

Appendix D

Consultation with National Marine Fisheries Service (ESA Endangered Species)



United States Department of the Interior



MINERALS MANAGEMENT SERVICE
Alaska Outer Continental Shelf Region
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5823

FEB 17 2006

Dr. James Balsiger
Regional Administrator, Alaska Region
National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802-1668

Dear Dr. Balsiger,

This letter serves as notification that pursuant to 50 CFR 402.08 and 600.920(c) the Minerals Management Service (MMS) has designated BP Exploration (Alaska) Inc. (BPXA) as the non-Federal representative for Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations for the Liberty development project. The BPXA is also the applicant in the proposed federal action. As the designated non-Federal representative, BPXA will conduct informal consultations with the National Marine Fisheries Service (NMFS) and prepare any requisite Biological Assessment (BA) and EFH assessment.

In accordance with 50 CFR 402.07 and 600.920(b), we are also advising the NMFS that the MMS will be the lead agency for ESA and EFH consultations for the Liberty development project. As required, MMS will independently review and evaluate the scope and contents of the BA and EFH assessment and is ultimately responsible for compliance with section 7 of the ESA and sections 305(b) (2) and 305(b)(4)(B) of the Magnuson-Stevens Act.

Liberty is an oil field located about 5.5 miles offshore in the central Beaufort Sea. The BPXA is proposing to develop Liberty from onshore using extended reach drilling (ERD) technologies. The Liberty ERD project envisions an on-shore satellite with production sent by pipeline to an existing processing facility (Badami or Endicott).

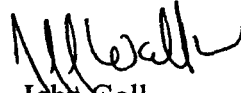
Attached for your information is a copy of a Memorandum of Understanding (MOU), dated February 2, 2006, between the MMS, the Army Corp of Engineers (COE) and BPXA. This MOU sets forth responsibilities and a schedule to affect timely National Environmental Policy Act (NEPA) and permit evaluation processes for the Liberty development project. Attachment 2 to the MOU is a schedule for conducting the ESA and EFH consultations.

Jeff Walker with this office and Peter Hanley, BPXA Liberty HSE Manager briefed the Deputy Regional Administrator and the Director of the Protected Resource Division on the Liberty project last fall. We would be pleased to arrange an update briefing at your convenience. We would also appreciate information regarding your designated point of contact for both the ESA and EFH consultations.

**TAKE PRIDE
IN AMERICA** 

We look forward to a working closely with your agency in a mutually beneficial regulatory process for the Liberty project. If there are any questions concerning the Liberty Project please contact Jeff Walker at 907-334-5303 or by e-mail Jeffery.Walker@mms.gov.

Sincerely,



John Goll

ACTING Regional Director

Enclosure: Liberty MOU

cc: Peter Hanley BPXA
Mike Holley



United States Department of the Interior



MINERALS MANAGEMENT SERVICE
Alaska Outer Continental Shelf Region
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5823

JUL 12 2007

Mr. Doug Mecum
Deputy Regional Administrator
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

Dear Mr. Mecum:

This letter is in regards to the Endangered Species Act Section 7 consultation request for the proposed Liberty Development and Production Plan-Bowhead Whale. The BP Exploration (Alaska) Inc. (BPXA) is proposing to develop the Liberty reservoir located southeast of the existing Endicott development. The project will utilize extended-reach drilling technology, and occur on a previously constructed satellite drilling island (SDI). The SDI will be expanded to accommodate this project, and remains connected to the mainland with a causeway.

The Mineral Management Service (MMS) Alaska Outer Continental Shelf (OCS) Region has entered into a Memorandum of Understanding with the US Army Corps of Engineers (USCOE); State of Alaska Department of Natural Resources; and BPXA to set forth the National Environmental Policy Act (NEPA) and permit evaluation responsibilities. An Environmental Assessment for the proposed action is being prepared by MMS, and is scheduled for completion in mid-August 2007.

The MMS recognized that the bowhead whale, an endangered species, occurs adjacent to the project area. On February 17, 2006, the MMS notified the Regional Administrator, Alaska Region, National Marine Fisheries Service (NMFS) it had designated BPXA as the non-Federal representative to conduct an informal consultation or prepare a biological assessment (BA) pursuant to Section 402.08 of the Endangered Species Act (ESA). The BPXA has coordinated with NMFS and submitted a transmittal letter (Enclosure 1) and a BA (Enclosure 2) to MMS on June 28, 2007.

The MMS and USCOE completed a review of the BA and coordinated subsequent modification of the BA with BPXA. The MMS and USCOE review and attached BA satisfy the information requirements specified in 50 CFR 402.12 and 402.14 and consequently constitute a complete consultation package for your review. The MMS determined that the proposed Liberty Development and Production Plan activities *are not likely to adversely affect* bowhead whales.

The MMS requests your concurrence on this finding and response indicating the same. If you determine that all or part of the proposed Liberty Development and Production Plan activities are



likely to affect bowhead whales, we ask that you notify us as early as possible, according to 50 CFR 402.14(g)(5), to allow the MMS Alaska OCS Region and NMFS time to jointly discuss the findings. If necessary, such discussion would facilitate further consultation and ensure protection of bowhead whales. To facilitate timely completion of this consultation, we are sending a copy of this letter to Mr. Brad Smith, NMFS Anchorage Field Office, Marine Mammal Program.

If you have any questions on this consultation or require additional information, please contact Mr. Jeffrey Denton at (907) 334-5262.

Sincerely,

A handwritten signature in blue ink that reads "John Goll". The signature is stylized and cursive.

John Goll
Regional Director

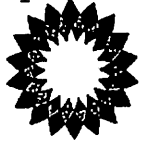
Enclosure (s)

cc: (w/Enclosures)

Brad Smith, NMFS
Cash Fay, BPXA
Mike Holley, USACOE
Don Perrin, State of Alaska, DNR / OPMP

bp

Enclosure 1



BP Exploration (Alaska) Inc.
900 East Benson Boulevard
P.O. Box 198612
Anchorage, Alaska 99519-6612
(807) 561-5111

June 28, 2007

Mr. Jeffrey Walker
Regional Supervisor
U.S. Minerals Management Service
3801 Centerpoint Drive, Suite 500
Anchorage, AK 99503

Transmittal of Revised Letter Report
Biological Assessment (BA) for Section 7 Endangered Species Act Consultation for the
National Marine Fisheries Service
Liberty Development Project

Dear Mr. Walker:

BP Exploration (Alaska) Inc. (BPXA) hereby transmits for your review and transmittal to the National Marine Fisheries Service (NMFS) a Letter Report Biological Assessment for the Liberty Development Project to support the Section 7 Endangered Species Act (ESA) consultation process. This report focuses on the endangered bowhead whale. This submittal has been revised to reflect proposed changes recommended by MMS from the original submittal of March 27, 2007.

Pursuant to 50 CFR 402.08, the Minerals Management Service designated BPXA as the non-federal representative for the ESA for the Liberty Development Project in a letter to Dr. Balsiger, Regional Administrator, National Marine Fisheries Service (NMFS) dated February 17, 2006.

BPXA is also the applicant in the proposed federal action. As the non-federal representative, BPXA has conducted informal consultations with the NMFS and has summarized potential project impacts to bowhead whales in the attached Letter Report (a format suggested by the NMFS).

If you have any questions or require further information, please contact me at (907) 339-5067.

Sincerely,


Cash E. Fay, Acting Liberty HSE Manager

Attachment

cc: Mike Holley, USACE
Don Perrin, OPMP

**Liberty Development Project
Proposed Text of Letter Report to the National Marine Fisheries Service
Biological Assessment
Section 7 Endangered Species Act Consultation**

**Prepared by BP Exploration (Alaska) Inc.
For the Minerals Management Service
Pursuant to 50 CFR 402.08**

June 2007

Background

BP Exploration (Alaska) Inc. (BPXA) is planning to develop the offshore Liberty reservoir located southeast of the existing Endicott development using extended-reach drilling technology from a shore-based pad rather than an offshore island as originally proposed. The location chosen for the drilling site is the Satellite Drilling Island (SDI) which is accessible by road from the Endicott causeway. SDI is located approximately 2.0 miles (3.2 km) offshore of the Sagavanirktok River delta well inside the barrier islands.

Request for Informal Consultation and Analysis

In accordance with the provisions of 50 CFR 402.10(c) and as discussed in a meeting between Brad Smith, NMFS, Dale Funk, LGL Alaska Research Associates and Dave Trudgen, OASIS Environmental, Inc. on December 6, 2006 the MMS requests an informal consultation, rather than a formal consultation that may include a Biological Assessment, regarding Section 7 requirements for threatened and endangered species. The bowhead whale, an endangered species which occurs in the general area of the proposed development activity, could potentially be affected by construction and oil production activities associated with the Liberty Project.

Most of the concerns related to the potential impacts to bowhead whales that may result from offshore development on the North Slope are related to the potential effects of noise on the bowhead whale migration corridor and potential effects on the subsistence bowhead whale hunt. Migrating bowhead whales that are deflected further offshore in response to industrial sounds may become less available to Native subsistence hunters who may be forced to hunt whales in more dangerous situations at locations further

offshore. BPXA believes that the potential impacts to bowhead whales from the current development plan are reduced compared to the original (offshore) plan, and that impacts to bowhead whales from the SDI option will be negligible.

Most construction phase development activities for the Liberty SDI option would occur from approximately mid-November through March when the Beaufort Sea is ice covered and when bowhead whales are wintering in the Bering Sea. Winter activities would include gravel mining, ice-road construction and use, gravel placement at SDI, and potential replacement of the West Sag River Bridge. Installation of sheet pile wall along the northern and eastern sides of the expanded SDI would occur during the same period. Originally sheet pile wall construction was planned for the spring and early summer following gravel placement. However, BPXA has recently (March 2007) revised its construction plans to defer island expansion to the winter of 2009 and to install the sheetpile slope protection contemporaneous with the winter gravel placement. These activities would not have an impact to bowhead whales.

Noise-producing activities that could occur during the summer or fall when bowhead whales are migrating in the general vicinity of the Liberty development include drill-rig mobilization and drilling activity, well pad facility installation, pipeline construction, and installation of the *LoSal*TM process plant and other equipment at the Endicott facility. The results of numerous acoustical studies at Northstar Production Facility indicated that underwater sound produced from construction and oil production activities attenuate rapidly and reach background levels within a few kilometers of the sound source (Blackwell and Greene 2001, 2006). Underwater sound propagation is affected by numerous factors including bathymetry, seafloor substrate, and water depth (Richardson et al. 1995). Underwater sound propagation is reduced in locations where water is shallow compared to deep water locations. Underwater drilling noise could be audible up to 10 km during unusually calm periods (Green and Moore, 1995). Blackwell et al. (2004) indicated underwater broadband sound levels from drilling Northstar reached background levels about 9.4 km from the island. McDonald et al. (2006) reported subtle offshore displacement of the southern edge of the bowhead whale migratory corridor offshore from Northstar Island. The Northstar Island is 8 km from the migration corridor and outside of the barrier islands where as the SDI is approximately 13-15 km from the migratory corridor, inside the barrier islands and in shallower water.

The fall bowhead whale migration corridor along the Alaskan Beaufort Sea coast is located 15 km or more offshore. Bowheads typically begin their fall migration out of the Canadian Beaufort Sea in late August and early September and continue through the Alaska Beaufort Sea throughout October. The peak number in the Alaskan Beaufort Sea is typically in mid September (Schick and Urban, 2000). Eskimo whalers have infrequently observed individual and groups of a few whales in the bay mouths between the barrier islands and inside the barrier islands. These observations have ranges from between 8.8 and 10 km from the SDI. Results of the Northstar studies that describe the rapid attenuation of underwater industrial sounds suggest that, particularly in shallow waters similar to those surrounding the Liberty SDI development option, sounds resulting from construction and production at or near SDI are not likely to affect migrating bowhead whales (Blackwell and Greene 2006). Given that the Liberty development will occur entirely inside of the barrier islands (Endicott SDI is located in shallow water about 2 miles off the mouth of the Sagavanirktok River) it is less likely to affect migrating

bowhead whales than Northstar, which is outside of the barrier islands. Impacts to individual whales or the bowhead population is considered negligible.

The greatest potential for activity related to construction of the Liberty SDI option to impact bowhead whales would result from a sealift of the *LoSa*TM process plant and other equipment to the MPI which is scheduled for summer 2012. 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.

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.

As described in BPXA's *Liberty Development Project Development and Production Plan, Attachment A Environmental Impact Assessment (2007,)* the SDI alternative for development of the Liberty project would result in very low probability of oil spills reaching bowhead whales. Most small spills would be contained on the SDI pad and only a large spill that reached the ocean during migration would have the potential to impact large numbers of bowhead whales. Even with a large spill the likelihood that oil would move beyond the barrier islands before it was contained is small.

Literature Cited

- Blackwell, S.B. and C.R. Greene Jr. 2001. Sound Measurements, 2000 Break-up and Open-water Seasons. *In: Monitoring of Industrial Sounds, Seals, and Whale Calls During Construction of BP's Northstar Oil Development, Alaskan Beaufort Sea, 2000*. LGL Report TA 2429-2. King City, Ontario, Canada: LGL Ecological Research Associates, Inc., 55 pp.
- Blackwell, S.B., C.R. Greene Jr., and W.J. Richardson. 2004. Drilling and operational sounds from an oil production island in the ice-covered Beaufort Sea. *J. Acoust. Soc. Am.* 116(5):3199-3211.
- Blackwell, S.B., and C.R. Greene Jr. 2006. Sounds from an oil production island in the Beaufort Sea in summer: characteristics and contributions of vessels. *J. Acoust. Soc. Am.* 119(1):182-196.
- BPXA. 2007. Liberty Development Project Development and Production Plan – Attachment A Environmental Impact Assessment. Report submitted to U.S. Minerals Management Service, Alaska OCS Region. Anchorage, Alaska.
- Greene, C.R. Jr. and S.E. Moore. 1995. Man-made noise. Chapter 6 *In: Marine mammals and noise*. W.J. Richardson, C.R. Greene Jr., C.I. Malme, and D.H. Thomson. Academic Press, San Diego, CA. pp. 101-158.
- McDonald, T.L., W.J. Richardson, C.R. Greene, Jr., and S.B. Blackwell. 2006. Evidence of subtle bowhead whale deflection near Northstar at high-noise times based on acoustic localization data, 2001-2004. Chapter 9 *In: Monitoring of industrial sounds, seals, and bowhead whales near BP's Northstar oil development, Alaskan Beaufort Sea, 1999-2004*. LGL Report TA4256A. Report from LGL Ltd., King City, Ontario, Greeneridge Sciences Inc., Santa Barbara, CA, and WEST Inc., Cheyenne, WY for BPXA Inc., Anchorage, AK.
- Richardson, W.J., C.R. Greene, Jr., C.I. Malme and D.H. Thomson. 1995. *Marine mammals and noise*. Academic Press, San Diego. 576 p.
- Schick, R. S. and D. L. Urban. 2000. Spatial components of bowhead whale (*Balaena mysticus*) distribution in the Alaskan Beaufort Sea. *Canadian Journal of Fisheries and Aquatic Science* 57:2193-2000.



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

National Marine Fisheries Service

P.O. Box 21668

Juneau, Alaska 99802-1668

October 19, 2007

John Goll
Director, Alaska Outer Continental Shelf Region
Minerals Management Service
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5823

Dear Mr. Goll:

The National Marine Fisheries Service (NMFS) has completed informal consultation regarding the Liberty project in the U.S. Beaufort Sea, Alaska. The Minerals Management Service (MMS) and Army Corps of Engineers are the Federal action agencies responsible for issuing permits to allow the operator, British Petroleum, to drill into Federal waters of the Alaskan Outer Continental Shelf. MMS is designated as the lead Federal action agency for this consultation.

The Corps of Engineers' public notice describes the proposed construction of an offshore oil facility in waters of the Beaufort Sea at Foggy Island Bay (POA-1998-1109-2, the Liberty project). This work would expand the existing Endicott drilling island with approximately 20 acres of marine fill, approximately 18 acres of fill associated with a gravel mine site adjacent to the Duck Island mine site, fill in 0.3 acres of marine waters to construct a boat launch at Endicott MPI, and renovate and expand the bridge over the West Saganavirktok River. The project's goal is to use Ultra-extended Reach Drilling to gain access to the Liberty oil prospect. Pressure will be maintained by a Low-Sal™ water injection technique. Using the existing Endicott SDI allows the project to avoid on-water drilling or construction of a new drilling island. It also avoids installing approximately 6.1 miles of buried pipeline to deliver the product. The Notice identifies the bowhead whale as the only species for which NMFS bears responsibility under the Endangered Species Act which may be affected by this project. No designated critical habitat occurs within the action area.

MMS and the Corps of Engineers have preliminarily determined that the described activity is not likely to adversely affect the bowhead whale. Based on an analysis of the information provided, NMFS concurs with this determination. This concurrence is based on information provided in the Submittal of Revised Oil Spill Risk Analysis Environmental Impact Analysis, the Biological Assessment (BPXA for MMS), the project proposal, the Corps of Engineers' Public Notice of Application for Permit, and other sources of information. A complete administrative record of this consultation is on



file in this office. While the Liberty project may affect these whales, our assessment (described below) 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).

Discussion

The potential for bowhead whales to be affected by this project will depend in large part on their occurrence in or near the project site. Bowhead whales are seasonally present in the Beaufort Sea. Beginning in late March, bowheads migrate north through the Bering Strait and into the Beaufort Sea, arriving in the Canadian Beaufort Sea from mid-May through June. They return in fall, migrating westward along the continental shelf of the Alaskan Beaufort Sea during September and October. Fall migrant bowhead whales generally migrate at least 18 to 20 km offshore in water depths exceeding 10 to 18 m. The satellite drilling island is approximately 13-15 km landward from this migration corridor (BPXA 2007).

Bowheads do not typically occur in the nearshore Beaufort Sea (i.e., inside the barrier island system) near the project area. During the spring migration eastward through the Alaskan Beaufort Sea, the nearshore waters of Prudhoe Bay are completely ice-covered and bowheads are far offshore of the Sagavanirktok River Delta, following open leads in the sea ice. During the fall, bowheads are usually more than 60 km offshore in heavy ice years, whereas in light or moderate ice years they generally occur more than 30 km from shore (BLM, 2004). In either type of ice year, this is far from the proposed project area.

During the fall migration, bowheads may occur closer to shore than in spring, depending on ice conditions. However, bowhead whales are rare nearshore in Prudhoe Bay. In years with light ice in the fall, surveys showed that bowheads occurred in waters deeper than 10 m while other studies have shown bowheads are generally restricted to waters 18 m deep. The area surrounding the project area is generally less than 3 m deep. Water depths of 10 m or greater occur at distances of about 20 km or more from the proposed development. Given that bowheads reportedly use water depths greater than 10 m; they are not likely to be found at the proposed Liberty project site. Although the presence of bowheads in the immediate project area is unlikely, bowheads occasionally use nearshore waters of the Beaufort Sea inside the barrier islands. Any bowhead whales that enter such waters could potentially be affected by this facility during construction or operation. Each of these phases of development is discussed.

Construction

Plans for the Liberty project facility call for the placement of gravel fill, a gravel mine, a boat-launch ramp on Endicott SDI, a bridge across the West Sagavanirktok River, and a sea-lift of equipment to the site. Proposed fill placement will occur in winter, and Bowhead whales would not be present in the Beaufort Sea during this time. The existing satellite drilling island would be expanded by 20 acres of fill. Installation of infrastructure on the islands and well drilling would occur during open water periods of the next several years including times of bowhead whale migrations. This work would include construction of drilling modules and drilling of production and injection/disposal

wells. It is important to note that this work would predominantly or wholly consist of work on the newly expanded island, rather than in-water work. Offshore drilling from natural or man-made islands generally produces underwater sounds that are weak and do not propagate beyond a few kilometers (Richardson and Williams 2004). Continuing Liberty project facility work during the open-water season would involve shore protection (placement of gravel bags) and vessel support. Work extending into the fall migration, including the possibility of sea-lift work if needed, could expose bowhead whales to construction noise. However, most bowheads pass offshore of the barrier islands north of this project and would be unlikely to receive noise at this distance or the received levels of such noise would not be expected to cause significant change in whale behavior.

Bowhead whales receiving noise from the Liberty project might move further offshore, but would be expected to continue their migration. Monitoring studies of the Northstar Island facility in the Beaufort Sea found that offshore displacement of bowhead whales occurred at times of loudest noise occurring during construction in 2001 (predominately due to vessel activity). However, no significant displacement was observed in subsequent years. The 2001 displacement was evident only when sound was averaged over 70 minutes, and the effect decreased with distance (Richardson and Williams 2004). The applicant does anticipate a possibility of a sea-lift for this project. Most of this traffic would occur within Foggy Island Bay where distance and the presence of barrier islands can be expected to partially screen seaward-propagating vessel noise from reception by migrating bowheads. Again, few bowhead whales are likely to occur in the deeper portions of Foggy Island Bay during the fall migration. Monitoring studies for the Northstar facility found that vessel noises were the main contributor to the underwater sound field. This noise was detectable as much as 30km from the island. However, whales may not react to noise at such distances. Bowhead whales are known to avoid small boats at distances up to 4 km, but most reactions have been observed at ranges of less than 1.9 km (Richardson et al. 1985). Whales tend to show little response to larger vessels that move slowly and are not heading towards them. NMFS believes any effects on bowhead whales due to vessels associated with construction of this project would be insignificant.

Pile driving presents concerns regarding the noise introduced into the water and its potential to harass bowhead whales. Information provided by the Corps and the applicant indicate no pile driving is associated with construction. Our assessment of the effects of this project on bowhead whales assumes no pile driving would occur during open water periods. Any use of pile driving would be outside the scope of this consultation and would require reinitiation of consultation.

Operation

Operationally, the Liberty project facility may affect bowhead whales. Given that bowheads reportedly occur in water depths greater than 4.3 to 6m, and migrate in waters deeper than 10 m, it is unlikely a bowhead whale would approach the island drill sites.

During studies conducted on the Northstar project to the west of this site, combined in-water drilling and production noise during open water reached ambient levels at distances of 2-4 km. Northstar production noise presumably is greater than that potentially generated by Liberty because Northstar has on-island processing whereas Liberty will employ production-only drillsites with onshore processing. Therefore, the probability that bowheads will receive elevated drilling and production noise is low. At that point, drilling and production noise should be at the level of regular ambient noises. Regardless, it is not likely that noise emanating from Liberty would be detectable to offshore whales.

The potential for oil spills associated with the Liberty project and the delivery pipeline also has the potential to affect bowhead whales. This effect was considered in information provided by *BPXA's Liberty Development Project Development and Production Plan, Attachment A Environmental Impact Assessment (2007)*. A spill that entered coastal waters in September or October could affect bowhead whales if the spill volume were large and the spill trajectory carried oil seaward of the barrier islands where fall-migrating whales can occur. However, the spill would have to travel long distances to reach migrating whales. Fall migrant bowhead whales generally use a migration corridor 13-15 km from the project site.

A number of small oil spills have occurred during oil and gas exploration in the Alaskan Beaufort Sea in past years. Only five spills have been greater than one barrel, and the total spill volume from drilling 52 exploration wells (1982 through 1991) was 45 barrels. Based on historical data, most oil spills would be less than one barrel, but a larger oil spill could also occur. Everett Consulting Associate's spill risk calculations project an estimated number of large spills from the Liberty project at about 0.09. Considering the number of days each year that bowhead whales may be present in or migrating through the area, the probability that a spill would occur, the probability for a spill to occur or persist during periods when whales are present, and the probability that oil would move into the migration corridor of the bowheads (at least that portion of the corridor outside of the barrier islands), it is unlikely that bowhead whales would be contacted by oil. Adverse affects would only be expected if all of these low probability events occurred at the same time; therefore NMFS considers these effects to be discountable.

Mitigation

The potential effects of this action on bowhead whales will be mitigated by the following factors as detailed in the project proposal submitted to the Corps of Engineers:

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 re-injected into the underlying formations.

Mitigation is also already designed into the project in the site selection, and usage of pre-existing facilities, as discussed in the introduction.

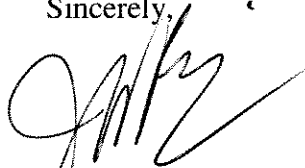
Conclusion

NMFS has reviewed pertinent information regarding this project as noted above. We believe that project design, construction, and operation of the Liberty project is not likely to adversely affect the Bering-Chukchi-Beaufort Sea stock of bowhead whales for the reasons discussed above.

This concludes section 7 consultation. Reinitiation of consultation is required if: (1) take of a listed species occurs, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not previously considered, or (4) a new species is listed or critical habitat designated that may be affected by the action.

Please direct any questions to Brad Smith at (907) 271-3023.

Sincerely,



Dr. James W. Balsiger
Administrator, Alaska Region

cc: John Goll, Minerals Management Service, Alaskan OCS Office

Appendix E

Consultation with National Marine Fisheries Service (Essential Fish Habitat)

RSLE eHkW



United States Department of the Interior



MINERALS MANAGEMENT SERVICE
Alaska Outer Continental Shelf Region
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5823

MAY 04 2007

Robert D. Mecum
Acting Administrator, Alaska Region
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

Re: EFH Consultation for Liberty Development Project

Dear Mr. Mecum:

BP Exploration (Alaska) Inc. (BPXA) is planning to develop the offshore Liberty reservoir located southeast of the existing Endicott development using extended-reach drilling technology. The project would occur on a previously constructed pad (connected to the mainland with a causeway) rather than an offshore island as originally proposed.

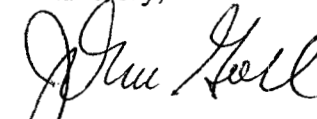
The Minerals Management Service (MMS) designated BPXA as the non-federal representative for Essential Fish Habitat (EFH) consultation for the Liberty Development Project, pursuant to 50 CFR 600.920(c). BPXA has delivered the enclosed document to fulfill MMS's responsibilities under the Magnuson-Stevens Fishery Conservation and Management Act of 1996 (Act). We consider the enclosed document to generally serve as the EFH Assessment for the Liberty Development Project. Despite designating BPXA as the non-federal representative, the MMS remains ultimately responsible for meeting sections 305 (b) (2) and 305 (b) (4) (B) of the Act. Therefore, the MMS must provide a conclusion regarding the effects of the proposed action on EFH.

The MMS and US Army Corps of Engineers have determined that the proposed action may adversely affect EFH identified under the Act. The primary difference between an EFH Assessment prepared by MMS and BPXA is that the MMS does not challenge the presumption that the waters of the Beaufort Sea constitute EFH for Pacific salmon and we have consistently treated these areas as if they were EFH. This difference in interpretation is largely inconsequential because we believe the proposed project is consistent with the NOAA document entitled Non-Fishing Impacts to Essential Fish Habitat and Recommended Conservation Measures (2003). As a result, the MMS believes that while there may be minor adverse effects on EFH, those effects have been reduced to the maximum extent practicable.



Please provide any Recommended Conservation Measures on the Liberty Development Project to us within the next 30 days so that we may incorporate those measures into the authorization process, as appropriate. Please contact Mark Schroeder at (907) 334-5247 or at mark.schroeder@mms.gov if you have any questions or require additional information on this consultation.

Sincerely,



John Goll
Regional Director

Enclosure

cc: Mike Holly
Matt Eagleton
Brad Smith

bcc: Official File (1001-03a)
Author (Buechler)
RD Chron
RSLE Chron ✓
Chief, EAS

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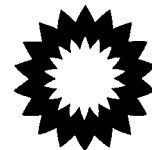
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Leasing &
Environment Office

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Anchorage, Alaska

MAR 27 2007

BP Exploration (Alaska) Inc.
900 East Benson Boulevard
P.O. Box 196612
Anchorage, Alaska 99519-6612
(907) 561-5111

March 26, 2007

REGIONAL SUPERVISOR
FIELD OFFICE
MINERALS MANAGEMENT SERVICE

Mr. Jeffrey Walker
Regional Supervisor
U.S. Minerals Management Service
3801 Centerpoint Drive, Suite 500
Anchorage, AK 99503

Transmittal of Threatened and Endangered Species Essential Fish Habitat Brief for the
National Marine Fisheries Service
Liberty Development Project

Dear Mr. Walker:

BP Exploration (Alaska) Inc. (BPXA) hereby transmits for your review and transmittal to the National Marine Fisheries Service (NMFS) *Threatened and Endangered Species Essential Fish Habitat Brief for the Liberty Development Project*. This Brief was prepared for BPXA by LGL Ecological Research Associates, Inc...

BP Exploration (Alaska) Inc. ((BPXA) is planning to develop the offshore Liberty reservoir located southeast of the existing Endicott development using extended-reach drilling technology from a shore-based pad rather than an offshore island as originally proposed. The location chosen for the drilling site is the Endicott Satellite Drilling Island (SDI) which is accessible by road from the Endicott causeway. SDI is located just offshore of the Sagavanirktok River delta. As you know, in a letter Dr. Balsiger, Regional Director, National Marine Fisheries Service (NMFS) dated February 17, 2006 pursuant to 50 CFR 402.08 and 600.920(c), the Minerals Management Service designated BPXA as the non-federal representative for Endangered Species Act (ESA) and Essential Fish Habitat (EFH) for the Liberty Development Project. BPXA is also the applicant in the proposed federal action. As the non-federal representative, BPXA has conducted informal consultations with the NMFS and has provided the information detailed in the attachment according those discussions with NMFS.

Please call me at 907-339-5024 if you have any questions or need more copies.

Sincerely,


Peter T. Hanley, Liberty HSE Manager

Mr. Jeffrey Walker
March 26, 2007
Page 2

Attachment

cc: Mike Holley, U.S. Army Corps of Engineers

Liberty Development Project Proposed Endicott Satellite
Drilling Island (SDI) Alternative

Threatened or Endangered Fish Species
Essential Fish Habitat

A Brief

by

Robert G. Fechhelm Ph.D.
LGL Ecological Research Associates, Inc.
1410 Cavitt St.
Bryan Texas 77845

for

BP Exploration (Alaska) Inc.
P.O. Box 196612
Anchorage, Alaska 99519-6612

March 2007

LGL Ecological Research Associates Inc. (LGL) has been requested by BP Exploration (Alaska) Inc. to prepare a Biological Brief regarding the Liberty Development Project Satellite Drilling Island (SDI) Alternative. This brief addresses the issues of 1) threatened and endangered fish species and 2) Essential Fish Habitat (EFH).

Threatened and Endangered Fish Species

Presently, there are no fish species in the State of Alaska that are 1) listed as either endangered or threatened, 2) candidate species for listing as either endangered or threatened, or 3) proposed for listing as either endangered or threatened (USFW 2006).

Essential Fish Habitat

The Fishery Conservation and Management Act of 1976 established national standards for the conservation and management of exploited fish and shellfish stocks in U.S. Federal waters. Coastal waters extending 200 nautical miles seaward, but outside areas under State jurisdiction, were delineated as fisheries conservation zones for the U.S. and its possessions (later defined as the Exclusive Economic Zone [EEZ]). Fishery Management Councils were created to manage fish stocks within those conservation zones based upon the national standards. Councils were required to prepare Fishery Management Plans (FMPs) that would provide the basis for local administration and management of regional fisheries. FMP components generally address management objectives, alternatives and rationale; habitat issues; the benefits and adverse impacts of each alternative; and plans for the monitoring, review and possible amendments to any action.

The Fishery Conservation and Management Act was followed by the Magnuson-Stevens Fishery Conservation and Management Act of 1996 (MSA), as amended by the Sustainable Fisheries Act of 1996, which required that FMPs further include the identification and description of Essential Fish Habitat (EFH). The MSA defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA § 3(10)). The EFH Final Rule (50 CFR Part 600) further elaborates that "waters" include aquatic areas and their associated physical, chemical, and biological properties; "substrate" includes sediments underlying the waters; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers all habitat types used by a species throughout its life cycle. EFH pertains to only commercially-exploited fish and shellfish species under Federal management. EFH includes areas that are under either Federal (offshore) or State (freshwater and coastal) management jurisdiction. The Act also requires Federal agencies to consult and comment on any activities that may adversely affect EFH. Under the National Environmental Policy Act (50 CFR 600.920[e]), in conjunction with stipulations of the MSA, Environmental Impact Statements are required to address issues pertaining to EFH.

Pursuant to NOAA, NMFS (2005), the Preliminary Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska, it is the current position of NMFS that the only two species of fish found in the Beaufort Sea that are amenable to EFH regulation and consideration are the pink salmon (*Oncorhynchus gorbuscha*) and the chum salmon (*O. keta*) (Jon Kurland, Director, NMFS Habitat Conservation Division, Juneau, pers. comm.; Lawrence Peltz, NMFS Habitat Conservation Division, Anchorage, pers. comm.). This is also the position of MMS (Jeff Childs, pers. comm.). Although all five species of Pacific salmon have been reported from the Beaufort Sea, three of these, chinook (*O. tshawytscha*), sockeye (*O. nerka*) and coho (*O. kisutch*) salmon are extremely rare and no known spawning stocks have been

identified in the region (Craig and Haldorson 1986, Fechhelm and Griffiths 2001, Stephenson 2006).

Chum Salmon (*Oncorhynchus keta*)

The chum salmon ranges from the Sacramento River in California (and stray as far south as Baja California) north to the Arctic and east to the Mackenzie and Anderson Rivers, west along the Arctic coast of Siberia to the Lena River (Laptev Sea), and south along the coast of Asia to Korea and Japan (Scott and Crossman 1983, Morrow 1989, Salo 2003). In Arctic Canada, small runs of chum salmon have been reported within the Mackenzie River watershed in Great Bear Lake, below Fort Smith in the Slave River, and in the upper Liard River (McPhail and Lindsey 1970, Scott and Crossman 1973; O'Neil et al. 1982; McLeod and O'Neil 1983). Isolated yet reliable reports of chum salmon taken throughout the Mackenzie River drainage date back to 1914 (Stephenson 2006). Chum salmon have been occasionally reported as far east of the Mackenzie River as the Hornaday River (Corkum and McCart 1981, Stephenson 2006). Runs within the Mackenzie River are likely quite small. Of the 30 major fishery surveys that have been conducted over the past 35 years in the Mackenzie River drainage, river drainages along the Canadian coast, and the coastal waters east, west, and within the Mackenzie River delta, almost all report taking no chum salmon (Fechhelm and Griffiths 2001). A 1979 escapement estimate in the Liard River was about 400 fish (Craig and Haldorson 1986).

In the Alaskan Beaufort Sea, small runs of chum salmon have been documented in the Colville River drainage Bendock (1979). In recent years, smolts have been caught in the lower delta (Moulton 2001). Although chum salmon are occasionally taken in the summer subsistence fishery that operates out of the village of Nuiqsut on the Colville River, they constitute only a minor portion of total catch (Moulton et al. 1986). Chum salmon are almost never taken in the fall subsistence fishery that operates from October to December (Moulton and Seavey 2005). There is no direct evidence that chum salmon spawn in the Sagavanirktok River or any other Alaskan River east of the Colville River (Craig and Haldorson 1986). Adult chum salmon are only occasionally taken in Alaskan coastal waters (Fechhelm and Griffiths 2001).

Small runs of chum salmon may also occur in rivers closer to Barrow. Although variable from year to year, substantial numbers of chum are taken in the Chipp River and in Elson Lagoon including adults in spawning condition (C. George, pers. comm., North Slope Borough, Department of Wildlife Management). However, multiple year surveys conducted in the Dease Inlet/Admiralty Bay area reported taking no chum salmon (Philo et al. 1993). Craig and Haldorson (1986) suggest that several rivers along the Chukchi Sea coast between Barrow and Point Hope may support small runs.

Pink Salmon (*Oncorhynchus gorbuscha*)

The pink salmon ranges from La Jolla, California, north to the Arctic and east to the Mackenzie River, west along the Arctic coast of Siberia to the Lena River (Laptev Sea), and south along the coast of Asia to Korea and Japan (Scott and Crossman 1983, Morrow 1989, Heard 2003). In Arctic Canada, rare takes of individual pink salmon have reported since 1936, but in almost all cases only single specimens have been captured (Craig and Haldorson 1986, Babaluk et al. 2000, Stephenson 2006). Most pink salmon have been caught in or near the Mackenzie River Delta. The farthest inland capture was made in the Peel River approximately 120 km from the coast (Hunter 1974 cited in Stephenson 2006). The extraordinarily low numbers of fish reported for Canadian waters suggest they are strays and that there are probably no spawning stocks in the Mackenzie Watershed (Craig and Haldorson 1986, Babaluk et al. 2000,

Stephenson 2006). Small runs of pink salmon occur in several drainages along the Chukchi Sea coast (Craig and Haldorson 1986).

In the Alaskan Beaufort Sea, small runs of pink salmon occur in the Colville River. Bendock (1979) caught 64 pink salmon between the mouths of the Itkillik and Etivluk rivers during 1978 and noted fish spawning near the Itkillik River and at Umiat. In 1978, McElderry and Craig (1981) caught two males spawners near Ocean Point just above Nuiqsut. Small numbers of pink salmon are taken in the summer subsistence fishery that operates out of the village of Nuiqsut on the Colville River, but they constitute only a minor portion of total catch (Moulton et al. 1986). Pink salmon are almost never taken in the fall subsistence fishery that operates from October to December in the lower Colville Delta (Moulton and Seavey 2005), however, in recent years, "substantial numbers" of pink salmon have been taken farther inland near the Itkillik River as part of the fall fishery (C. George, pers. comm., North Slope Borough, Department of Wildlife Management). Pink salmon are also taken in the subsistence fisheries operating in the Chipp River and Elson Lagoon just to the east of Point Barrow (C. George, pers. comm., North Slope Borough, Department of Wildlife Management).

In the Sagavanirktok Delta/Prudhoe Bay region, pink salmon are regularly taken in summer fish surveys but numbers are quite low (Fechhelm et al. 2006). In 24 summers of sampling, only 375 pink salmon have been caught. All are adults in spawning condition. In 1982, Griffiths et al. (1983) reported taking eight pink salmon upriver in the west channel near the Sagavanirktok Bridge where several dead spawned-out adults were also observed. However no actual spawning sites or activities have ever been reported for the Sagavanirktok Watershed or any drainage east of the Colville River.

Arctic Expansion

In recent years, concern has been expressed that global warming could allow southern stocks of Pacific salmon from the Bering Sea to expand northward into Arctic waters where they might establish spawning populations (Babaluk et al. 2000, Stephenson 2006). Overall, evidence of climatic change in the Arctic continues to mount (Carmack and MacDonald 2002). Climate models predict a warming trend that could be quite intense at higher latitudes (Walsh and Crane 1992). Carmack and MacDonald (2002) note that the disproportionate influence of warming on Arctic physical systems will have profound effects on Arctic biota. Physical changes will include increased periods of open water, decreased ice cover, rising sea levels, increased storms, shifting water mass fronts, and more. Babaluk et al. (2000) note that changes in the distribution and abundance of salmon in Arctic waters may be useful proxies for monitoring the effects of climate change on the Beaufort Sea.

For 24 of the past 26 years, summer fish monitoring studies have been conducted in Beaufort Sea coastal waters in and around Prudhoe Bay (Fechhelm et al. 2006). Although the catch of pink salmon is relatively low, it is rather persistent through time. From 1981 through 2006, the summer catch rate for pink salmon exhibited no evidence of a protracted shift in abundance (Figure 1). Catch rates for 2003, 2004, and 2005 were significantly higher than all but one of the previous 20 years but CPUE dropped substantially in 2006 when only four pink salmon were taken.

The extension of chum and pink salmon into arctic waters is probably linked to a number of factors. Craig and Haldorson (1986) suggest that intolerance of cold temperatures, particularly in freshwater environments, may limit the establishment of coho and sockeye salmon in the Arctic. Pink and chum salmon are far more tolerant of cold temperatures (Craig and Haldorson 1986).

The predominantly marine life cycle of pink and chum salmon would also give them an advantage in establishing populations along the North Slope. Both species migrate to sea soon after emergence and do not rely on freshwater rearing and overwintering habitat (Heard 2003, Salo 2003). In contrast, sockeye and coho salmon spend one to several years in their natal watersheds before migrating to sea (Burgner 2003, Sandercock 2003). Some stocks of chinook salmon migrate to sea after only three months in freshwater, but most stay within their natal streams for their first year (Morrow 1980). Freshwater overwintering space is at a premium along the Arctic North Slope and the obligatory dependence of sockeye, coho, and possibly chinook salmon could severely limit their success. The ability of fish to exploit available overwintering habitat is considered by some to be the single most important factor limiting the success of anadromous and freshwater species in the Arctic (Craig 1989).

The obligatory freshwater phase of sockeye and coho salmon would also leave them exposed for longer periods to the cold Arctic temperatures. Craig and Haldorson (1986) speculate that once they emerge into Beaufort Sea coastal waters, chum and pink salmon probably migrate southward toward the Bering Sea thereby avoiding cold Arctic waters during winter. The 1,200+ km summer journey would be well within the migratory capabilities of juvenile pink and chum salmon (Heard 2003, Salo 2003). Mature adults later migrate back to the Beaufort Sea to spawn. Excluding their egg phase, such a migratory cycle would mean that both species would only have to endure Arctic waters during the warmest part of the year.

The expansion of pink salmon into the Arctic may also be hampered by their fixed, two-year life span (Craig and Haldorson 1986). All pink salmon reproduce at age 2 and there is virtually no genetic overlap between alternate year spawning cohorts (Heard 2003). The reproductive output of either year class is confined to a single spawning event and if that spawning fails the bulk of the cohort gene pool could be forfeit. The other species of Pacific salmon are characterized by varying ages at which adults reach sexual maturity. The spawning success of a single cohort is spread out over several years and failure in any single year would not necessarily be catastrophic. Craig and Haldorson (1986) theorized that pink salmon populations in the Arctic probably undergo regular cycles of colonization and extinction due to their precise two-year spawning cycle coupled with the harsh climatic vagaries of the region.

The characteristics of egg deposition could also prevent pink and chum salmon from establishing major spawning stocks in North Slope rivers. Pink salmon from both Asian and North American populations typically spawn at depths of 30-100 cm (Heard 2003). Well-populated spawning grounds are mainly at depths of 20-25 cm, less often reaching depths of 100-150 cm. Redds themselves can be as deep as 46 cm (Scott and Crossman 1973). Chum salmon have adapted to spawning in waters of lesser depths than pink salmon (Salo 2003). In the State of Washington, maximum spawning depths have been reported to be 50 cm, and in Japan 110 cm (Salo 2003). Redd depths are typically less than 50 cm (Salo 2003). On the North Slope, all waterbodies freeze during winter and ice thickness can reach 200+ cm. Much of the substrate where salmon typically spawn would freeze thereby destroying the eggs. Greater survival would likely occur during milder winters when ice cover is less thick. Even during normal winters, much of the reproductive output of the spawning stock could be lost, a factor that could contribute to the relatively small runs that seem to occur in the few Arctic rivers that are populated.

In general, Pacific salmon do not possess the life-history characteristics that define anadromous species of the Arctic. Arctic anadromous fish possess unambiguous K-selective traits: longevity, delayed maturity, and repeat spawning in individuals (Craig 1989). Many species of Arctic anadromous fish have maximum life spans that range from 18-25 years (Craig

1989). In contrast, anadromous salmonids from temperate latitudes have maximum ages that range from 2 to 12 years (Scott and Crossman 1973, Groot and Margolis 2003). Arctic fishes reach sexually maturity in 7 to 11 years depending on species. Pacific salmon generally reach sexual maturity in 2-5 years. Arctic anadromous species are repeat spawners whereas all five species of Pacific salmon die after their first spawning. K-selective traits of Arctic anadromous fish undoubtedly reflective adaptation to the unique environment that they inhabit. K-selective populations are long-lived, have low population turnover rates, and have a relatively stable number of adults. Populations with many year classes of older repeat spawners are better able to withstand intermittent reproductive loss without jeopardizing the survival of the population (Craig 1989). These characteristics enable Arctic fish populations to remain generally stable in what otherwise might be considered a harsh and unstable environment (Johnson 1981, 1983). If these K-selective traits are prerequisites for a successful Arctic existence then they could determine the extent to which more R-selective Pacific salmon are able to expand their range into the Beaufort Sea.

Adverse Effects

The MSA requires federal agencies to consult with the NMFS on all actions or proposed actions permitted, funded, or undertaken by the agency that may adversely affect EFH. An adverse effect is any impact that reduces the quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species, and their habitats, as well as other ecosystem components. Adverse effects may be site-specific or habitat-wide, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.910[a]).

Pacific salmon fisheries in the Alaska are managed under a combination of domestic and international regulations and treaties (NOAA, NMFS 2004). Salmon fisheries are managed by the Alaska Department of Fish and Game (ADF&G) within state waters, where most of Alaska's commercial fishing occurs. Commercial fishing within the EEZ is limited to southeast Alaska and Federal management is deferred to ADF&G. Harvests of chinook, coho, and sockeye salmon in southeast Alaska are managed by agreement with Canada under the Pacific Salmon Treaty. Management of salmon fisheries in international waters of the North Pacific is under the auspices of the North Pacific Anadromous Fish Commission, which consists of four countries (Canada, Japan, Russia, and the U.S.). Federal management of salmon stocks is largely directed by FMPs designed to limit the bycatch of salmon in non-salmon directed fisheries within the EEZ.

By definition, the coastal waters in and around the Liberty Development site should not be classified as EFH for chum and pink salmon despite their marginal presence in the Alaskan Beaufort Sea. EFH pertains to habitat "required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem" (50 CFR Part 600). There are no federally-managed commercial salmon fisheries in the Beaufort or Chukchi seas and it is highly doubtful that the low numbers of pink and chum salmon that regularly migrate to the Bering Sea constitute a meaningful component of the commercial fisheries there. There are also no federally-managed fisheries for other species within the Beaufort and Chukchi Seas thereby rendering the bycatch FMP issue moot. Again, it is highly unlikely that Beaufort Sea pink and chum salmon comprise a meaningful portion of bycatch within the North Pacific EEZ.

The MSA defines EFH as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA ' 3(10)). Current theory holds that, upon

emergence into coastal waters, the small numbers of salmon that are spawned in the Colville River and rivers west migrate southeast to the warmer waters of the Bering Sea and do not return to the Beaufort Sea until time of spawning (Craig and Haldorson 1986). No juvenile salmon have ever been observed within the Prudhoe Bay area in over 26 years of study (Fechhelm et al. 2006). The few adults that have been caught in the Liberty Development area occur in late summer and are likely stray adult spawners returning to the Colville River. They have already grown to sexual maturity and are no longer feeding. Thus, there is no evidence that the waters in the vicinity of the proposed Liberty Development are used by salmon for any of the ecological requirements defined in the MSA.

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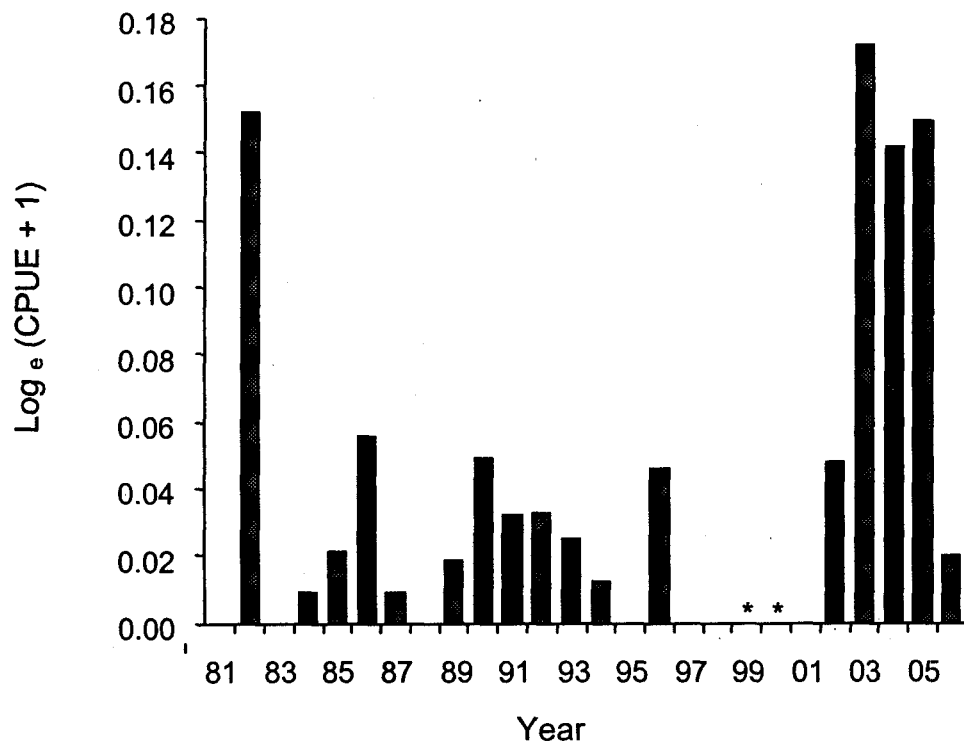


Figure 1. Log_e (CPUE [fish/net/24 h]+1) for the 375 pink salmon collected in the Prudhoe Bay area by year. Asterisks indicate years in which no sampling took place. Catch rates for 1982, 2003, 2004, and 2005 were significantly ($P = 0.008$, t -test, Ostle and Mensing 1972) higher than the remaining 20 summers. Source: Fechhelm et al. (2006).



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

National Marine Fisheries Service

P.O. Box 21668 2007_08_31_14_24_06_NOAA_Liberty
Juneau, Alaska 99802-1668

August 27, 2007

RECEIVED
AUG 31 2007

John Goll, Regional Director
Alaska OCS Region
Minerals Management Service
3801 Centerpoint Dr., Suite 500
Anchorage, Alaska 99503-5823

REGIONAL DIRECTOR, ALASKA OCS
MINERALS MANAGEMENT SERVICE
ANCHORAGE, ALASKA

RE: Liberty Expansion Project
POA-1998-1109-2

Dear Mr. Goll:

The National Marine Fisheries Service (NMFS) has reviewed the Minerals Management Service's (MMS) proposal to expand the Liberty Drill Site. Based on the information provided and our associated review of the U.S. Army Corps of Engineers (Corps) Public Notice (Department of the Army Permit Application Foggy Island Bay, POA-1998-1109-2, Foggy Island Bay) we offer the following comments specific to the Magnuson-Stevens Fishery Conservation and Management Act.

Section 305(b) of the Magnuson-Stevens Act requires federal agencies to consult with NMFS on all actions that may adversely affect Essential Fish Habitat (EFH). NMFS is required to make conservation recommendations, which may include measures to avoid, minimize, mitigate or otherwise offset adverse effects.

In our response to the Corps Public Notice (copy enclosed), NMFS offered two EFH Conservation Recommendations. Based on the information provided by MMS, we have no additional recommendations and no further EFH consultation is necessary.

Should you have any additional questions please contact either Jonathan Taylor or Jeanne Hanson of my staff at 907-271-5006.

Sincerely,

Robert D. Mecum
Acting Administrator, Alaska Region

Enclosure





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

July 18, 2007

Colonel Kevin J. Wilson
U.S. Army Corps of Engineers
P.O. Box 898
Anchorage, Alaska 99506-0898

Re: Foggy Island Bay
POA-1998-1109-2

Attention: Mike Holley

Dear Colonel Wilson:

The National Marine Fisheries Service (NMFS) has reviewed the above referenced Public Notice, applicant BP Exploration (Alaska) Incorporated. The purpose of the proposed project is to recover oil from the offshore Liberty prospect. The project site is located in the North Slope of Alaska, Umiat Meridian. To take advantage of existing infrastructure at Endicott, BP proposes to drill the ultra-extended-reach-drill (uERD) wells from the Endicott Satellite Drilling Island (SDI). The project would include expansion of the existing SDI by 20 acres of fill into marine waters, 18 acres of fill would be associated with a gravel mine site adjacent to the existing Duck Island Mine site, and 0.3 acres of impacts for a boat launch. The project also includes plans for a new bridge across the West Channel of the Sagavanirktok River that will be reviewed as a modification of DA permit number POA-1992-90 or Nationwide Permit 15.

Conservation Recommendations

Fish and Essential Fish Habitat

Under Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation Management Act (Magnuson-Stevens Act), federal agencies are required to consult with the Secretary of Commerce on any action that may adversely affect EFH. The Corps has made a determination that the project may adversely affect EFH. The Magnuson-Stevens Act requires NMFS to make conservation recommendations regarding any federal action that would adversely affect EFH. The construction and operation of the proposed project would not adversely affect EFH and anadromous fish if necessary conservation measures are followed.

1. 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 drainage, associated buildings, and roads. The applicant should also implement maintenance and monitoring plans for this system. Non-point source pollution can have deleterious effects on salmonids, particularly growth in juveniles. Petroleum hydrocarbons damage developing salmon eggs, larvae, and fry at extremely low concentrations. Sculpin eggs and larvae, and juvenile Pacific cod, which may occur in near shore areas, would likely experience similar effects.



2. Work on the new Sag River bridge should follow timing window restrictions to the best extent practicable. Timing window for the Sag River is August 15 to September 15.

Please note that under section 305(b)(4) of the Magnuson-Stevens Act, the Corps of Engineers (Corps) is required to respond in writing within 30 days to NMFS EFH Conservation Recommendations. If the Corps does not make a decision within 30 days, the Corps should provide NMFS with a letter to that effect, and indicate when a full response will be provided. Jonathan Taylor is the NMFS EFH contact for this project, and can be reached by telephone at (907) 271-2373 or e-mail at jonathan.e.taylor@noaa.gov.

Sincerely,



Robert D. Mecum
Acting Administrator, Alaska Region

cc:

Corps - Michiel.e.holley@poa02.usace.army.mil
ADNR/OHMP - cindy_anderson@dnr.state.ak.us
EPA - dean.heather@epa.gov
USFWS - phil_brna@fws.gov
HDR Alaska, Inc. - Robin.Reich@hdrinc.com
MOA - WigglesworthDT@ci.anchorage.ak.us

Appendix F

Consultation with Alaska Historic Preservation Officer (SHPO)



7

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
Alaska Outer Continental Shelf Region
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5823



JUL 12 2007

Due
8/16

RECEIVED

JUL 16 2007

Ms. Judith Bittner
State Historic Preservation Officer
Office of History and Archaeology
550 West 7th Avenue, Suite 1310
Anchorage, Alaska 99501-3565

Dear Ms. Bittner:

The Minerals Management Service (MMS) is in receipt of the BP Exploration (Alaska), Inc.'s (BPXA) Liberty Development and Production Plan (DPP) and Environmental Impact Analysis, dated April 2007. The MMS entered into a Memorandum of Understanding with the US Army Corps of Engineers (USACE), State of Alaska Department of Natural Resources, and BPXA in November 2006. The MMS and USACE are jointly preparing an Environmental Assessment (EA), which is scheduled for completion in August 2007.

The MMS and USACE have mutually agreed to conduct separate consultations per the National Historic Preservation Act. The MMS will address the offshore effects of the proposed construction activities (beyond 3 miles of the shoreline), and the USACE will address the onshore and coastal effects (including the proposed expansion of the Satellite Drilling Island, out to 3 miles of the shoreline).

The BPXA informed our agencies on July 2, 2007, that a cultural resource survey in the area of the proposed project has been contracted to Reanier & Associates, Inc., and the final survey report is scheduled for completion in late 2007. We trust the survey will meet the requirements you have outlined in your recent correspondence.

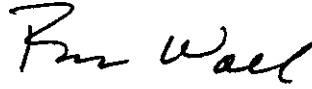
The MMS has reviewed the offshore area of potential effect for historic resources by consulting its shipwreck database and the Alaska Historic Resources Survey database for other potential archaeological resources. No offshore prehistoric or historic resources were identified. Since no offshore resources were identified, and the well bore would be thousands of feet below the seafloor in offshore waters, the MMS has determined that there will be no effect upon offshore prehistoric or historic resources.

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IN AMERICA 

The MMS requests your concurrence with our "no effect" determination for offshore historic and prehistoric resources for the Liberty Development Project.

If you have any questions, please contact Michael Burwell at (907) 334-5249 or Casey Buechler at (907) 334-5265.

Sincerely,



John Goll
Regional Director

cc: USACE
Cash Fay, BPXA
Don Perrin, State of Alaska, DNR / OPMP

No Historic Properties Affected
Alaska State Historic Preservation Officer
Date: 8/9/07
File No.: 3130-12 MMS
ML

Appendix G

Consultation with Native Alaskans (Government to Government)



United States Department of the Interior



MINERALS MANAGEMENT SERVICE
Alaska Outer Continental Shelf Region
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5823

APR 17 2006

Fenton Rexford, Executive Director
Native Village of Kaktovik
PO Box 130
Kaktovik, Alaska 99747

Dear Mr. Rexford:

This letter confirms our meeting with the Native Village of Kaktovik Tribal Council and staff on April 18, 2006 to discuss the Liberty development project. The Minerals Management Service (MMS) and the US Army Corps of Engineers (COE) appreciate this opportunity to initiate joint Government-to-Government consultation with the Native Village of Kaktovik in accordance with Executive Order 13175.

As arranged by Albert Barros, MMS Community Liaison, British Petroleum Exploration, (Alaska), Inc. (BPXA) will provide a summary of the Liberty project via telecom. This will be followed by the MMS and COE overview of the process and schedule for the regulatory and National Environmental Policy Act review of the project. After our presentation, we welcome the opportunity for an open discussion, questions and concerns of the Native Village of Kaktovik.

The Liberty reservoir is located about 5 miles offshore in the central Beaufort Sea. BPXA is proposing to develop the Liberty reservoir from an onshore pad using extended reach drilling (ERD) technologies to reach the reservoir. BPXA is currently evaluating alternatives to onshore development options including pad location and host production facilities (Endicott or Badami).

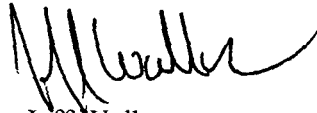
We will provide the Tribal council and staff ten copies of a brochure dated November 2005 which will provide an overview of the Liberty ERD project and 10 copies of the document titled Liberty Update that summarizes the base or best case alternatives being evaluated by BPXA. Mr. Peter Hanley, BPXA Liberty Regulatory Affairs Manager, will provide an overview of this document.

Attendees will be Jeff Walker and Albert Barros from the MMS, Mike Holley from the COE. Also, participating via telecom will be Mr. Peter Hanley, and Cindy Bailey, BPXA Director, Regional Government and Community Affairs, Alaska.

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IN AMERICA 

Thank you for facilitating this meeting in observance of the recently signed MOU between the Native Village of Kaktovik and MMS regarding Government-to-Government Relations. We look forward to participating in the Native Village of Kaktovik Tribal Council's April meeting.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeff Walker". The signature is fluid and cursive, with a long horizontal stroke at the end.

Jeff Walker
Regional Supervisor
Field Operations

cc: Mike Holley, COE



United States Department of the Interior



MINERALS MANAGEMENT SERVICE
Alaska Outer Continental Shelf Region
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5823

MAY 11 2007

To: (see distribution)

The Minerals Management Service (MMS) is requesting comments on BP Exploration (Alaska) Inc, (BPXA) proposed Development and Production Plan (DPP) for the Liberty Development Project. The Liberty reservoir underlies federal Outer Continental Shelf leases in the central Beaufort Sea, and is located about 5.5 miles offshore. BPXA is proposing to drill 5-6 development wells from the Endicott Satellite Drilling Island (SDI) using ultra-extended reach drilling technologies (uERD). Production from the Liberty reservoir will be processed through the existing Endicott facilities.

Copies of the DPP were distributed directly to your office by BPXA under separate letter. If you did not receive a copy of the DPP, please contact this office. The DPP was deemed submitted in accordance with 30 CFR 250.266 on May 10 2007. We request you review the DPP within your area of expertise. Comments must be submitted to the MMS's office in Anchorage, ATTN: Regional Supervisor, Field Operations, at 3801 Centerpoint Drive, Suite 500, Anchorage, Alaska 99503-5823 by July 09, 2007.

In accordance with Executive Order 13175, Consultation and Coordination with Indian Tribes; receipt of this letter also provides an invitation to Federally Recognized Tribes to hold formal Government to Government consultations if requested.

A copy of the DPP is also available for checkout from the MMS office or online at the MMS website at <http://www.mms.gov/alaska>. To check out a copy of the DPP, please contact Ms. Tina Huffaker at (907) 334-5207.

The DPP has also been submitted to the State of Alaska, Department of Natural Resources, Office of Project Management and Permitting (OPMP) for consistency review with the Alaska Coastal Management Program. The OPMP Alaska Coastal Management Program will notify review participants under separate cover of the timing for conducting the consistency review.

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IN AMERICA 

If you have any questions please feel free to contact me at (907) 334-5303; or Mr. Daniel Hartung at (907) 334-5304, or by email at daniel.hartung@mms.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeff Walker". The signature is fluid and cursive, with a long horizontal stroke at the end.

Jeff Walker
Regional Supervisor
Field Operations

cc: Peter Hanley, BP Liberty Permit Manager
Mike Holly, AK COE
Don Perrin, AK OPMP

MMS FO LIBERTY DPP DISTRIBUTION

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Director Planning
North Slope Borough
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Taqulik Hepa
North Slope Borough
Dept of Wildlife Management
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Appendix H

Land Cover and Vegetation Survey

VEGETATION/LAND COVER MAP FOR THE LIBERTY GRAVEL MINE SITE, PRUDHOE BAY UNIT, ALASKA

**Prepared by
BP Exploration (Alaska) Inc.
and LGL Alaska Research Associates, Inc.**

29 August 2007

INTRODUCTION

Development of a gravel mine site is required to provide an estimated 1,000,000 cubic yards of gravel to expand the Endicott Satellite Drilling Island in support of the Liberty field development. The proposed mining area is approximately 7.5 miles northeast of the Deadhorse Airport, adjacent to the existing Duck Island Mine Site at South ½ Section 6, North ½ Section 7, Township 10 North, Range 16 East, Umiat Meridian. The permitted area would cover approximately 63 acres. In accordance with the permit application this document describes the vegetative community types within the proposed mining area.

MATERIALS AND METHODS

Visual interpretation of false color near infrared (NIR) photography was used to make an initial assessment of vegetation type polygons within the proposed permitted area. Aerial photos at a scale of 1:6000 (1 inch = 500 feet) were digitally scanned and georeferenced for use in ArcGIS.

Vegetation polygons were classified using a hierarchical scheme designed specifically for the North Slope of Alaska (Walker 1983). Vegetation types were mapped at Level C of the hierarchy. This scheme was selected because it is commonly used by the U.S. Fish and Wildlife Service to delimit habitats important to waterbirds on the North Slope. In addition, because of its hierarchical nature, this scheme allows vegetation to be classified at various map scales and facilitates direct comparisons with vegetation maps of other parts of the North Slope.

Walker's (1983) vegetation and land cover classification scheme involves categorizing sites with respect to site moisture regime and dominant plant growth forms (and landform type when plant cover is very sparse or non-existent). Many areas on the North Slope consist of complexes of landforms which result in complexes of site moisture and vegetation types. In areas such as these, the classification scheme calls for combining site moisture and plant growth form terms to more accurately describe the character of the area.

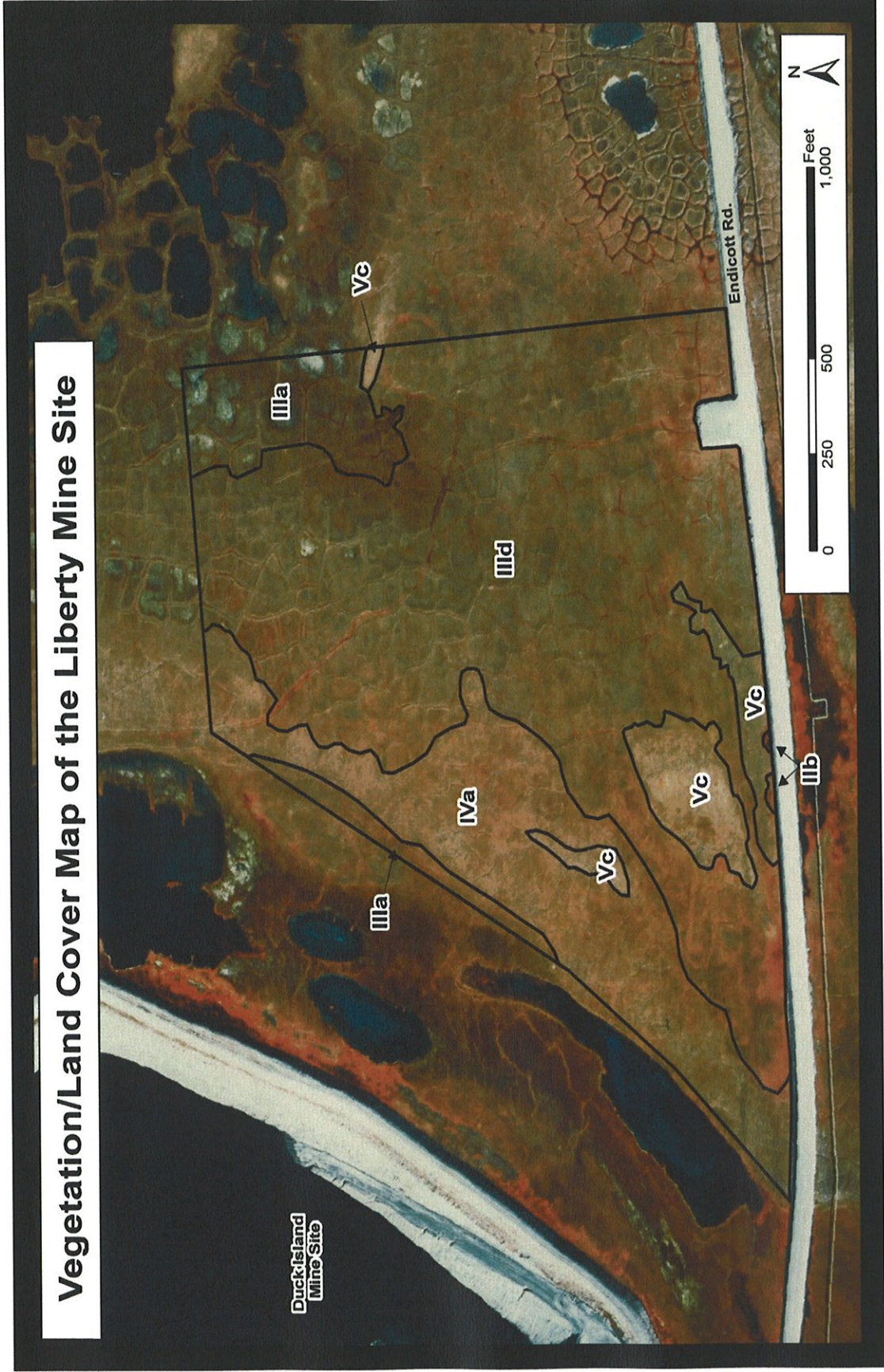
A site inspection was completed in August 2007. Information collected during the field inspection was used to clarify vegetation polygon boundaries and community types.

RESULTS

Table 1 provides a brief title description, area, and percent of mapped area for each of vegetation/land cover unit within the mine site boundary. Figure 1 depicts the mapped area and distribution of land cover units.

<i>Table 1. Vegetation/Land cover description and associated map area composition.</i>			
Map Unit	Map Unit Description	Area (acres)	% of Mapped Area
I Ib	Aquatic Graminoid Tundra (emergent vegetation)	0.08	0.12%
IIIa	Wet Sedge Tundra	5.21	8.29%
III d	Wet Sedge/Moist Sedge, Dwarf Shrub Tundra Complex (wet patterned-ground complex)	40.53	64.46%
IVa	Moist Sedge, Dwarf Shrub/Wet Graminoid Tundra Complex (Moist patterned ground complex)	12.92	20.54%
Vc	Dry, Dwarf Shrub, Crustose Lichen Tundra (<i>Dryas</i> tundra, pingos, river bars)	4.14	6.59%
Total:		62.87	100%

Figure 1. Distribution of land cover types within the Liberty Mine Site boundary.



DISCUSSION

The predominant landform within the mapped area was that of poorly developed low-centered polygons and irregular strangmoor ridges. The vegetation was fairly uniform throughout the mapped area. Vegetation units were delineated based on predominant soil moisture conditions and abundance of secondary community types. While definite lines are provided for mapping purposes, broad transitional zones between community types were common.

The Wet Sedge/Moist Sedge, Dwarf Shrub Tundra Complex (III_d) was the predominant land cover type within the mapped area. This vegetation type is defined by poorly developed low-center polygons. Wet sedge communities are found within the polygon centers and moist sedge communities are common on the slightly elevated polygon rims and strangmoor ridges.

The large, rather central III_d complex within the mine site boundary grades into a slightly wetter area towards the northeast corner of the site. This area was classified as III_a due to the presence of several small relatively recently drained ponds that were scattered across the area. Pond basins were well vegetated with emergent sedges, primarily *Carex aquatilis*. Staining of the soil surface and vegetation indicated that standing water was likely present for a significant period during the growing season.

The western edge of central III_d map unit was bordered by relatively drier Moist Sedge, Dwarf Shrub/Wet Graminoid Tundra Complex (IV_a). This land cover type is typically used to classify a mixture of well developed high- and low-centered polygons. The IV_a unit is also, however, used to classify areas of weakly developed strangmoor where moist ridges are dominant. The IV_a classification was used for this area to indicate the slightly drier soil conditions, relative to the III_d area, where moist dwarf shrub/graminoid communities were more common.

Additionally, relatively wetter and drier habitats are found within the mine site boundary. Dry community types (V_x) dominated by shrubs, grasses, and other forbs are common throughout the area but are typically too small to accurately classify at this map scale. Similarly, wet sedge habitats are found adjacent to the Endicott Road and to the west edge of the mine site boundary where the area begins grading towards the ephemeral Duck Island Creek. Emergent vegetation present in the flooded areas and small ponds within the mine area were dominated almost exclusively by *Carex aquatilis*. The emergent grass, *Arctophila fulva*, a highly valued provider of waterfowl habitat, was not present in any of the water bodies within the mine site boundary.

Map units classified as II, or III are probably the most important for waterfowl and shorebirds (Troy 1992). These include lake margins, shallow ponds with or without emergent vegetation, pond/tundra complexes, areas of aquatic graminoid tundra, and areas of wet sedge tundra. These are important areas for feeding birds and in some cases also serve as nesting habitat, especially for waterfowl (Troy 1992). However, most tundra-nesting bird species – especially shorebirds – tend to select nest sites in areas drier than those where they prefer to feed (Troy 1992). Thus, the drier habitats (map unit V [all types]), although less important for feeding, probably provide nesting habitat for some species. The vegetation complexes III_d and IV_a are likely to be important bird habitats because these areas provide both moist sites suitable for nesting and

nearby wet sites favored for feeding. This is especially so when these vegetation types encompass clusters of lakes and ponds.

References:

Troy, D.M. 1992. Tundra Birds. Chapter IV *in* Prudhoe Bay Waterflood Project: Tundra bird monitoring program 1987. U.S. Army Corps of Engineers, Alaska District, Anchorage, AK.

Walker, D.A. 1983. A hierarchical tundra vegetation classification especially designed for mapping in northern Alaska. Pp. 1332-1337 *in*: Permafrost: fourth international conference proceedings, July 17-23, 1983, Fairbanks, AK. National Academy Press, Washington D.C.

Appendix I

Gravel Site Mining and Rehabilitation Plan

**MINING AND REHABILITATION PLAN
LIBERTY GRAVEL MINE SITE
NORTH SLOPE, ALASKA**

BP Exploration (Alaska) Inc.
September 2007

INTRODUCTION

A gravel mine site is required to supply an estimated 1,000,000 cubic yards of gravel for the Liberty Development Project consisting primarily of an expansion to the existing Endicott satellite drilling island (SDI).

The goal for the mine site preparation, operation, subsequent closure and rehabilitation is to minimize tundra disturbance.

The following figures provide additional information regarding the mine site development and rehabilitation:

- Figure 1 shows the vicinity of the proposed mine site.
- Figure 2 shows the location of the proposed mine site and overburden storage areas.
- Figure 3 shows the proposed mine site cross sections.
- Figure 4 shows the mine site grading after excavation and features of the rehabilitation plan.
- Figure 5 shows typical cross sections through the rehabilitated mine site.
- Figure 6 shows typical cross sections through the rehabilitated mine site.

The proposed Liberty mine site will disturb approximately 50 acres (including ice pads for staging). This includes a staging area for mining activities, overburden storage areas and the anticipated excavation surface area of approximately 21 acres.

EXISTING CONDITIONS

The proposed Liberty mine site will be located in the eastern operating area of the Prudhoe Bay Unit (EOA/PBU), approximately 7.5 miles northeast of the Deadhorse Airport. The proposed mine site is adjacent to the existing Duck Island Mine Site at

South ½ Section 6, North ½ Section 7, Township 10 North, Range 16 East, Umiat Meridian.

This site was chosen after field geotechnical investigations of several alternative mine sites near the Endicott Road to confirm gravel quality and quantity.

The mine site is still in the planning stages as part of the Liberty Development Project SDI island expansion, therefore, at this stage of the development some flexibility is required regarding mining and rehabilitation plans.

A geotechnical characterization of the material source has been conducted but no development has yet occurred at the site. The outer perimeter boundary shown in the figures describe the maximum aerial extent of the mine site for permitting requirements. The revegetation performance standards are listed in Table 2.

Permits authorizing the proposed mining plan are as follows:

- U.S. Army Corps of Engineers (Section 404)
- Alaska Department of Natural Resources (Material Sale Contract)
- North Slope Borough (Development Permit)

MINING PLAN

General

The mine site will provide gravel for the expansion of the existing SDI to accommodate new facilities and the drilling operations. It is anticipated that gravel will be mined from the site over two winter seasons so that any extra gravel required due to settlement at the SDI can be made up prior to the arrival of the drilling equipment.

The excavated gravel area is shown in Figure 2. The tundra and overburden overlaying the excavated area will be moved adjacent to the north and south sides of the excavated area. The mined area is expected to provide approximately 1,000,000 cubic yards of gravel. Approximately 325,000 cubic yards of overburden is expected to overlay the suitable gravel fill material. The site will be accessed directly by a gravel road from the Endicott Road and a seasonal ice road between the SDI and the mine site. The ice road route will be determined after bathymetric surveys and field reconnaissance of the area between the mine site and the SDI are conducted during the summer 2007. The goal will be to utilize the existing river channel to the extent practicable while avoiding over-wintering fish habitat.

Summer Mining Plan

No summer mining activities are planned.

Winter Mining Plan

Mining operations will occur during the winter months and will include the preparation of a gravel access road for equipment access at the east side of the mine, as well as ice pad staging areas on the north and south sides of the pit for temporary spoil storage. The south side of the mine will be offset approximately 300 ft. from the Endicott Road for safety considerations. A water diversion berm, as depicted in Figure 3, will be constructed around the mine site to protect against flooding. The berm will abut the existing Endicott Road just east of the 48-inch diameter culvert that conducts water under the Endicott Road into the ephemeral Duck Island Creek. The berm will wrap around the site to prevent flood water from flowing into the pit during excavation (see Figure 2). It is not anticipated that the seasonal flow from Duck Island Creek would be diverted from the swale.

Examination of the land form surrounding the mine site suggests that the permafrost is uniform with little thermokarst or ice polygon features. There are shallow ponds to the northeast of the mine site. Based on the experience at the nearby Duck Island Mine Site, BPXA does not expect to encounter significant solid ice features that could thaw and erode into the excavated area.

The site will be monitored during overburden stripping to identify any such ice features. If massive ice is encountered, it will be excavated and replaced with spoil prior to spring break-up.

Mining operations will commence with survey and staking followed by overburden stripping. It is anticipated that an average 10 ft. overburden layer will be removed from the excavated area and stock piled. The organic layer (i.e. the top root mass) within the overburden layer will be removed and stockpiled separately from the inorganic material. The depth of the organic layer will be confirmed by visual inspection during overburden stripping. Mining operations will include blasting and mechanical excavation to an overall depth of approximately 50 ft. with respect to the original land elevation. The 300 ft. offset from the Endicott Road and pipeline will ensure they are not adversely affected by blasting. Blasting safety precautions will be in effect during blasting and all traffic will be halted immediately prior to and until after the blast and "all clear."

Road access to the mine will be via the existing gravel pad turn out from the Endicott Road at the east side of the site as depicted in Figure 2. The access road will connect to the protective flood berm on the west side. Road access ramps will be constructed as mining progresses deeper into the excavated area. The road gradient into the excavated area will not exceed a 10% gradient. Mined gravel will be transported from the mine site to the SDI along an ice road routed north of the Endicott Road. The existing river channel will be used for the ice road where practicable.

The pit side walls will be stepped as shown in Figure 3 and as close to vertical as allowed by safe mining practices. Overburden removed from the excavation area will be stockpiled on ice pads adjacent to the north and south sides of the excavated area. This is intended to reduce the impact to underlying vegetation. The spoil and organic material

stockpiles will be used to contour the excavated area and used for mine site rehabilitation after mining is complete.

REHABILITATION PLAN

Introduction

The Liberty Rehabilitation Plan (Rehabilitation Plan) describes methods and procedures proposed for rehabilitating the Liberty mine site and are subject to confirmation based on a biological assessment of the site prior to mining operations. The Rehabilitation Plan may be amended when more site-specific information is available and as the rehabilitation progresses over time. The target revegetation performance standards are listed in Table 1. A proposed treatment, monitoring, and reporting schedule to evaluate progress towards the performance standards is listed in Table 2.

Surrounding Vegetation

The vegetated area surrounding the Liberty mine site lies within the Sagavanirktok River delta, a relatively flat, rolling landscape with minimal topographic relief. The vegetation is wet and moist tundra dominated by *Eriophorum angustifolium* and *Carex aquatilis*. *Arctophila fulva* is present in wetter areas and shallow flooded habitats. *Dupontia fischeri* may be locally prevalent and in drier areas tussock tundra dominated by *Eriophorum vaginatum* may also occur.

Site Preparation

The excavated area will be rehabilitated once mining has been completed. Inorganic spoil will be placed at a nominal 5:1 H:V side slope within the stepped benches on the west side of the pit. The remaining stockpiled inorganic spoil will be placed in the deeper pit excavation to moderate the side slopes. Inorganic overburden will be placed into the pit after mining in the first year. The fill will be placed along the north, west and south faces so as not to encumber vehicle access if required in future. An irregular shoreline will be created along the south side of the pit during backfilling of the overburden material. Scallops to a depth of 1 - 2 ft. and 20 - 40 ft. back will be incorporated along the edge of the future shore line. Excavated material will be used to create small peninsulas and islands near shore. The creation of artificial island or peninsulas will depend on site specific conditions encountered. The exposed land formations will be covered with organic material. The near shore water depth will be at 1 - 2 ft depth.

The stockpiled organic material will be used to cover the disturbed area to encourage natural species revegetation. Excess organic material will be removed from the mine site and relocated to an offsite location (e.g., Duck Island Mine Site disturbed areas) for potential use elsewhere.

The water diversion berm on the west side will be breached as shown in Figures 4 and 5. The breach will be armored with select material to prevent erosion during spring

flooding. Although the mine site is slightly elevated with respect to the surrounding area based on observations from the most recent spring break up (2007), water should periodically flood into the abandoned mine site. The fill rate will depend on the annual snow cover and precipitation. The pit will flood gradually over time from locally occurring run-off waters. Once the pit completely fills it will connect with the ephemeral Duck Island Creek through the weir breach on the west side of the mine site. Detailed plans for creating a channel connecting the creek with the mine site will be developed following complete filling of the mine site.

The portions of the water diversion berm remaining after breaching will be covered with stockpiled organic material.

Goals and Objectives

The water diversion berm around the site is intended to allow the short-term establishment of seeded grasses that will assist in stabilizing the soil surface within the mine site while allowing natural colonizers to establish over time. The objective in utilizing stockpiled organic spoil is to ensure adequate soil nutrients to encourage rejuvenation of existing native plants. The shallow gradient created inside the berm is intended to establish diverse and productive wetland and upland plant communities similar to those in the surrounding area, thereby improving the appearance of the site and improving its suitability for some wildlife species. The shallow gradient will also encourage animals to more readily escape from the area after it is flooded. By creating an ice pad under the stockpile areas it is intended that the underlying vegetation is preserved after the stockpiles are removed. The goal is to restore conditions to those that existed prior to creating the stockpiles (Table 1).

Wetland Functions

In recent years, the evaluation of wetland rehabilitation has attempted to assess functionality as a criterion for successful rehabilitation. However, wetland function and thereby the possibility of restoring wetland functions in arctic ecosystems are poorly understood (Funk and Streever 2003, unpub. manuscript). Hydrogeomorphic models or HGM's are one approach being used to make functional wetland assessments. HGM's evaluate different biological and environmental variables and contrast this information to ecologically comparable, 'normal' functioning wetlands. In order to effectively deliver a functional HGM assessment, a significant amount of baseline or reference site data must be available. HGM's are developed locally or regionally for different environmental gradients. There is no HGM for Alaska's North Slope and it is doubtful that such an approach will work.

In consultation with the U.S. Army Corps of Engineers, BPXA has established a practice of defining clear goals, objectives, and performance standards as part of their current approach to rehabilitation. The quantitative measures associated with BPXA's rehabilitation goals, objectives, and performance standards typically focus on percent vascular cover, species composition, and available soil nutrients. Additional qualitative

measures often include monitoring the site for wildlife activity, and significant areas of subsidence or thermokarst.

It is reasonable to assume that, until adequate HGM data are made available, inference to wetland functionality may be derived from BPXA's current approach to rehabilitation; reasoning that a positive trend in vegetative establishment and species diversity promotes soil stability, develops soil structure, and indicates adequate plant available nutrients; evaluating surface stability indicates maintenance of thermal equilibrium; and observations of wildlife activity support habitat development and food web structuring.

Rehabilitation Treatments

Disturbed areas outside the excavated area will be seeded with *Puccinellia borealis*, a native grass that is short-lived and non-competitive to invasion by indigenous tundra plant species. An application of approximately 3-5 lb/acre of *P. borealis* should provide adequate cover (BP Exploration (Alaska), Inc. et al. 2004). *P. borealis* seed is available in limited quantities, and this seeding plan (either the species or the year of planting) may be revised if enough seed is not available.

Based on past experience, applying phosphorus fertilizer will greatly enhance establishment of seeded grasses and encourage the invasion of the site by indigenous species. An application of 400 lbs/acre 10:20:20 NPK fertilizer is recommended as a balanced application suitable for most soils in this region. Soil samples will be collected and nutrient analysis conducted to finalize the most appropriate fertilizer application.

The first summer following mine site closure, the area will be allowed to settle, soil samples will be collected, and the area will be inspected to determine the extent of rehabilitation treatments required. Rehabilitation treatments will begin during the following growing season; after breakup and before freeze up in autumn when the soil surface has thawed and drained of excess moisture. The seeded grass is expected to reach maturity by the third growing season following seeding and to begin declining after four to five growing seasons, allowing natural colonizers to occupy the site.

Performance Standards

By the tenth year following cultivation treatments, seeded areas will support 10% total live vascular plant cover excluding seeded grass cultivars. At least five species of naturally colonizing plants should be present, with at least 0.2% cover by each. These performance standards are intended to lead to a soil stabilizing plant cover on the site while also promoting eventual replacement of seeded grasses with naturally colonizing species. These standards do not apply to areas that are ponded for more than four weeks during the growing season. Other disturbed areas, primarily the former overburden stockpile area will, by year 10, support a live vascular cover $\geq 15\%$ of that found in the surrounding undisturbed area (Table 1).

Monitoring for Performance Standards

Monitoring will be used to evaluate the progress of vegetation relative to performance standards. The final monitoring will establish whether the revegetation performance standards have been met.

Canopy cover and species composition will be assessed using BPXA's standard method, as described in "BP Revegetation and Compliance Monitoring; Standardized Methods for Documenting Plant Community Development" and according to the schedule in Table 2. If intermediate sampling indicates that vegetation has not established enough to meet the proposed standards, additional remedial actions may be required to increase plant cover.

Reporting

Progress reports following BPXA's standard format will be submitted by 1 February of the year following site visits scheduled in Table 2. Reports will be provided to State of Alaska Department of Natural Resources, U. S. Army Corp of Engineers, and the U. S. Fish and Wildlife Service.

Remedial Action

If monitoring suggests that performance standards may not be met by Year 10, additional seeding, fertilizing, and/or other planting approaches will be considered in consultation with agency representatives.

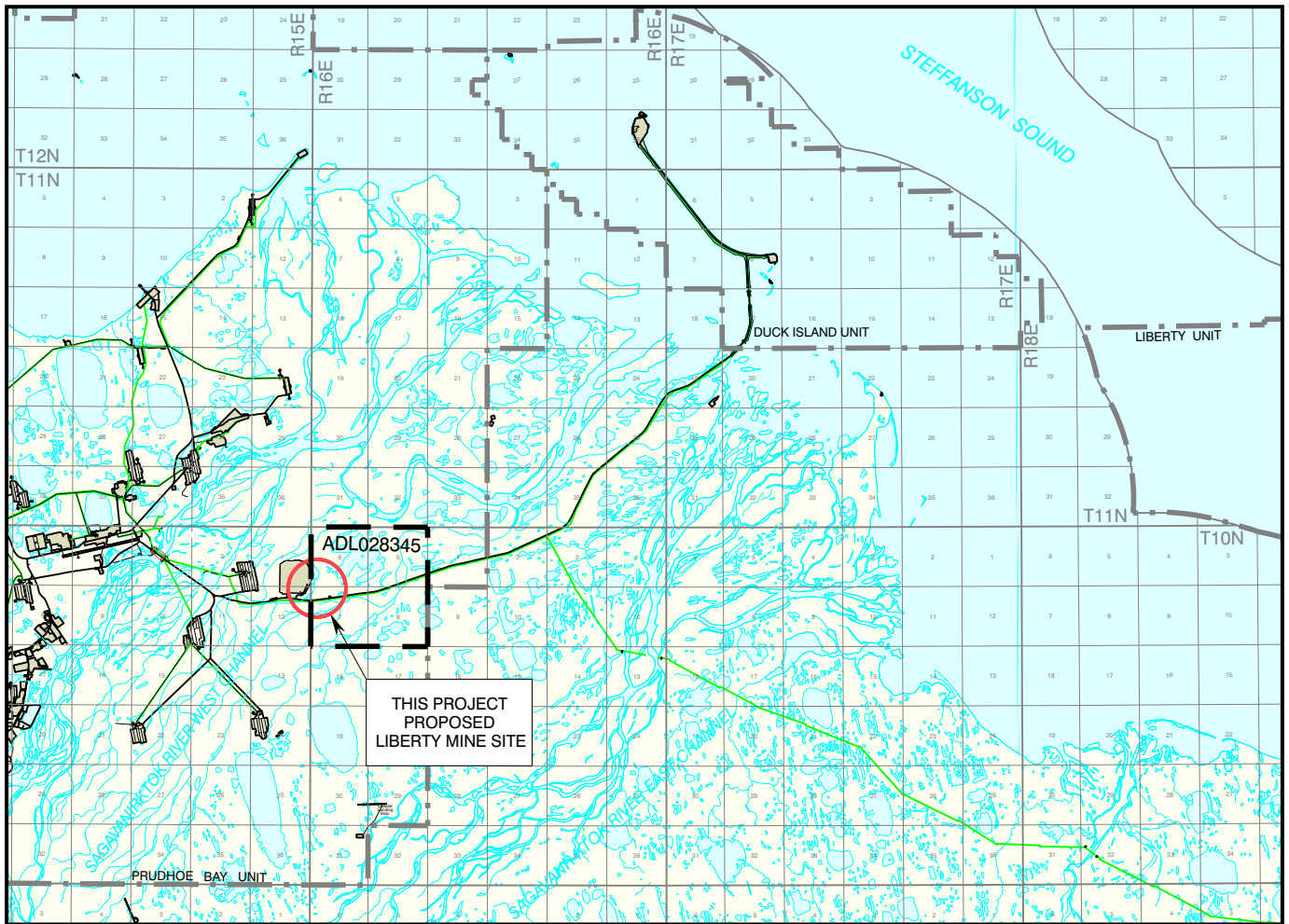
REFERENCES

- BP Exploration (Alaska), Inc, Conoco Phillips Alaska, Inc., ABR, Inc., and Lazy Mountain Research. 2004. North Slope Plant Establishment Guidelines Table May 11, 2004. Prepared by Oasis Environmental, Inc. 10 pp.
- Funk, D.F., and B. Streever. 2003. Wetland function on the Arctic Coastal Plain of Alaska. Unpublished manuscript prepared by LGL Alaska Research Associates, Inc., and BP Exploration (Alaska), Inc. Environmental Studies Program. Anchorage, Alaska.

Table 1. Goals, Objectives, Performance Standards, and Monitoring Methods	
Goals	<p><u>Flood protection berm</u>: Establish diverse and productive wetland and upland plant communities on the site similar to those of the surrounding area, thereby improving the appearance of the site and improving its suitability for some wildlife species.</p> <p><u>Former stockpile area</u>: Restore natural conditions comparable to those that existed prior to material stockpiling.</p>
Objectives	<p><u>Flood protection berm</u>: Short-term establishment of seeded grass that will not persist, allowing natural tundra plant species to colonize the site over time.</p> <p><u>Former stockpile area</u>: Ensure adequate soil nutrients to encourage rejuvenation of native plants.</p>
Performance Standard	<p><u>Flood protection berm</u>: By year 10, 10% cover by live vascular plants, including seeded grasses, with at least 1% cover of naturally colonizing species. Species composition consisting of at least 5 naturally colonizing species with 0.2% canopy cover each, on the excavated area and the gravel pad removal area.</p> <p><u>Former stockpile area</u>: Live vascular cover $\geq 15\%$ of that found in the surrounding, undisturbed area.</p>
Monitoring Methods	<p>Use BPXA's standard method for measuring plant vegetation cover.</p> <p>Establish photopoints to qualitatively assess changes in site conditions.</p>

Table 2. Proposed schedule for application of rehabilitation treatments, site monitoring, and reporting.

Year	Treatment & Monitoring	Reporting
First summer following site close out	Sample and test soil for fertility and other features. Inspect site to determine extent of rehabilitation activities required. Establish photopoint markers.	None.
Year 0	Apply fertilizer and seed; quantitatively measure cover in former stockpile area; collect photo records.	Progress report.
Year 2	Measure vegetation cover and species composition, and compile a species list, using BPXA's standard method in seeded areas and former stockpile area. Sample soil where revegetation success appears lacking. Observe surface stability qualitatively and collect photo records.	Progress report.
Year 6	Measure vegetation cover and species composition, and compile a species list, using BPXA's standard method in seeded areas and former stockpile area. Sample soil where revegetation success appears lacking. Observe surface stability qualitatively and collect photo records.	Progress report.
Year 10	Measure vegetation cover and species composition, and compile a species list, using BPXA's standard method in seeded areas and former stockpile area. Sample soil where revegetation success appears lacking. Observe surface stability qualitatively and collect photo records.	Final report.



This map is based on U.S.G.S. quad Beechey Point (A-2, A-3, B-2, B-3) and on the Unit Operator's Facility Maps.



PROJECT LOCATION:

PRUDHOE BAY UNIT - LIBERTY MINE SITE

NAD83

LAT. = 70° 14' 30.03"

LONG. = -148° 11' 06.48"

ALASKA STATE PLANE ZONE 4, NAD 83

X = 1,864,732.90 FEET

Y = 5,941,043.61 FEET

ADL 028345 SECS. 6, 7 T10N, R16E

DATUM: MEAN SEA LEVEL

PURPOSE: MINE DEVELOPMENT

ADJACENT PROPERTY OWNER: STATE OF ALASKA

COUNTY: NORTH SLOPE BOROUGH

APPLICANT: BP EXPLORATION ALASKA, INC.

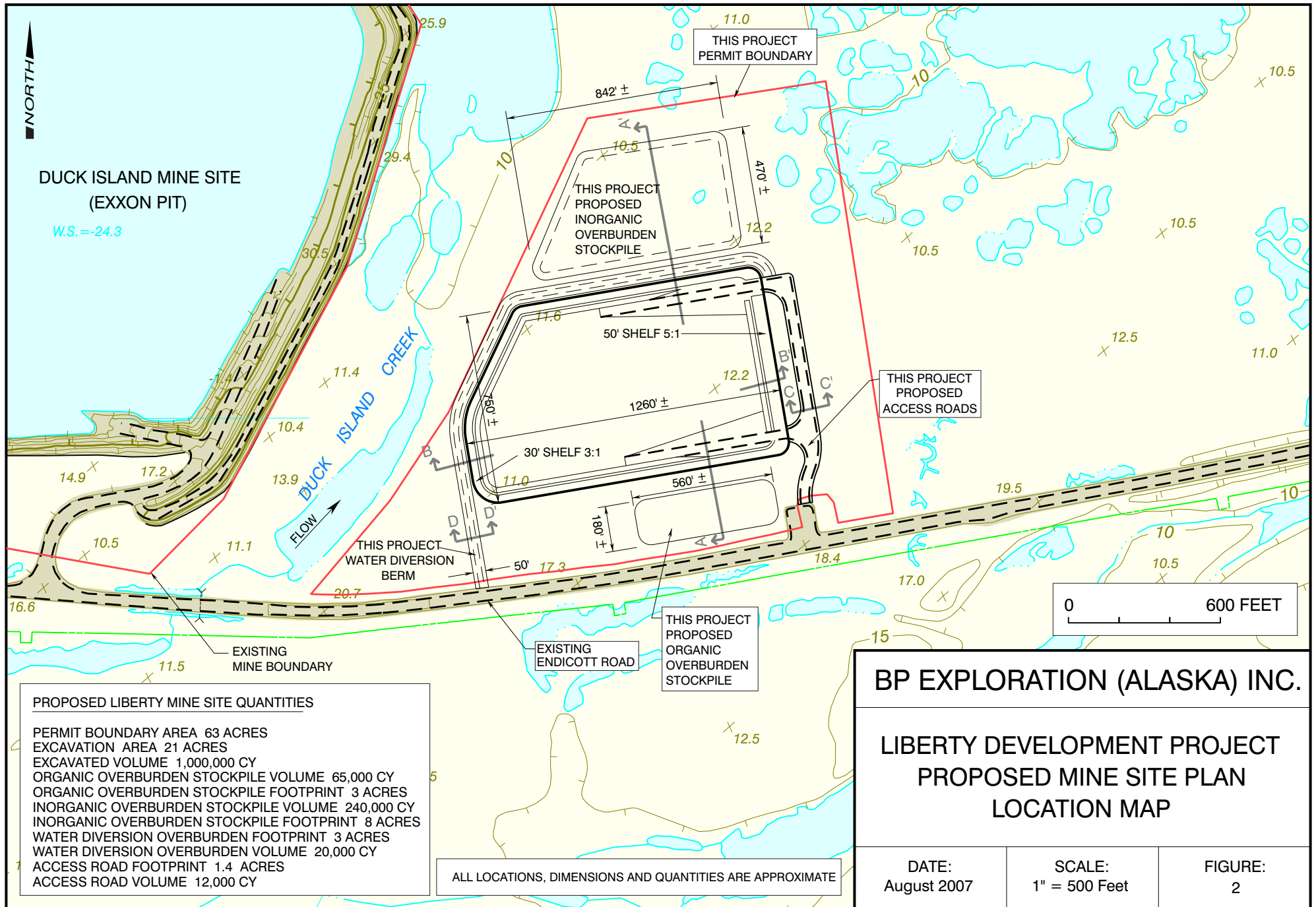
BP EXPLORATION (ALASKA) INC.

**LIBERTY DEVELOPMENT PROJECT
MINE SITE
VICINITY MAP**

DATE:
August 2007

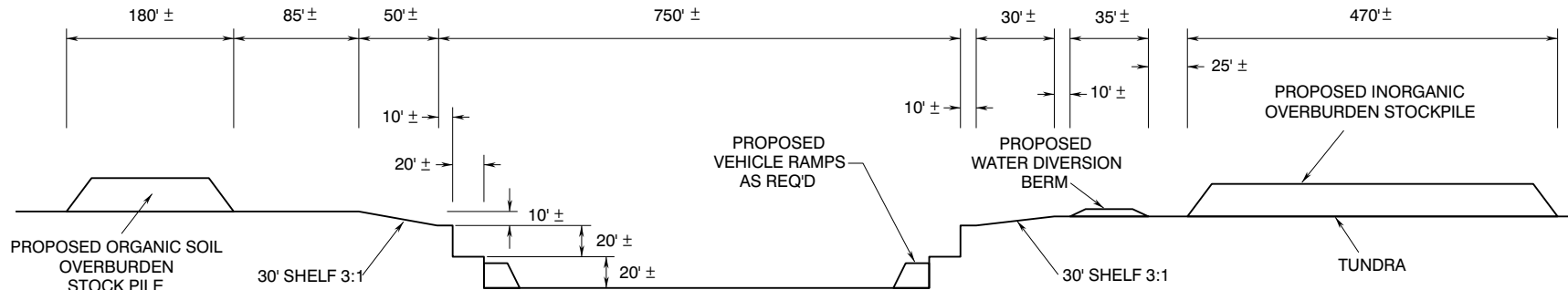
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1" = 3 Miles

FIGURE:
1



SOUTH

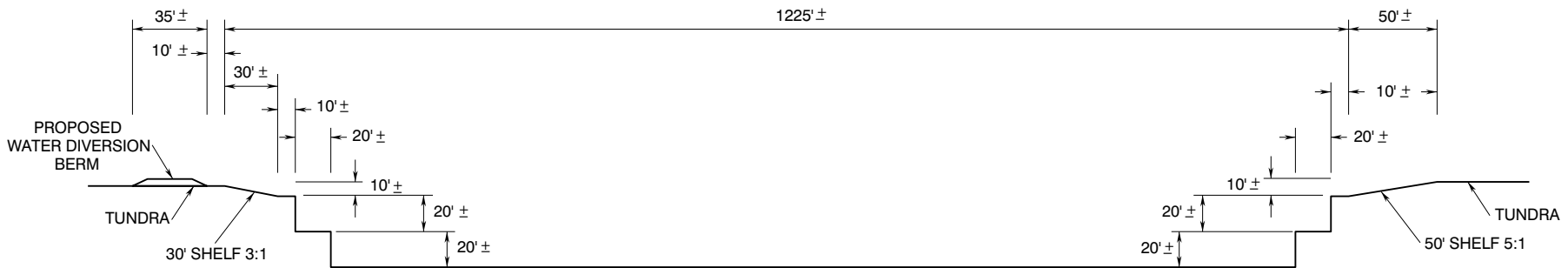
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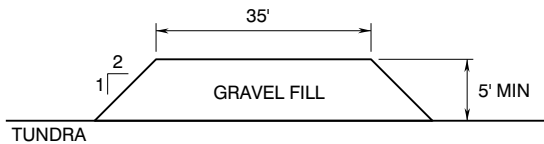
EXCAVATION CROSS SECTION A-A'

WEST

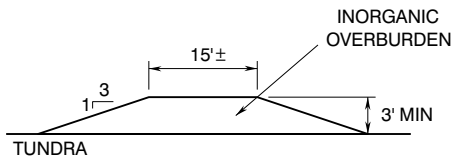
EAST



EXCAVATION CROSS SECTION B-B'



ACCESS ROAD CROSS SECTION C-C'



WATER DIVERSION BERM CROSS SECTION D-D'

ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE

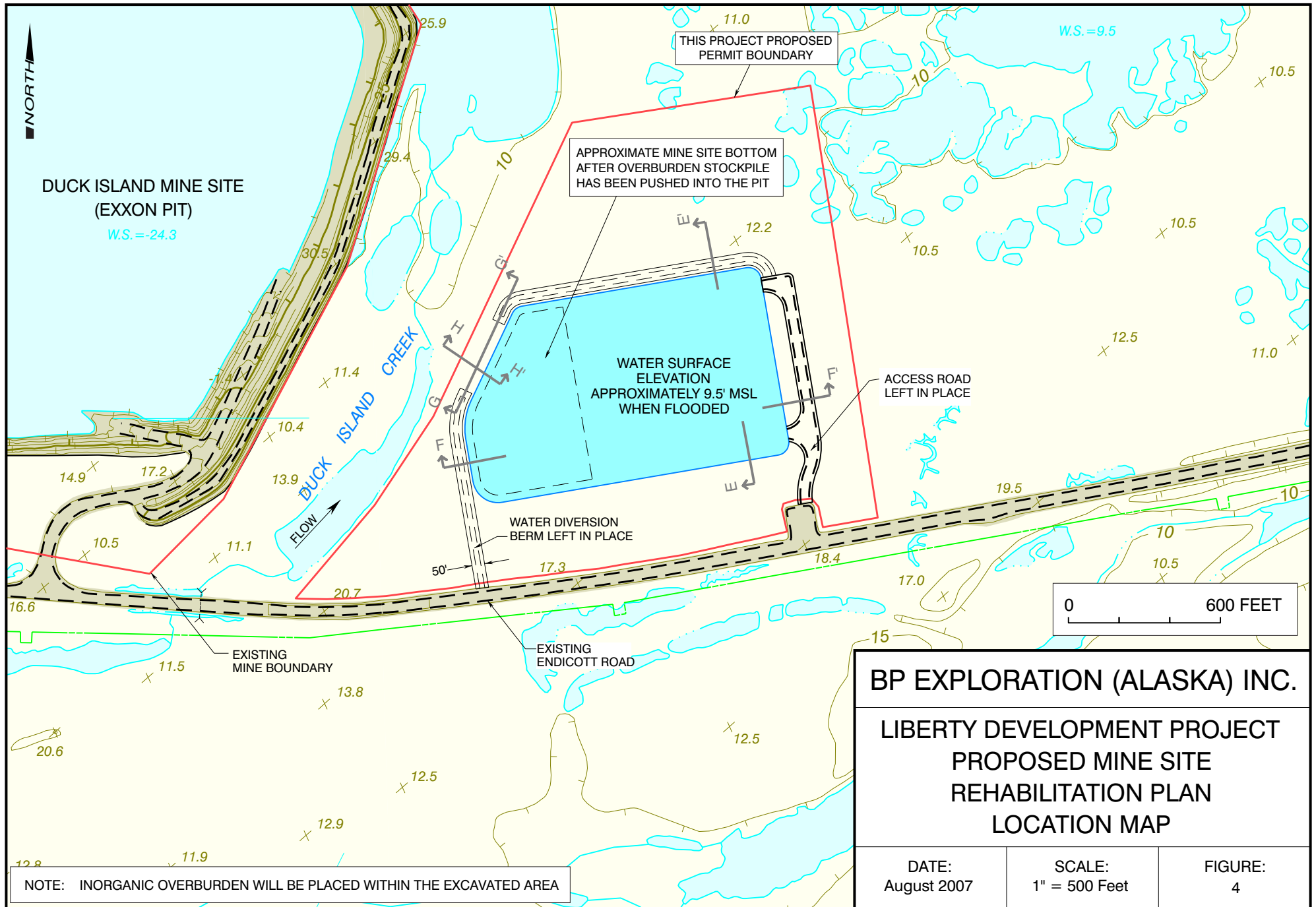
BP EXPLORATION (ALASKA) INC.

LIBERTY DEVELOPMENT PROJECT
PROPOSED MINE SITE PLAN
CROSS SECTIONS

DATE:
August 2007

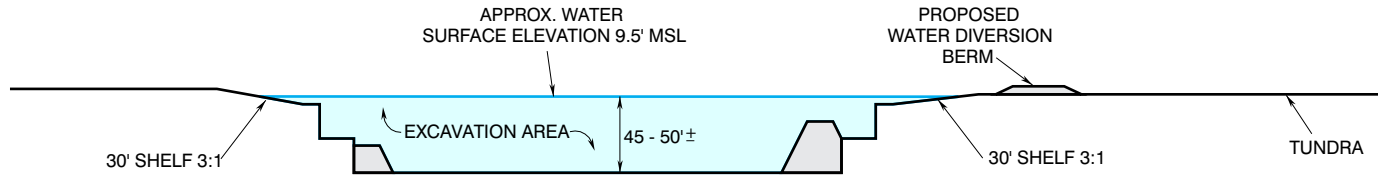
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FIGURE:
3



SOUTH

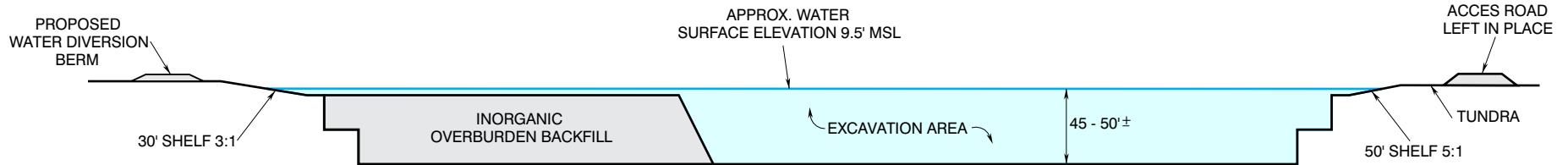
NORTH



REHAB CROSS SECTION E-E'

WEST

EAST



REHAB CROSS SECTION F-F'

ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE

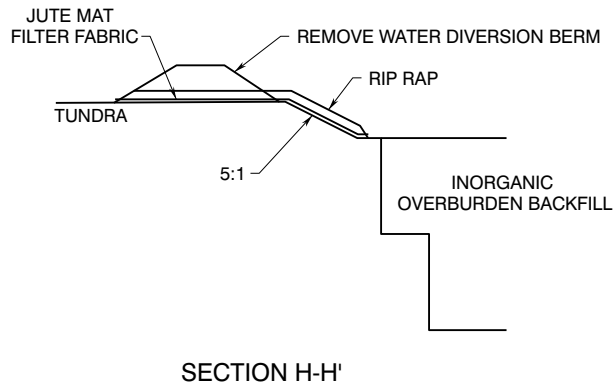
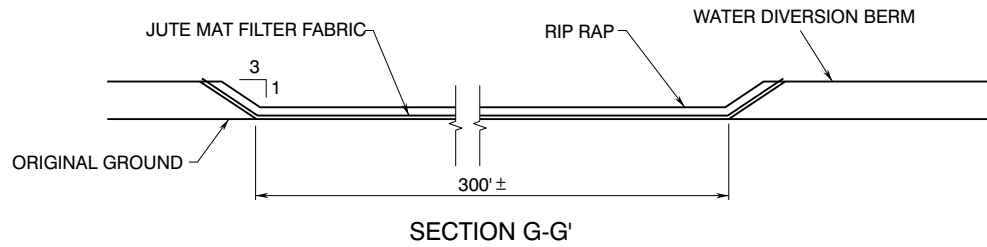
BP EXPLORATION (ALASKA) INC.

LIBERTY DEVELOPMENT PROJECT
PROPOSED MINE SITE
REHABILITATION PLAN
CROSS SECTIONS

DATE:
August 2007

SCALE:
NOT TO SCALE

FIGURE:
5



BP EXPLORATION (ALASKA) INC.

**LIBERTY DEVELOPMENT PROJECT
PROPOSED MINE SITE
REHABILITATION PLAN
CROSS SECTIONS**

ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE

DATE:
August 2007

SCALE:
NOT TO SCALE

FIGURE:
6



The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U. S. administration.



The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS Royalty Management Program meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U. S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of : (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.