

## **Section 4**

# **Mitigation Measures**

## 4. MITIGATION MEASURES

This section describes the mitigation measures considered in the design of the proposed Liberty (SDI) Project. Tables 4-1 and 4-2 summarize mitigation actions and expected benefits at the design, construction, and operation phases.

In 2005, BPXA proposed to develop the Liberty Project using uERD from a newly constructed pad on the shore of Foggy Island Bay. This reduced the potential environmental impacts to the Boulder Patch, marine mammals, and addressed concerns of Inupiat residents of the North Slope related to bowhead whale and subsistence whaling.

In August 2006, BPXA proposed to develop the project at the Endicott Satellite Drilling Island (SDI). This decision further mitigated potential impacts by taking advantage of existing infrastructure at the SDI and on the Endicott Main Production Island (MPI). Because this option eliminates the need for construction of a new pad on the shore of Foggy Island Bay and associated roads and pipelines through undeveloped lands, anticipated impacts to wetlands were reduced.

### 4.1 MITIGATION OF IMPACTS COMMON TO THE CONSTRUCTION AND OPERATIONS PHASES

Mitigation common to both the construction and operation phases are:

- Oil spills
- Personnel training
- Compliance with Lease Sales 124 and 144 stipulations
- Preventing wildlife access to human food and garbage

#### 4.1.1 Oil Spills

The proposed action will mitigate the effects of oil spills during the operation of the Liberty (SDI) Project, compared to the project originally analyzed in the 2003 Liberty FEIS (USDOI, MMS, 2003). For example, the offshore pipeline has been eliminated and use of the present infrastructure is maximized.

No new oil or three-phase flow pipelines are required for the Liberty (SDI) Project. Two new pipelines will be constructed to support the Liberty (SDI) Project: a 10-in diameter *LoSal*<sup>™</sup> water injection pipeline and 6-inch gas pipeline routed along the inter-island causeway from the MPI to the SDI. These pipelines will be on new vertical support members on the lagoon side of the causeway. Production from the Liberty (SDI) Project wells will be transported from the SDI to the MPI for processing via the existing 28-inch flowline which is constructed of corrosion resistant alloy (CRA). The existing 16-in-diameter Endicott sales oil line will be used to export Liberty oil to Pump Station 1 of TAPS. This line has isolation valves installed at both sides of

the causeway bridges. The pipeline is monitored for leaks using the industry-standard mass-balance line-pack compensation system and is pigged according to DOT requirements.

The proposed Liberty (SDI) Project will incorporate other design measures to assure that the potential for spills and leaks has been minimized to the extent practicable. These features include lined, bermed areas for storage tanks, discharge detection technology, tank overflow-protection technology, well control design, and pad design and grading. Major quantities of diesel fuel are not anticipated to be stored on the SDI because the drilling rig will be fueled by natural gas.

Liberty (SDI) Project planning includes oil spill prevention measures, as well as spill response preparedness. BPXA will submit an application to the Alaska Department of Environmental Conservation to amend the *Endicott and Badami Oil Discharge Prevention and Contingency Plan* to cover the operations of the Liberty (SDI) Project at the Endicott facility, as allowed by 30 CFR 254.3. The facilities are in close proximity and share similar trajectory, sensitive resource, and response logistic elements. Following State approval, the amended plan will be submitted to MMS for its approval. MMS spill response planning regulations (30 CFR 254.53) provide for submitting a response plan developed under State requirements for facilities within 3 mi of the natural shoreline.

Per MMS regulation 30 CFR 254.5(b), Oil Spill Response Plans (OSRPs) submitted to meet response planning requirements must be consistent with National Contingency Plan and appropriate Area Contingency Plans. In Alaska, OSRPs must be consistent with The Alaska Federal and State Preparedness Plan for Response to Oil and Hazardous Substance Discharges and Releases (Unified Plan) and the appropriate Subarea Contingency Plan. For activities occurring in the Beaufort Sea, the appropriate subarea plan is the North Slope Subarea Contingency Plan. As the Unified Plan and the North Slope Subarea Contingency Plan are updated, it is incumbent upon the operators to review their OSRPs to ensure that their response activities and operations remain consistent with the provisions of these plans.

A required component of an OSRP is to identify sensitive areas along the coastline that could be impacted by an oil spill, and evaluate if the sites can be protected from the oil's impact by deploying protective booming or other spill response methods. The North Slope Subarea Contingency Plan Sensitive Areas section is undergoing a review to identify priority protection sites from Brownlow Point to the Canadian border and from Cape Halkett to the Chukchi Sea. The impetus for this update to the east is Shell Offshore Inc.'s planned exploration activities occurring in 2007 and to the west expanding exploration and development in the National Petroleum Reserve-Alaska (NPR-A).

An initial meeting of the Sensitive Areas Workgroup (SAW) was held on May 10, 2007, in Fairbanks, Alaska, to review the coastline and identify areas of critical concern for the eastern segment of the North Slope. A similar meeting was held on June 14, 2007, to identify sites located west of Prudhoe Bay. Following the identification of those sites representatives from Alaska Clean Seas (ACS), the FWS, North Slope Borough, and Spilltek conducted aerial surveys of the coastline to evaluate the selected sites to determine if protective measures are possible and what equipment and personnel requirements would be necessary to implement response tactics. The survey of the eastern sites occurred in early July 2007; and the western sites in August 2007.

The sites identified as polar bear aggregation areas (Barrow, Cross Island, Barter Island, and Flaxman Island) have been identified as such and will be included in the next update of the ACS Technical Manual Atlas, which is incorporated into the North Slope Subarea Contingency Plan. All new sites identified during the July and August 2007 surveys conducted from the Canadian border to Flaxman Island and NPR-A west to the Chukchi Sea will be presented to the Alaska

Region Response Team Sensitive Areas Workgroup for review and approval on November 14, 2007. Once approved, the manual will be updated to incorporate all the changes.

For activities conducted on the OCS, operators are required to review their entire plans biennially to determine if their plans require changes to meet new requirements or reflect changes in their operations. For activities located on State of Alaska submerged lands, plans must be resubmitted for approval every 5 years in accordance with ADEC regulations. If there are major changes that negatively impact the operator's ability to respond to a spill, the operator is required to notify the MMS within 15 days of the change so that MMS may evaluate the operator's response capabilities and determine what actions may be required by the operator until response capabilities are reestablished.

#### **4.1.2 Personnel Training**

BPXA has developed health, safety, and environmental (HSE) and technical training programs that should address the requirements of 30 CFR Subpart B, Stipulation No. 3 (Orientation Program of Lease Sale 144), and Stipulation No. 2 (Protection of Biological Resources) of Lease Sale 124. Those stipulations are focused on projects located in the OCS. BPXA will evaluate its existing training programs with respect to these MMS requirements and the specific circumstances of an Endicott-based development prior to initiating construction and drilling operations, and consult with the MMS to assure the programs comply with MMS requirements.

General topical areas in BPXA's HSE and technical training programs that Liberty personnel will have to take as applicable to their job include the following:

- uERD drilling
- Well control
- Permit and regulatory compliance
- Pollution prevention and spill reporting
- Biological resource protection and wildlife interaction (e.g., polar and grizzly bears)
- Safety and health

#### **4.1.3 Compliance with Lease Sale 124 and 144 Stipulations**

NOTE: There were seven Lease stipulations applied to leases in Sale 144. The same seven stipulations with two additional stipulations were applied to Sale 124 leases. The two additional stipulations are now incorporated by the following laws/regulations:

- **Protection of Archaeological Resources.** This stipulation is addressed through the National Historic Preservation Act (NHPA), Section 106 consultation with the Alaska State Historic Preservation Officer (SHPO). Documentation for this consultation can be found at Appendix F.
- **Oil Spill Response Preparedness.** This stipulation is now addressed in the 30 CFR 254 regulations.

For the purposes of this EA, the numbering sequence of Lease Sale 144 will be used, and the additional two stipulations from Lease Sale 124 are not included, because they are addressed through laws/regulations.

#### **4.1.3.1 Stipulation No. 1, Protection of Biological Resources**

##### **Stipulation Summary**

The Regional Supervisor, Field Operations (RS/FO) may require the lessee to conduct biological surveys needed to determine the extent and composition of biological populations and habitats requiring additional protection. As a result of these surveys, the RS/FO may require the lessee to relocate the site of operations, modify the operation and/or establish that operations will not have adverse effects, or ensure that special biological resources do not exist. In addition, the lessee is required to report any area of biological significance discovered during the conduct of any operations on the lease, and make every effort to preserve and protect the biological resource from damage until the RS/FO provides direction with respect to resource protection.

##### **Planned BPXA Compliance**

The proposed project is located near the Stefansson Sound Boulder Patch, a special biological resource. Selection of the SDI pad location rather than an offshore island in Foggy Island Bay avoids impacts to Boulder Patch habitats.

The MMS has identified aggregations of polar bears at coastal bone piles as sensitive resources that must be protected in the event of an oil spill.

#### **4.1.3.2 Stipulation No. 2, Orientation Program**

##### **Stipulation Summary**

The lessee must develop a proposed orientation program for all personnel involved in the Liberty (SDI) Project. The program must address environmental, social, and cultural concerns that relate to the area, including the importance of not disturbing archaeological and biological resources and habitats. The program will include 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 the personnel to community values, customs, and lifestyles in areas in which such personnel will be operating. The orientation program also shall include information concerning avoidance of conflicts with subsistence, commercial fishing activities, and pertinent mitigation. The program shall be attended at least once a year by all personnel involved in onsite exploration or development and production activities. 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.

##### **Planned BPXA Compliance**

BPXA requires all North Slope field contractors complete an 8-hour “unescorted” training program provided by the North Slope Training Cooperative. All attendees receive a Field Environmental Handbook, an Alaska Safety Handbook, and a North Slope Visitor’s Guide. The unescorted training includes review of the Alaska Safety Handbook, personal protective equipment, camps and safety orientation, hazard communications, HAZWOPER Level 1, Environmental Excellence, and cultural awareness modules.

The program includes an explanation of the applicable laws protecting cultural and historic resources, and stresses the importance of not disturbing archeological, cultural and historic resources, and biological resources and habitats while providing guidance on how to avoid disturbance. For example, the goal of BPXA’s Polar Bear Interaction Plan for the Operating

Units is to ensure that bears that encounter industry activity are detected quickly and responded to appropriately through monitoring, avoidance, or active deterrence by appropriate personnel.

Federal Occupational Safety and Health Administration (OSHA) regulations and guidance provide training standards for individual positions. Training for individual positions vary with the activities performed. Individual training may include an electrical safety program; emergency preparedness and action plans; hazards communication program; HAZWOPER (Levels 3-5); lockout/tagout procedures for control of hazardous energy; emergency shut down systems; cranes, chain hose, and sling/rope inspection program; drilling and workover operations; machinery guarding; tank/vessel cleaning procedures; confined space entry program; first aid material and training; eye and face protection; hearing conservation program; personnel protective equipment; respiratory protection program; safety and environmental meetings.

As discussed in Section 4.1.10, BPXA will evaluate its existing training programs with respect to MMS requirements and the specific circumstances of an Endicott-based development.

#### ***4.1.3.3 Stipulation No. 3, Transportation of Hydrocarbons***

##### **Stipulation Summary**

Pipelines are the preferred transportation mode for production.

##### **Planned BPXA Compliance**

BPXA plans to use existing Endicott flowlines and the existing Endicott sales oil pipeline to transport Liberty production.

#### ***4.1.3.4 Stipulation No. 4, Industry Site-Specific Bowhead Whale Monitoring Program***

##### **Stipulation Summary**

A monitoring program is required for exploratory operations conducted during the bowhead whale migration.

##### **Planned BPXA Compliance**

Not applicable to this proposed development and production project.

#### ***4.1.3.5 Stipulation No. 5, Subsistence Whaling and Other Subsistence Activities***

##### **Stipulation Summary**

The lessee must conduct operations in a manner that prevents unreasonable conflicts between industry activities and subsistence activities. Prior to submitting a DPP, the lessee shall consult with the potentially-affected communities and the Alaska Eskimo Whaling Commission to discuss potential conflicts with the siting, timing, and methods of proposed operations and safeguards or mitigation measures which could be implemented to prevent unreasonable conflicts. The lessee shall make every reasonable effort to assure that development and production activities are compatible with whaling and other subsistence hunting activities and will not result in unreasonable interference with subsistence harvests.

A discussion of resolutions reached during this consultation process and any unresolved conflicts shall be included in the DPP. In particular, the lessee shall show in the plan how

mobilization of the drilling unit and crew and supply boat routes will be scheduled and located to minimize conflict with subsistence activities. Those involved in the consultation shall be identified in the plan. The lessee shall notify the RS/FO of all concerns expressed by subsistence hunters during the operations and of steps taken to address such concerns.

#### **Planned BPXA Compliance**

Fall bowhead whaling is conducted by Nuiqsut whalers from Cross Island located about 10 mi northwest of Endicott. As discussed elsewhere, major marine support activities are not envisioned for the Liberty (SDI) Project at this time. Currently, there will be one sealift for the *LoSal*<sup>TM</sup> plant to the Endicott MPI (BPXA is also considering the option of sealifting the drill rig to the SDI, but the base case involves road transport of modules from southern Alaska). Refer to Section 4.2.9 of this EA for a description of proposed sealift mitigation. Typically sealifts occur prior to September and fall subsistence whaling depending upon ice and weather conditions. Should the sealift be delayed into the subsistence whaling season, then that activity would be coordinated with the AEWG and with Barrow and Nuiqsut Whalers' Associations through a Conflict Avoidance Agreement or other communications mechanisms. BPXA has also consulted with a number of North Slope organizations including the AEWG about the project during the pre-application phase process. These consultations will continue through other phases of the project.

#### ***4.1.3.6 Stipulation No. 6, Agreement Between the United States of America and the State of Alaska***

##### **Stipulation Summary**

An advisory regarding the terms of the subject agreement.

##### **Planned BPXA Compliance**

No compliance activity required.

#### ***4.1.3.7 Stipulation No. 7, Agreement Regarding Unitization***

##### **Stipulation Summary**

An advisory regarding the terms of an agreement between the United States of America and the State of Alaska.

##### **Planned BPXA Compliance**

No compliance activity required.

#### **4.1.4 Preventing Wildlife Access to Human-use Food and Garbage**

Compliance with regulations governing waste management and feeding of wildlife will reduce the potential for increasing populations of bird predators within the oilfields such as foxes, bears, glaucous gulls, and common ravens, which can dramatically decrease nesting-bird production. Segregation of food waste and disposal in animal-proof containers will reduce wildlife access to human food and garbage. According to BPXA's North Slope Wildlife Avoidance and Interaction Plan, feeding wildlife (regardless of species) is prohibited both by the

State of Alaska (5 AAC 92.230) and BPXA policy. According to BPXA's Polar Bear Interaction Plan for the Operating Units:

...the majority of dumpsters approved for food waste disposal in the oil fields are now bear-proof. Food wastes should not be deposited in any of the remaining non-bear proof dumpsters. All garbage that contains food should be bagged before being deposited into animal-proof dumpsters. The dumpsters are owned by the North Slope Borough or contractors and are replaced periodically. The dumpsters are generally in high visibility and high traffic areas. All personnel are instructed to check the area for wildlife before exiting a building to deposit garbage in the dumpsters. Animal activity (including grizzly bears, foxes and gulls) near the dumpsters should be monitored, and if problems arise, corrective measures taken. Environmental Advisors on the Slope should be notified of any open or deformed dumpsters. Garbage and other food-related waste should not be left in trucks (either on the flatbed or inside the vehicle). Personnel should avoid carrying garbage or food around with them as these items may attract bears. Each unit will comply with their existing waste management procedures, available from the Environmental field and technical staff of each unit.

## **4.2 CONSTRUCTION PHASE - MITIGATION**

To minimize environmental impacts, all major construction involving offshore and on-tundra activities will take place during winter, including the bridge upgrade, expansion of the SDI and gravel mining at the Duck Island mine site.

### **4.2.1 Cultural Resources**

Gravel for the project would be obtained from a new site in the Sagavanirktok River floodplain, adjacent to the existing Duck Island mine site. Prior to any gravel mining activities on previously unsurveyed locations, BPXA will conduct archeological and cultural resource surveys to assure that any sites are avoided and/or resources protected. BPXA has contracted the archaeological and cultural surveys to Reanier & Associates, Inc. in the area of the proposed Liberty (SDI) Project in support of the development of the Liberty Prospect. The area will be identified on maps provided by BPXA. Deliverables include the following: review the scope area of the proposed work; field surveillance of identified area; provide field observation report; provide final Archeological and Cultural Resources Reconnaissance report. Copies of the final report are submitted to BPXA, MMS, Alaska SHPO and the NSB Inupiat History Language and Culture Commission. The field work was conducted July - August 2007, with a final report scheduled for completion by the end of 2007.

A contract archeologist meeting the Secretary of the Interior's professional standards will be employed to perform these archeological and cultural resource surveys. If cultural resources not identified during archeological surveys are discovered during construction, work will be halted and the State Historic Preservation Officer will be contacted. In addition, U.S. Army Corps of Engineers, MMS cultural resource personnel, and the NSB Inupiat History, Language, and Culture Commission will be consulted. A decision will be made, following these discussions, to avoid, protect, or remove the resource, using appropriate scientific and culturally-sensitive techniques.



## **Ice Roads**

Ice roads will be used for temporary gravel haul from the mine site to the SDI and inter-island (MPI to SDI) pipeline construction. Ice roads will be located within the nearshore areas and offshore to the island. Onshore ice roads for pipeline construction can be breached at river and stream crossings if necessary prior to breakup, and all ice roads will melt during breakup.

### **4.2.2 Boulder Patch Communities**

The only potential impacts to Boulder Patch communities would come from excessive propeller downwash from barge and tug traffic that could disturb epilithic fauna and kelp of the Boulder Patch (see Section 3.1.5). BPXA currently plans a sealift directly to the Endicott MPI and will route any barge traffic to avoid the Boulder Patch community, particularly the research sites such as Dive Site 11 (Dunton, 2005), thus eliminating the potential for physical and scientific loss.

### **4.2.3 Fish and Essential Fish Habitat**

The NMFS (refer to Appendix E for NMFS correspondence) determined that construction and operation of the proposed project would not adversely affect EFH and anadromous fish if the following necessary conservation measures are followed:

- The applicant should use vegetated swales and/or an oil/water separator (or equivalent system) that remove total suspended solids (TSS) and oil and grease from the parking lot maintenance and monitoring plans for this system.
- Work on the new Sagavanirktok River bridge should follow timing window restrictions to the best extent practicable. Timing window [avoidance period due to spawning] for the Sagavanirktok River August 15 to September 15.

#### **4.2.3.1 Gravel Mining**

Once mining operations are completed, the mine site will be rehabilitated according to the agency-approved mining and rehabilitation plan (Attachment D to the April 2007 DPP, and Appendix I of this EA). Mitigation to overwintering fish habitat is accomplished by mining outside the active floodplain and routing the ice road (based on bathymetric surveys and field reconnaissance of the area) using the existing river channel (avoiding overwintering fish habitat).

#### **4.2.3.2 Ice Roads**

A 3-mi-long ice road that would run parallel to the lagoon side of the inter-island causeway may be located near potential fish overwintering habitat (see Section 3.2.3). However, it is expected that the ice road would be limited for the most part to the grounded-ice area along the southwest shore of the causeway and as close to the gravel beach. As a result, possible damage to any potential fish overwintering habitat should be avoided.

#### **4.2.3.3 West Sagavanirktok River Bridge Work**

At least two deep-water holes are located at the existing West Sagavanirktok River Bridge and pipeline crossing (see Section 3.2.3). These areas have been well documented as overwintering sites for a number of freshwater and anadromous species and may be a spawning area for broad whitefish. The project will make all attempts to minimize impacts to these areas during upgrade of the bridge superstructure.

Information defining the overwintering holes is from the late 1990s. The river is a dynamic system and some of the holes may have changed location. BPXA will conduct open-water surveys during the summer of 2007 and refine the bathymetry of the bridge area. Particular attention will be given to deep holes that could provide overwintering habitat for fish. The ADNR Office of Habitat Management and Permitting and the U.S. Army Corps of Engineers will be the permitting agencies for the West Sagavanirktok River bridge upgrade.

#### **4.2.4 Marine Mammals**

The overall impact on marine mammals from the Liberty (SDI) Project construction activities during winter is unlikely to be major. Conducting construction activities during the winter when beluga whales (and Pacific walrus) are absent will eliminate potential disturbances from those activities.

Marine mammals are unlikely to be seriously impacted by summer erosion because BPXA plans to install sheetpile slope protection on the north and east sides of the SDI which are the side most prone to erosion. Installation of the sheet pile wall is planned to be concurrent with the winter gravel placement thus minimizing erosion.

#### **4.2.5 Marine and Coastal Birds**

The abundance and distribution of bird predators would be reduced by designing facilities in a way that eliminates any new bird nesting, or fox denning sites.

Per the FWS Final BO, BPXA has committed search Liberty (SDI) Project structures for raven-nesting activities from March 1 through June 30 each year. Monitoring would take place every 4 days and, if nesting materials are found, they will be removed and disposed of to prevent their reuse by ravens. An annual report summarizing monitoring efforts will be provided to the FWS by BPXA through MMS before December 31 each year.

Other components of the Liberty (SDI) Project may afford foxes new denning sites. For example, the currently proposed mine rehabilitation plan includes retention of portions of an elevated earthen berm and the stockpiles of organic overburden, which could become a site of future new fox dens. Per the FWS Final BO, BPXA intends to monitor the berm and stockpiles weekly from April 15 through June 15. If denning activities are observed, the ADF&G and FWS will be contacted to develop a plan to prevent further activity. An annual report summarizing monitoring efforts will be provided to the FWS by BPXA through MMS before December 31 each year.

Obstruction of brood movements due to increased traffic on roadways will be mitigated by reducing traffic speeds along the Endicott Road during broodrearing. BPXA informed FWS that speed limits on the Endicott road system are reduced from 45 mph to 35 mph between July 1 and August 15. These actions will enhance road crossing.

Per the FWS Final BO, BPXA proposes to minimize the use of *Arctophila* ponds for ice road water sources. The *Arctophila* ponds are a habitat type favored by listed eiders but also are used by marine and coastal birds.

#### **4.2.6 Terrestrial Mammals**

Identification of active grizzly bear dens and arctic fox den structures prior to winter construction activities will allow avoidance of these structures and will minimize injury or disturbance to hibernating grizzly bears and destruction of existing fox den sites.

Construction during winter will reduce disturbance to caribou and muskoxen, which generally are not on the Arctic Coastal Plain in the project vicinity during winter. However, while most major gravel placement occurs during winter, summer activities associated with smoothing, grading, and installing other facilities on the expanded SDI have the potential to disturb terrestrial mammals.

Obstruction of caribou movements and collision mortality due to increased traffic on the Endicott Road will be mitigated by reducing traffic speeds along the road during the summer insect season, when the caribou may be present in large numbers. These actions also would enhance road-crossing success by the animals.

#### **4.2.7 Wetlands and Vegetation**

The selected mine site is in a portion of the Sagavanirktok River floodplain. After mine site closure, the mine will be rehabilitated according to the mine site rehabilitation plan (Appendix D of the April 2007 DPP, and Appendix I of this EA). Wetlands and vegetation impacts will be mitigated due to activities occurring in the winter versus summer, use of ice pads to stage equipment and overburden, and locating the excavation as closely as practicable to the existing road system.

An ice road will be used to transport gravel from the mine site to the SDI. As discussed in Section 3.2.7, tussock-type tundra and areas with elevated microsites or irregular topography are more susceptible to damage from ice roads than are wetter meadow-type communities. To the extent possible, surveying the ice-road route to avoid potentially higher risk areas and routing along the Sagavanirktok River channel to the maximum extent feasible will minimize the impact from construction activities.

Increased traffic along the Endicott Road to support construction activities will generate additional road dust. The reduced speed limit along the Endicott Road (from 45 mph to 35 mph between July 1 and August 15) will moderate the amount of dust generated. This, in addition to the current road-watering program, should provide some relief to adjacent vegetation from the effects of dust fallout.

#### **4.2.8 Threatened and Endangered Species**

##### **Bowhead Whales**

Construction activities are unlikely to have any major effect on bowhead whales. The construction activity with the greatest potential to impact bowhead whales is the proposed sealift to the Endicott MPI. Scheduling of the sealift to be completed prior to August 31 should mitigate possible deflection of the bowhead whale migration. Most whales migrate offshore of the SDI and outside of the barrier islands passing by during September. Per the informal consultation dated October 19, 2007 (refer to Appendix D of this EA), NMFS stated the following mitigation factors:

- The project would be sited to provide a natural barrier to sound transmission into normal bowhead whale habitat.
- Drilling muds, cuttings, and produced waters would not be discharged into the Beaufort Sea but reinjected into the underlying formations.
- Mitigation is already designed into the project in the site selection and usage of pre-existing facilities.

Based on these factors, the NMFS stated "...while the Liberty project may affect these whales, our assessment...finds any such effects are insignificant (such effects could not be meaningfully measured or detected) or discountable (such effects would not reasonably be expected to occur)."

### **Polar Bears**

Potential impacts from ice roads on denning polar bears will be mitigated per FWS LOA condition #6, which prohibits activities within 1 mi of known polar bear dens. Preconstruction surveys (FLIR surveys) should determine den sites near the ice-road corridor.

Current North Slope waste-management practices incorporate methods to minimize attraction of wildlife to development. Continued implementation of these practices will help prevent interactions with polar bears that could potentially result in hazing or destruction of bears, or in injury to oil field workers.

### **ESA-protected Birds**

Many of the same activities that impact marine and coastal birds would affect ESA-protected species. Consequently, mitigation measures that reduce construction impacts to marine and coastal birds (Section 4.2.5) also would reduce adverse effects to ESA-protected species and are not repeated here (Refer to Appendix C of this EA).

Per the FWS Final BO, BPXA has committed to ensuring vessels do not enter the Ledyard Bay Critical Habitat Unit located in the Chukchi Sea, where large numbers of flightless spectacled eiders molt.

BPXA has stated they would evaluate the mine site and water source lakes (for ice road construction) for suitability as eider nesting habitat but does not indicate if that information would influence the design of the mine or use of these lakes. Lake studies and permitting are required by the State of Alaska to estimate the volume of water that can be withdrawn without causing adverse effects. Per the FWS Final BO, BPXA proposes to minimize the use of *Arctophila* ponds, a habitat type favored by listed eiders. Given the limited number of years that ice roads will be constructed, the recharge by spring melt, and the avoidance of preferred habitat types, adverse effect to listed eiders are not anticipated to result from water withdrawal activities.

### **4.2.9 Subsistence and Area Use Patterns**

Per correspondence received from BPXA on July 17, 2007, the following sea lift mitigation was provided to MMS:

The logistical base case for the Liberty Development Project is for transportation to the North Slope of Alaska via truckable modules. Presently, a sealift is only anticipated to support the would be the *LoSal*<sup>TM</sup> process plant and other equipment to the Endicott main production island (MPI), which is scheduled for summer 2012. The greatest potential for activity related to construction of the Liberty SDI option to impact bowhead whales would result from a sealift of the *LoSal*<sup>TM</sup> process plant and other equipment to the MPI.

Summer is defined here as the early portion of the open-water season from July through late-August. Bowhead whales are unlikely to occur in the project area prior to mid-August and summer sealift activities would be unlikely to affect bowhead whales. Small numbers of bowhead whales could be affected by the sealift activities should these activities extend beyond mid-August. Bowhead whales have been known to respond to vessel noise and activities, and the

sealift could have the potential to cause a temporary deflection of some bowhead whales at the southern edge of the migration corridor. Any deflection to migrating bowheads would occur while the sealift vessel was transiting the near shore waters of the Beaufort Sea. The potential deflection effects to bowhead whales could occur over several days.

The MMS has identified the following areas as sensitive to subsistence whaling activities within the Beaufort Sea:

- The area between 10 mi west of Point Barrow to Harrison Bay extending 35 miles seaward from the north coast of Alaska between September 1 and October 25 for whaling and whale migration and feeding activities, and
- The area between Prudhoe Bay and 40 mi east of Cross Island extending 25 mi north of Cross Island between September 5 and 20 for Nuiqsut whaling activities.

To the greatest extent possible, BPXA will plan all operations to avoid impacts to the bowhead migration and the annual bowhead hunt. Mitigation will, in all but exceptional cases, be achieved by scheduling sealift operations to avoid the migration timing and periods of the annual hunt. Typically, depending upon ice and weather conditions, sealifts in the central Beaufort Sea can be completed in August prior to the main migration of bowhead whale and subsistence whaling. Should the sealift be delayed for any reason, then BPXA would coordinate this activity with the Alaska Eskimo Whaling Commission (AEWC) and Barrow and Nuiqsut whaling Captains' Associations through a Conflict Avoidance Agreement (CAA) or other communication mechanisms. Consistent with safe navigation and ice conditions, the sealift may be routed inshore to avoid migrating bowhead whales and subsistence whaling.

BPXA currently enters into an annual CAA with the AEWC and Nuiqsut whaling Captains' Associations for Northstar open water activities. The annual CAA may be entered into jointly with other industrial (e.g., Shell, ConocoPhillips, etc) activities or separately by BPXA.

At such time that BPXA is aware that sealift activities will occur, BPXA shall:

- Consult with the NSB, AEWC and the Barrow and Nuiqsut whaling Captains' Associations. Typically, consultation is conducted via formal and informal meetings with the above identified entities. Consultation includes, but is not limited to, telephone, face-to-face meetings and written correspondence. Presentations are conducted for the full commission and attending whaling captains at the AEWC miniconvention and with whaling captains associations at the CAA postseason meetings.
- The year prior to sealift activities, BPXA works with the AEWC on a CAA reflecting upcoming open water activities. There are several mechanisms for formal consultation. These include the following: (1) open water activities presentation at the annual AEWC meeting, and (2) the annual "open water" meeting.

Additionally, BPXA monitors impacts in consultation with NMFS, the North Slope Borough, and other stakeholders. Over the past 6 years, BPXA has developed and implemented a study using directional hydrophone arrays to locate bowhead whales and related their locations to sound levels emanating from Northstar. BPXA has also completed a multiyear study of impacts to ringed seals.

The Liberty (SDI) Project area is not an area of high subsistence activities. Fall bowhead whaling is conducted by Nuiqsut whalers from Cross Island located about 10 mi northwest of Endicott. The Liberty (SDI) Project currently includes a single sealift in the 2012 open-water season of the *LoSal*<sup>TM</sup> plant and other equipment. As is typical for most sealifts to the central Beaufort Sea, this sealift is scheduled to be completed early in August prior to the main migration of the Bowhead whale and fall subsistence whaling depending upon weather and ice conditions.

Should the sealift be delayed into September for any reason, BPXA will coordinate this activity with the AEWG and Barrow and Nuiqsut Whaling Captains' Associations through a CAA or other communication mechanisms. Consistent with safe navigation and ice conditions, the sealift may be routed inshore to avoid migrating bowhead whales and subsistence whaling.

#### **4.2.10 Water Quality**

Turbidity will be minimized by conducting gravel-fill operations in the winter when nearshore circulation is more muted compared to the open-water season. Turbidity should be further reduced through the installation of the sheet pile wall on the north and east sides of the expanded SDI. Installation will be done concurrent with winter gravel placement. The potential for small equipment spills (oil, diesel fuel, and hydraulic fluid) will be mitigated through proper training and awareness of personnel. Best management practices will be followed for fuel handling, storage, and dispensing. The amendment to the *Endicott and Badami Oil Discharge Prevention and Contingency Plan* for the Liberty (SDI) Project will detail measures to be taken to reduce the possibilities of a spill reaching marine waters. Also, the drainage plan for the expanded SDI provides for internal drainage of stormwater and low points to reduce the possibility of spills entering marine waters.

### **4.3 OPERATIONS PHASE - MITIGATION**

#### **4.3.1 Benthic and Boulder Patch Communities**

The Boulder Patch will be largely isolated from the normal construction and operational activities of the Liberty (SDI) Project because of uERD technology, and also because barge traffic will be routed around the Boulder Patch to reduce turbulence (Section 3.1.5.1). Leak-detection systems and routine pipeline inspections (including pigging of the Endicott sales oil line) will reduce the likelihood of a major oil spill from existing pipelines that could reach nearshore benthic communities. Continuous and rigorous training of oil spill response teams increases the probability that any spill, should it occur, will be contained and damage to the coastal benthos minimized. Approved discharges (principally the brine reject from the *LoSal*<sup>TM</sup> EOR plant) into surrounding waters stemming from production activities will be monitored according to the requirements of the NPDES permit to ensure compliance with regulatory guidelines.

#### **4.3.2 Fish and Essential Fish Habitat**

The NMFS (refer to Appendix E for NMFS correspondence) determined that construction and operation of the proposed project would not adversely affect EFH and anadromous fish if the following necessary conservation measures are followed:

- The applicant should use vegetated swales and/or an oil/water separator (or equivalent system) that remove total suspended solids (TSS) and oil and grease from the parking lot maintenance and monitoring plans for this system.
- Work on the new Sagavanirktok River bridge should follow timing window restrictions to the best extent practicable. Timing window [avoidance period due to spawning] for the Sagavanirktok River August 15 to September 15.

Per an email from the U.S. Army Corps of Engineers, Alaska District, to MMS on October 22, 2007, it was stated that the Corps has placed the aforementioned conservation measures as a Special Condition of the 404 permit, and will monitor the permittee. If the permittee is found to

be in noncompliance, the Corps will suspend the permit, and the NMFS will be contacted regarding possible mitigation/corrective measures.

Fish protection measures are essentially the same as for benthic communities above; routine pipeline inspections will reduce the chance of a major oil spill from new or existing pipelines that could reach coastal or freshwater fish habitat. Continuous training by oil spill response teams increases the likelihood that any spills will be contained and potential damage to the fish habitat is minimized. Approved discharges (principally the brine reject from the *LoSal*<sup>TM</sup> EOR plant) into surrounding waters stemming from production activities will be monitored according to the requirements of the NPDES permit to ensure compliance with regulatory guidelines.

### **4.3.3 Marine Mammals**

The greatest potential impact on marine mammals from operations at Liberty (SDI) Project facilities would be the effects of a large oil spill. Preventative maintenance and monitoring of all operational aspects will be given the highest priority. Oil spill prevention is the greatest single measure that can be taken to prevent major consequences for all marine mammals in the area. The existing *Endicott and Badami Oil Discharge Prevention and Contingency Plan* is currently under revision to include the Liberty (SDI) Project and is scheduled for submittal to ADEC in December 2007. Refer to Appendix B for the existing ODPCP, which is marked as DRAFT, because it is currently under revision.

### **4.3.4 Marine and Coastal Birds**

Refer to Section 4.2.8 of this EA (ESA-protected Birds).

### **4.3.5 Terrestrial Mammals**

Use of existing infrastructure, such as the Endicott SDI, MPI, and the Endicott Road, mitigates habitat loss from the construction of new facilities, such as production pads, access roads, and pipelines. Should culverts be required for the Liberty (SDI) Project (e.g., for the mine site access road), foxes creating dens in culverts and other structures will be discouraged by inspection and removal of the dens. In addition, the structures and culverts will be designed to discourage these activities (i.e., use of screens, fences, or construction materials that are unattractive to the animals).

Compliance with regulations governing waste management and feeding of wildlife will assist with preventing skewed distributions of predator species such as arctic fox, red fox, and grizzly bears. To reduce attraction, food waste will be segregated and disposed of in animal-proof containers. See Section 4.1.4 for further details.

Biological resource protection and wildlife interaction plans inform project personnel of the importance of wildlife and resource protection, reduce potential for harassment of wildlife, and illustrate how personnel actions have a potential to negatively affect terrestrial mammal resources. Restriction of on-tundra activities during spring and summer reduces the potential disturbance to terrestrial mammals.

Environmental and safety training programs assist in preventing fuel spills, vehicle collision mortalities, and other avoidable effects to terrestrial mammals and their habitats, and ensure compliance with permit requirements.

### **4.3.6 Wetlands and Vegetation**

Operational impacts associated with the SDI expansion would have minimal direct impact to wetlands and vegetation. The primary risk would be associated with a large oil spill. Prevention, responsible monitoring, and a reliable response plan are all critical to mitigating damage to wetlands and vegetation.

### **4.3.7 Threatened and Endangered Species**

#### **4.3.7.1 Bowhead Whales**

The greatest potential impact on bowhead whales from operations at Liberty (SDI) Project facilities is from a large oil spill or a large fuel spill related to sealift operations. Preventive maintenance and monitoring of all operational aspects will be given the highest of priority to minimize the chance of an oil spill. Oil spill prevention is the greatest single measure that can be taken to prevent major consequences for bowhead whales.

Adequate preparation for oil spill response on terrestrial, delta, and offshore habitats requires that a variety of properly maintained equipment and supplies be available and accessible, and that response personnel have proper training. Implementation of the response strategies detailed in the existing *Endicott and Badami Oil Discharge Prevention and Contingency Plan* and USCG-required spill response for vessels should mitigate the impact of both small and large spills should they occur.

Per the informal consultation dated October 19, 2007 (refer to Appendix D of this EA), NMFS stated the following mitigation factors:

- The project would be sited to provide a natural barrier to sound transmission into normal bowhead whale habitat.
- Drilling muds, cuttings, and produced waters would not be discharged into the Beaufort Sea but reinjected into the underlying formations.
- Mitigation is already designed into the project in the site selection, and usage of pre-existing facilities.

Based on these factors, the NMFS stated "...while the Liberty project may affect these whales, our assessment...finds any such effects are insignificant (such effects could not be meaningfully measured or detected) or discountable (such effects would not reasonably be expected to occur)."

#### **4.3.7.2 Polar Bears**

This analysis includes the mitigation measures that BPXA has committed to in writing to date. Other mitigation measures may be evaluated for the purposes of minimizing impacts and determining whether certain major effects could be rendered minor, if such measures become part of the proposal prior to its approval or as a condition of its approval.

Polar bears are known to investigate human activities, especially when certain attractants such as food are present. Continuation of current North Slope practices on food handling and disposal will help reduce the potential for human/bear interactions. Reducing these encounters will play an important role in reducing the impacts of the Liberty (SDI) Project on polar bears. BPXA will mitigate potential impacts to polar bears from human encounters by adhering to their Polar Bear Interaction Plan and by working closely with the USDO, FWS according to the terms



of the Letters of Authorization for incidental take of marine mammals they receive for BPXA-operated North Slope oil fields.

The MMS has identified aggregations of polar bears at coastal bone piles as sensitive resources that must be protected in the event of an oil spill. The MMS will ensure these areas are added to the ACS Technical Manual map and, thus, are addressed in the project's required OSRP.

Section 1.6 Scenario 3 Part (xi) Wildlife Protection of the current Endicott OSRP provides a description of activities to be taken to protect wildlife from being impacted by a spill. In addition to containment and control of an oil spill, BPXA will use polar bear guards and security staff trained to carry out hazing activities, to protect both polar bears and workers at remote locations. Specific wildlife protection actions are identified in the ACS Technical Manual under the Wildlife Protection Tactics. BPXA has hazing and incidental take authorizations from FWS for polar bears and other marine mammals for spill response activities.

#### **4.3.7.3 ESA Listed Birds**

The FWS BO (Refer to Appendix C of this EA) outlines the following mitigation measures which would avoid or minimize adverse effects to threatened eiders and other marine and coastal birds:

- Ensure vessels do not enter Ledyard Bay Critical Habitat Unit
- Reduction of speed limits on the Endicott road between July 1 and August 15
- Reduce access to solid waste and garbage by predators and scavengers
- Removal and disposal of raven nesting structures, and submit annual report
- Monitor berm and stockpiles for fox den sites, and submit annual report
- Work with the FWS to design, install, and operate strobe lights for the Endicott SDI, which should operate from late June through the end of November
- Report all avian mortalities and collisions (including vehicle collisions) and their circumstances to the FWS

Monitoring committed to by BPXA and required by FWS BO will inform agencies on the effectiveness of these mitigation measures.

#### **4.3.8 Cultural Resources and Subsistence and Area Use Patterns**

Any archeological or cultural resources will have been identified prior to or during construction and appropriate protection measure implemented as required by regulations (see Sections 4.2.1; and 4.2.9, above).

#### **4.3.9 Air Quality**

Air quality impacts of operation activities and mitigation are described in the air quality control permit application submitted to ADEC (April 2007). Potential impacts of operations to air quality will be mitigated principally through selection of the most efficient equipment, implementation of best available control technology (BACT) where applicable, and use of natural gas instead of diesel fuel to power the drilling rig.

#### **4.3.10 Water Quality**

The potential for small equipment spills (oil, diesel fuel, and hydraulic fluid) will be mitigated through proper personnel training and adherence to best management practices for handling, storage, and dispensing of fuel. The expanded SDI has been designed to confine

surface-water drainage to the work surface and will also reduce the risk of any incidental equipment spills reaching marine waters. The project will have zero surface discharges of drilling wastes. Operational discharges will conform to the stipulations of the existing or renewed Endicott NPDES permit.