Appendix E

Application for U.S. Fish & Wildlife Service

Letter of Authorization

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

May 2011

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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)
Discoverer	Motor Vessel *Noble Discoverer*
drilling program	Chukchi Sea Exploration Drilling Program
EA	Environmental Assessment
EC	Eurocopter
EP	Exploration Plan
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
Fennica	Motor Vessel *Fennica*
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 *Tor Viking*
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 it's 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	[1]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"

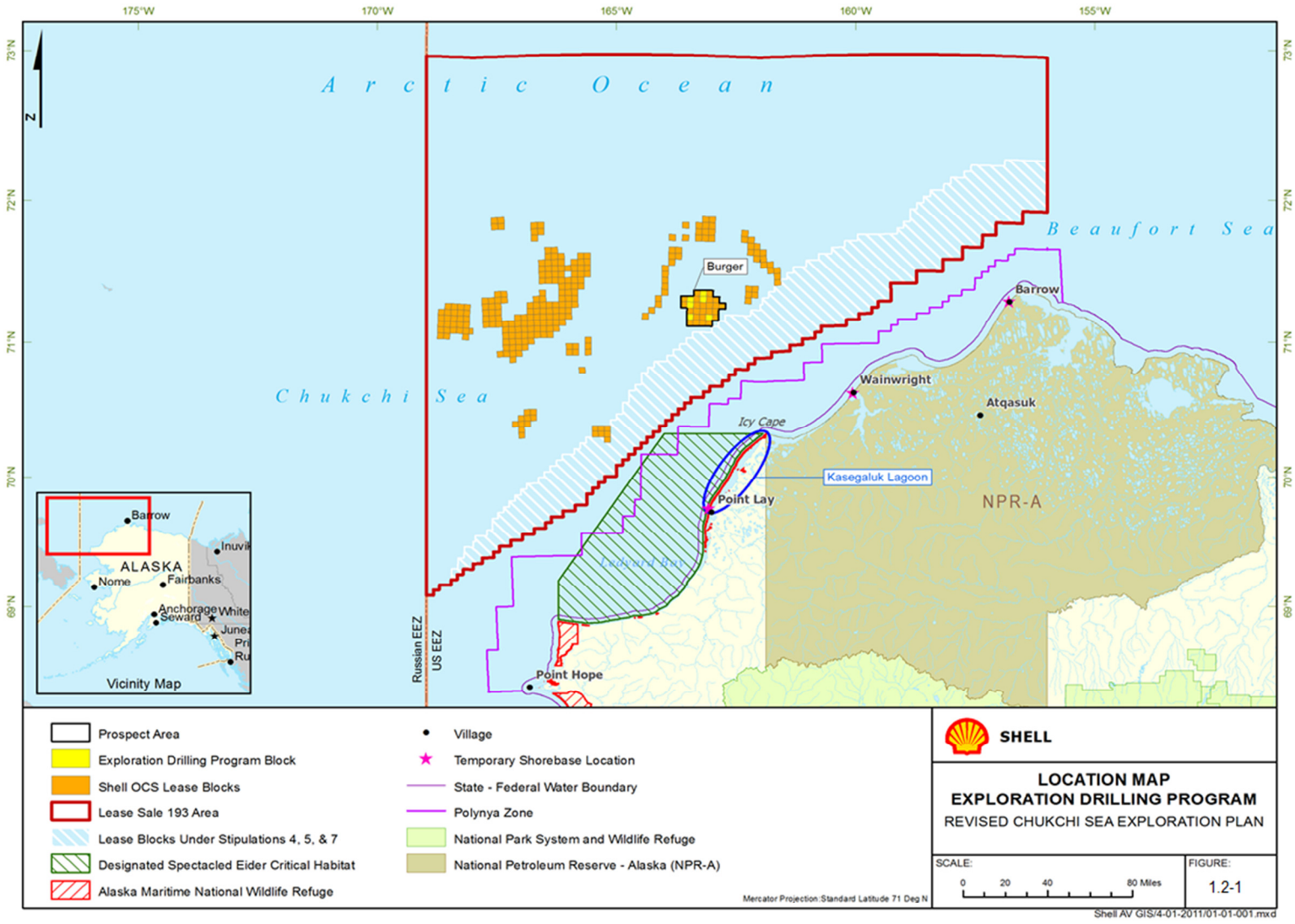
This plan also contemplates a situation where a well that is started must be temporarily suspended due to ice, weather, or other conditions, and finished at a later date. Any well on which exploration drilling is suspended will be secured in compliance with BOEMRE regulations and with the approval of 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 116 m	275 ft 83.7 m	280 ft 85.3 m	280 ft 85.3 m
Width	85 ft 26 m	59 ft 18.0 m	60 ft 18.3 m	60 ft 18.3 m
Draft	27 ft 8.4 m	20 ft 6.0 m	15.9 ft 4.9 m	19 ft 5.8 m
Accommodations	82 berths	23 berths	37 berths	29 berths
Maximum Speed	16 knots 30 km/hr	16 knots 30 km/hr	13 knots 24 km/hr	13 knots 24 km/hr
Fuel Storage	11,070 bbl 1,760 m^3	7,484 bbl 1,190 m^3	6,233 bbl 991 m^3	7,217 bbl 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	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

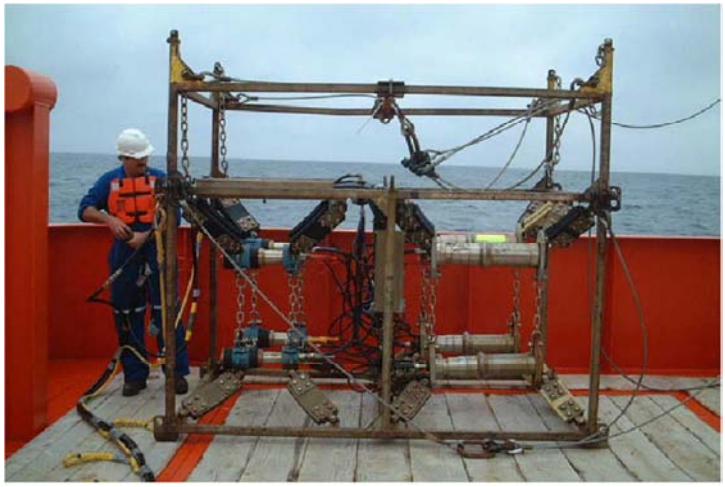
Aircraft	Flight Frequency
Sikorsky S-92 or Eurocopter EC225 - crew rotation	Approximately 12 round trips/week between land and offshore vessels throughout the 2012 drilling season
Sikorsky S-61, S-92 or Eurocopter EC225 helicopter – SAR	Trips made only in emergency; one training flight/month
Saab 340-B 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



Photograph of the ITAGA 8-airgun Array in Sled

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.

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.

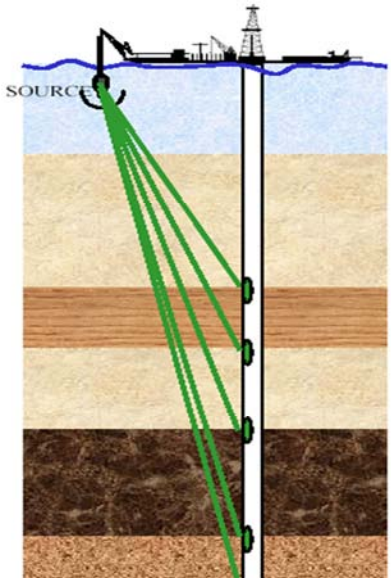


Figure 1.2-2 Schematic of ZVSP

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.

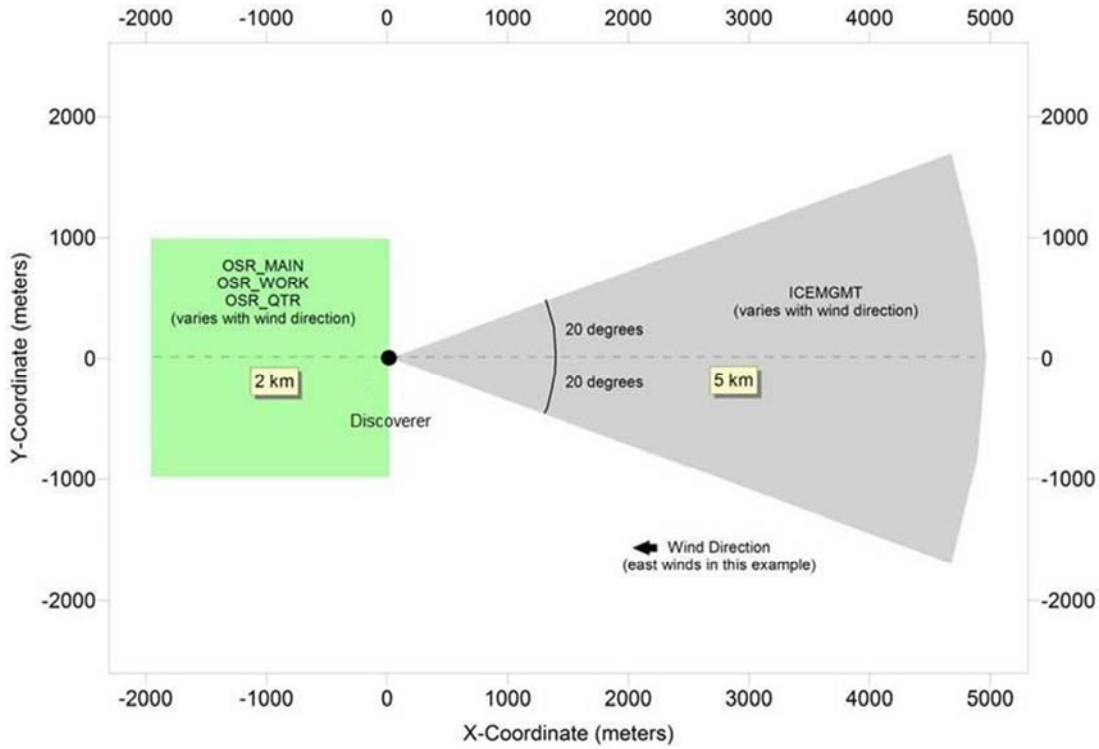
Drift ice will be actively managed by ice management vessels, consisting of an ice management vessel and an anchor handling vessel. Ice management for safe operation of Shell's planned exploration drilling program will occur far out in the OCS, remote from the vicinities of any routine marine vessel 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^{o} 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 m^3), 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 m^3)

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/altered/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 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 measure 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 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 sited 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 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 revise 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

ADF&G (Alaska Department of Fish and Game). 2008a. *Wildlife Notebook Series*, accessed February 2008. http://www.adfg.state.ak.us/pubs/notebook/marine/ .

ADF&G. 2008b. *Wildlife Notebook Series*, accessed February 2008. http://www.adfg.state.ak.us/pubs/notebook/marine/walrus.php .

Fischbach, A., S. Amstrup, and D. Douglas. 2007. Landward shift of Alaskan polar bear denning associated with recent sea ice changes. Polar Biol. 30:1395-1405.

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Attachment A
Ice Management Plan

(Refer to Appendix K of the Chukchi Sea EP)

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

(Refer to Appendix D of the Chukchi Sea EP)

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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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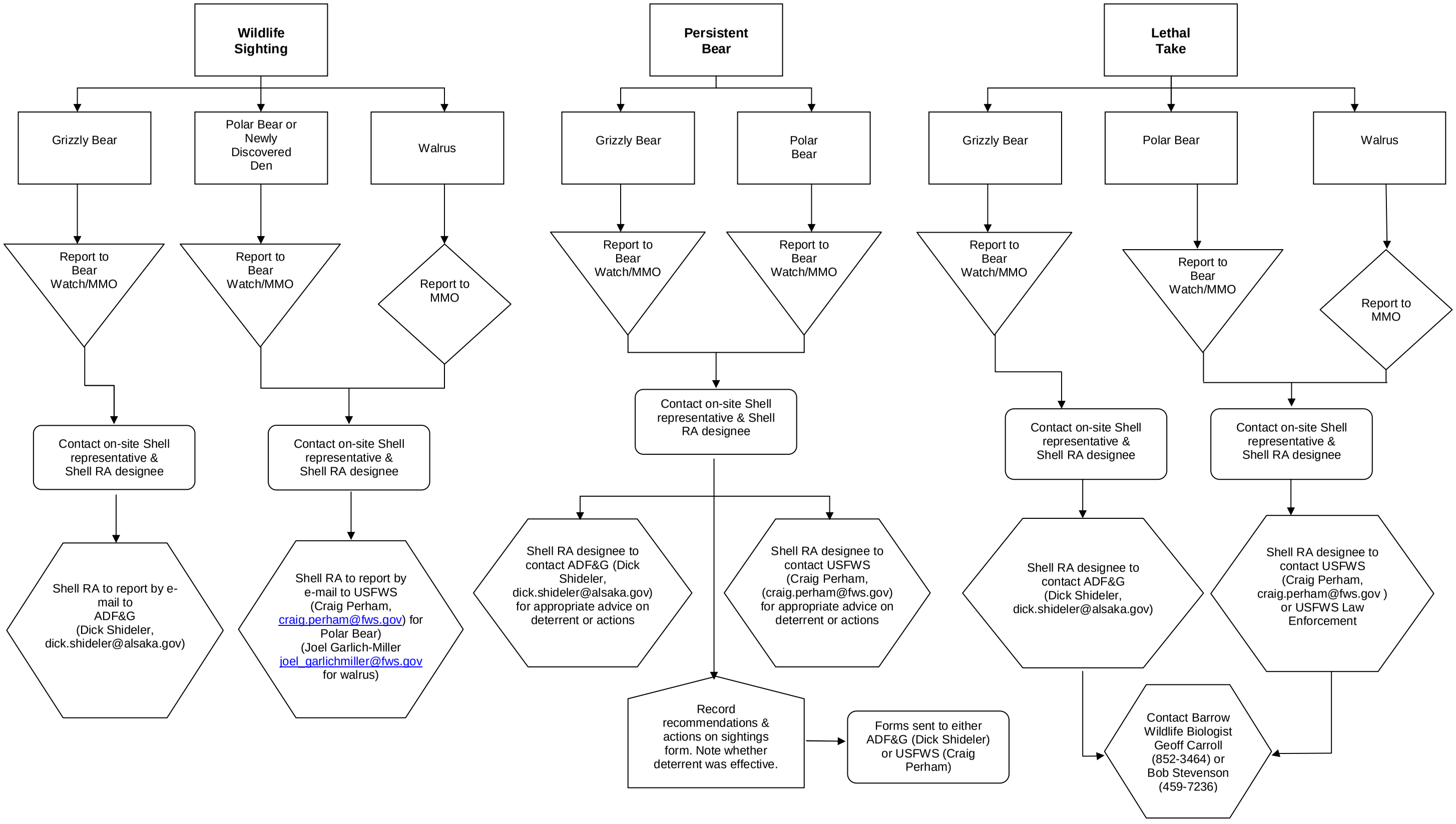
WILDLIFE NOTIFICATION FLOW CHART



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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: _____ ºF ☐ 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

(Refer to Appendix H of the Chukchi Sea EP)

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