Commission (AWC), Alaska Nanuuq Commission (ANC), Alaska Beluga Whale Committee (ABWC), Ice Seal Committee (ICS), and village Whaling Captains Associations (WCA). Each planned drilling season in the Chukchi Sea will begin with transit through the Bering Strait into the Chukchi Sea on or after July 1, then on location at a drill site on or about July 4 and end on or about October 31.

The Communications Plan will be implemented in two phases. Phase I describes the guidelines already in place to ensure proper communication during the drilling season. Phase II describes what to do in the event Shell Gulf of Mexico Inc. (Shell) activities potentially affect subsistence activities and how to keep subsistence user groups informed of Shell activities. Phase I and II are designed to minimize the potential for interference of Shell activities with subsistence activities and resources and to keep operators up-to-date regarding the timing and status of the beluga and bowhead whale migrations in the Chukchi Sea as well as the timing and status of other subsistence hunts.

Drilling program operations will be performed in compliance with all applicable permits and authorizations, including the Plan of Cooperation, Letter of Authorization per U.S. Fish & Wildlife Service, Incidental Harassment Authorization per National Marine Fisheries Service and Lease Stipulation 5 from Lease Sale 193 per Bureau of Ocean Energy Management, Regulation and Enforcement.

PHASE I

- Shell will fund the operation of Communication and Call Centers (Com Centers) in the coastal villages to enable communications between Shell operations and vessels, local subsistence users, and Subsistence Advisors (SAs), thereby notifying the subsistence community of any vessel transit route changes and avoiding conflicts with subsistence activities.
- Marine Mammal Observers (MMOs) will be onboard exploration drilling-related vessels with responsibilities to: monitor for the presence of marine mammals, assist with the maintenance of marine mammal safety radii around vessels, monitor and record avoidance or exposure behaviors, and communicate with the Com Centers and local subsistence hunters by marine radio.
- If a conflict arises with offshore activities, the MMOs will immediately contact the vessel captain and the Com Centers. The Com Centers will then contact Shell's simultaneous operations emergency response team. If avoidance is not possible, the next phase will

include communication between a Shell representative and a representative from the impacted subsistence hunter group(s) to resolve the issue and plan an alternative course of action by either industry or the subsistence groups.

- Shell will employ local SAs from the Chukchi Sea villages to provide consultation and guidance regarding the affected species migration, the subsistence hunt, and other subsistence activities. The SAs will work approximately 8 hours per day and 40-hour weeks through each drilling season. Responsibilities of the SAs will include: reporting any subsistence concerns or conflicts, within 4 hours if the conflict appears imminent, to the Com Centers (who will then contact Shell's simultaneous operations emergency response team); coordinating with subsistence users to advise on location and timing of Shell's activities; reporting subsistence-related comments, concerns, and information to Shell staff; and, advising Shell how to avoid subsistence conflicts and subsistence users. A SA handbook will be developed and provided to each SA. The handbook will outline contact numbers, communication procedures, and communication timelines for reporting and communicating potential conflict situations.
- Helicopter traffic flight restrictions will be in place to prohibit aircraft from flying within 1,500 ft (457 m) of marine mammals or below 1,500 ft (457 m) altitude, (except during takeoffs and landings, in emergency situations or for MMO overflights), while over land or sea. If flights need to deviate from this path due to emergency landings or other unavoidable reasons, the new flight information will be immediately shared, as outlined by Shell Health, Safety, Security and Environment requirements, with Com Centers so area subsistence users can be notified.
- Regular overflight surveys and support vessel surveys for marine mammals will be conducted to further monitor prospect areas and identify areas currently being used for subsistence activities to avoid potential conflicts with users.
- To minimize impacts on marine mammals and subsistence hunting activities, the drillship and support vessels traversing north through the Bering Strait will transit through the Chukchi Sea along a route that lies offshore of the polynya zone. In the event the transit outside of the polynya zone results in Shell having to break ice, as opposed to managing ice by pushing it out of the way, the drilling vessel and support vessels will move into the polynya zone far enough so that ice breaking is not necessary. If it is necessary for any vessel to move into the polynya zone, Shell will notify the local communities of the change in the transit route through the Com Centers.

PHASE II

All guidelines in Phase I will be adhered to in addition to the following:

- If potential conflicts are identified between Shell activities and subsistence activities; the Com Center Action Plan will be used to manage the issue.
- Shell will continue with engagements and regular communications with the AEW, AWC, ANC, ABWC, ISC, and the WCAs of Barrow, Wainwright, Point Lay and Point Hope once transiting of vessels begins through Chukchi Sea, during drilling activities, and during mobilization from the Chukchi Sea.