

US Army Corps of Engineers Alaska District

Public Notice of Application for Permit

ANCHORAGE Regulatory Division (1145) CEPOA-RD Post Office Box 6898 JBER, Alaska 99506-0898

PUBLIC NOTICE DATE:	April 24, 2019
EXPIRATION DATE:	May 24, 2019
REFERENCE NUMBER:	POA-2019-00122
WATERWAY:	Ugnuravik River

Interested parties are hereby notified that a Department of the Army permit application has been received for work in waters of the United States as described below and shown on the enclosed project drawings.

All comments regarding this Public Notice should be sent to the address noted above. If you desire to submit your comments by email, you should send it to the Project Manager's email as listed below or to regpagemaster@usace.army.mil. All comments should include the Public Notice reference number listed above.

All comments should reach this office no later than the expiration date of this Public Notice to become part of the record and be considered in the decision. Please contact Janet Post at (907) 753-2831 toll free from within Alaska at (800) 478-2712, by fax at (907) 753-5567, or by email at janet.l.post@usace.army.mil if further information is desired concerning this notice.

<u>APPLICANT</u>: Hilcorp Alaska, LLC., Attn: Anna Dugan, 3800 Centerpoint Suite 1400, Anchorage AK 99503, email: adugan@hilcorp.com, tel: 907-777-8322.

<u>LOCATION</u>: The project site is located within Section 24, T. 13 N., R. 9 E., Umiat Meridian; USGS Quad Map Beechey Point B-5; Latitude 70.4615 N., Longitude 149.6959° W.; near Deadhorse, Alaska.

<u>PURPOSE</u>: The applicant's stated purpose is to meet the gravel needs for planned Milne Point Unit (MPU) Development projects, including R Pad Development and additional pad expansions for drilling new wells to increase production within the MPU.

<u>PROPOSED WORK</u>: The proposed work is to expand the existing material site, Mine Site E, in Milne Point Unit by adding an additional 27-acre cell, named Cell 6, and to rehabilitate the project site after completion of material extraction. The area to be mined is 900 feet long and 850 feet wide, totaling 16 acres. The additional 11 acres of impacts would include overburden storage and construction of a thermal barrier and an access road. All work would be performed in accordance with the enclosed plan (sheets 1-5), dated 4/11/2019.

<u>ADDITIONAL INFORMATION:</u> Attached please find Hilcorp's "Mining and rehabilitation plan for Ugnu Mine Site E Milne Point Unit, North Slope Borough, Alaska".

Other permits required: Alaska Department of Natural Resources (ADNR), North Slope Borough (NSB), and Alaska Department of Environmental Conservation (ADEC).

<u>APPLICANT PROPOSED MITIGATION</u>: The **applicant** proposes the following mitigation measures to avoid, minimize, and compensate for impacts to waters of the United States from activities involving discharges of dredged or fill material. The following is a summary of the **applicant's statement**.

a. Avoidance.

Hilcorp has reviewed options to avoid expansion of Ugnu Mine Site E, but an expansion could not be avoided. The Ugnu Mine Site E expansion in Cell 6 is designed with the minimum footprint consistent with safety and engineering constraints. The Ugnu Mine Site E expansion is designed in a phased approach, which avoids immediate impacts to roughly half of Cell 6 (Phase 2) unless additional gravel is needed in the future. Hilcorp employs deep mining to reduce surface area disturbance. Instead of developing a new gravel source, Hilcorp is expanding an existing mine site and mining as deeply as possible in an existing mine site. Although additional wetlands will be directly impacted by opening new mine cells, the proposed wetlands are already subject to indirect impacts from ongoing activities in the adjacent mine cells. This expansion of the existing mine site avoids the following impacts: Avoided impacting as many lakes, ponds and streams as possible. Avoided anadromous water crossings to the maximum extent possible. Avoided impacting pristine wetlands to develop a new gravel source. Will use existing material sites and local existing roads to the maximum extent possible.

b. Minimization.

Hilcorp's decision to maximize gravel recovery from the existing Ugnu Mine Site E by expanding the existing Mine Site to meet the required gravel needs demonstrated minimization of impacts to high quality wetland habitat within the Milne Point Unit. The proposed expansion has been designed to minimize the area disturbed. The overburden will be removed in phases to maximize the conservation, segregation and stockpiling of the organic overburden for use in reclamation and restoration projects. Once mining is completed, overburden will be placed back into the pit to reduce and buttress side slopes and limit area required for storage. Hilcorp will construct berms around the margin of Cell 6 to serve as a thermal barrier. This barrier will help to preserve the underlying permafrost and prevent the melting of ice wedges and thermokarsting. Without this insulation, exposed ice wedges may melt and erode back from the edge of the pit with the potential to drain adjacent wetlands. The slope stability gained by this practice will ensure that the cell can eventually provide valuable habitat for avian species. The berms will also prevent transmission of surface water between mining cells, which is a major safety concern in an active mine site. The result of these berms is a net benefit for wetland preservation.

A thermal barrier berm of native overburden will be constructed around Phase I as it is opened. Typical dimensions of the thermal barrier will be 60 feet at the base and 10 feet thick. Gravel removal for use in Milne Point will only occur during winter via an ice road. This will eliminate the need for a new gravel road from Ugnu Mine Site E to Milne Point. Phase 2 of Cell 6 development, which was included in the Division of Mining, Land, and Water (DMLW) material sale contract and Mining and Rehabilitation Plan, will not be constructed at this time. Current planned impacts total 27.0 acres, which minimizes impacts by reducing the initially planned footprint by 23.5 acres. Hilcorp minimizes the amount of gravel necessary by minimizing the footprint necessary for additional development wells and associated infrastructure including providing access to the existing well rows for drilling, completion and operation of existing wells. Hilcorp designs the footprint of well pads to minimize impacts while still drilling new development wells and working on existing wells. This minimizes the amount of gravel expansion required at this site.

c. Compensation for unavoidable impacts to waters of the U.S., including wetlands.

Hilcorp examined permittee responsible mitigation, including creation/restoration and preservation of wetlands. Hilcorp stated that wetland creation/restoration on the North Slope is impracticable because wetlands are primarily developed through permafrost action (taking hundreds of years to develop) and the growing season is only 60 days, which prevents any reasonable success goals from being achieved that would show replacement of lost functions, as required by regulation. Also, the protection instrument that would be required cannot be accomplished because of land ownership and constitutional protection restrictions. Hilcorp stated that wetland preservation is also impracticable. Lands within the watershed are owned by the State of Alaska, United States Government, or private native corporations. There are currently no parcels of land available for purchase for preservation of the watershed. State lands on the North Slope are identified for resource development, and any purchase/preservation of those lands would appear to contradict the Alaska Constitution that states those lands are for maximum resource development. The federal lands on the North Slope are not available for private purchase. According to communication with the Arctic Slope Regional Corporation's Director of Land Management and Enforcement, there are no private Native owned lands available for purchase in the area. Out of kind mitigation (working with state/private/federal owners) is not considered practicable.

Hilcorp has avoided potential impacts by methods listed in Section 2 above, including expanding an existing mine site instead of opening a new mine and minimized potential impacts by methods listed in Section 3 above including by constructing thermal berms around the mine area. Avoidance and minimization is proposed to the maximum extent practicable.

<u>WATER QUALITY CERTIFICATION</u>: A permit for the described work will not be issued until a certification or waiver of certification, as required under Section 401 of the Clean Water Act (Public Law 95-217), has been received from the Alaska Department of Environmental Conservation.

<u>CULTURAL RESOURCES</u>: The latest published version of the Alaska Heritage Resources Survey (AHRS) has been consulted for the presence or absence of historic properties, including those listed in or eligible for inclusion in the National Register of Historic Places. There are no cultural resources in the permit area or within the vicinity of the permit area. The permit area has been determined to be the footprint of the proposed project area. Consultation of the AHRS constitutes the extent of cultural resource investigations by the Corps at this time, and we are otherwise unaware of the presence of such resources. The Corps has made a No Potential to Cause Effects determination for the proposed project. Consultation with the State Historic Preservation Office (SHPO) is not required, however, any comments SHPO may have concerning presently unknown archeological or historic data that may be lost or destroyed by work under the requested permit will be considered in our final assessment of the described work.

<u>ENDANGERED SPECIES</u>: The project area is within the known or historic range of the polar bear (*Ursus maritimus*), Spectacled Eider (*Somateria fischeri*), and Steller's eider (*Polysticta stelleri*).

We have determined the described activity may affect the polar bear, Spectacled Eider, and Steller's eider. We will initiate the appropriate consultation procedures under section 7 of the Endangered Species Act with the U.S. Fish and Wildlife Service. Any comments they may have concerning endangered or threatened wildlife or plants or their critical habitat will be considered in our final assessment of the described work.

<u>ESSENTIAL FISH HABITAT</u>: The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996, requires all Federal agencies to consult with the National Marine Fisheries Service (NMFS) on all actions, or proposed actions, permitted, funded, or undertaken by the agency, that may adversely affect Essential Fish Habitat (EFH).

No EFH species are known to use the project area.

We have determined the described activity would not adversely affect EFH in the project area.

<u>TRIBAL CONSULTATION</u>: The Alaska District fully supports tribal self-governance and government-to-government relations between federally recognized Tribes and the Federal government. Tribes with protected rights or resources that could be significantly affected by a proposed Federal action (e.g., a permit decision) have the right to consult with the Alaska District on a government-to-government basis. Views of each Tribe regarding protected rights and resources will be accorded due consideration in this process. This Public Notice serves as notification to the Tribes within the area potentially affected by the proposed work and invites their participation in the Federal decision-making process regarding the protected Tribal right or resource. Consultation may be initiated by the affected Tribe upon written request to the District Commander during the public comment period.

<u>PUBLIC HEARING</u>: Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, reasons for holding a public hearing.

EVALUATION: The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts of the proposed activity and its intended use on the public interest. Evaluation of the probable impacts, which the proposed activity may have on the public interest, requires a careful weighing of all the factors that become relevant in each particular case. The benefits, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. The outcome of the general balancing process would determine whether to authorize a proposal, and if so, the conditions under which it will be allowed to occur. The decision should reflect the national concern for both protection and utilization of important resources. All factors, which may be relevant to the proposal, must be considered including the cumulative effects thereof. Among those are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people. For activities involving 404 discharges, a permit will be denied if the discharge that would be authorized by such permit would not comply with the Environmental Protection Agency's 404(b)(I) guidelines. Subject to the preceding sentence and any other applicable guidelines or criteria (see Sections 320.2 and 320.3), a permit will be granted unless the District Commander determines that it would be contrary to the public interest.

The Corps of Engineers is soliciting comments from the public; Federal, State, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

AUTHORITY: This permit will be issued or denied under the following authorities:

(X) Discharge dredged or fill material into waters of the United States – Section 404 Clean Water Act (33 U.S.C. 1344). Therefore, our public interest review will consider the guidelines set forth under Section 404(b) of the Clean Water Act (40 CFR 230).

Project drawings and a Notice of Application for State Water Quality Certification are enclosed with this Public Notice.

District Commander U.S. Army, Corps of Engineers

Enclosures

STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION DIVISION OF WATER Wastewater Discharge Authorization Program (WDAP) / 401 Certification

DEPARTMENT OF ENVIRONMENTAL CONSERVATION WDAP/401 CERTIFICATION 555 CORDOVA STREET ANCHORAGE, ALASKA 99501-2617 PHONE: (907) 269-6285 | EMAIL: dec-401cert@alaska.gov

NOTICE OF APPLICATION FOR STATE WATER QUALITY CERTIFICATION

Any applicant for a federal license or permit to conduct an activity that might result in a discharge into navigable waters, in accordance with Section 401 of the Clean Water Act of 1977 (PL95-217), also must apply for and obtain certification from the Alaska Department of Environmental Conservation that the discharge will comply with the Clean Water Act, the Alaska Water Quality Standards, and other applicable State laws. By agreement between the U.S. Army Corps of Engineers and the Department of Environmental Conservation, application for a Department of the Army permit to discharge dredged or fill material into navigable waters under Section 404 of the Clean Water Act also may serve as application for State Water Quality Certification.

Notice is hereby given that the application for a Department of the Army Permit described in the Corps of Engineers' Public Notice (PN) Reference Number **POA-2019-00122 Ugnuravik River**, serves as application for State Water Quality Certification from the Department of Environmental Conservation.

After reviewing the application, the Department may certify there is reasonable assurance the activity, and any discharge that might result, will comply with the Clean Water Act, the Alaska Water Quality Standards, and other applicable State laws. The Department also may deny or waive certification.

Any person desiring to comment on the project with respect to Water Quality Certification, may submit written comments to the address above or via email to <u>dec-401cert@alaska.gov</u> by the expiration date of the Corps of Engineer's Public Notice. All comments should include the PN reference number listed above. Mailed comments must be postmarked on or before the expiration date of the public notice.

Disability Reasonable Accommodation Notice

The State of Alaska, Department of Environmental Conservation complies with Title II of the Americans with Disabilities Act of 1990. If you are a person with a disability who may need special accommodation in order to participate in this public process, please contact Theresa Zimmerman at 907-465-6171 or TDD Relay Service 1-800-770-8973/TTY or dial 711 within 5 days of the expiration date of this public notice to ensure that any necessary accommodations can be provided.







<u>Project Location:</u> Milne Point Unit Ugnuravik Mine Site / Mine Site E

Latitude (Decimal Degrees): 70.461513 , NAD 1983 Longitude (Decimal Degrees): -149.695938 , NAD 1983

Alaska State Plane Zone 4, NAD 1983 X = 1677663.24 Y = 6018354.96

Sec. 24, T13N, R09E, Umiat Meridian

ADL#: 025514, 025515 Adjacent Property Owner: State of Alaska

Milne Point Unit Ugnuravik Mine Site / Mine Site E Vicinity Map - Figure 1

POA-2019-00122 Hilcorp Alaska, LLC. Ugnuravik River 4/23/2019

Sheet 1 of 5

Legend

- Existing Gravel Footprints
- ----- Existing Pipeline (Above Ground)
- Cil and Gas Unit Boundary







NOTES:

- 1. THESE DRAWINGS DISPLAY THE MAXIMUM PIT SIZE FOR PHASE 1. THE FINAL DISTURBED FOOTPRINT MAY BE SMALLER DEPENDING ON GRAVEL NEEDS. THESE DRAWINGS ARE NOT FOR CONSTRUCTION.
- 2. THESE PLANS ARE FOR WINTER OPERATIONS ONLY.
- 3. LOCATED WITHIN S19 T13N R10E UM AND S24 T13N R9E UM.
- 4. CELL 6 IS APPROXIMATELY 50.5 ACRES. FOR PHASE 1 APPROXIMATELY 11 ACRES WOULD INCLUDE OVERBURDEN STORAGE, THERMAL BARRIER AND ACCESS ROAD. THE MATERIAL SITE'S FOOTPRINT WILL BE APPROXIMATELY 16 ACRES.
- PHASE 1 OF CELL 6 WOULD PRODUCE AN ESTIMATED 615,000 CYDS. OF OVERBURDEN, INCLUDING A 30-PERCENT SWELL FACTOR, AND AN ESTIMATED 1,000,000 CYDS. OF GRAVEL.
- 6. ALL PIT SIDE SLOPES TO BE MINED AT 1.5:1 TO MAXIMIZE GRAVEL
- EXTRACTION AND MINIMIZE FOOTPRINT. 7. A THERMAL BARRIER BERM OF NATIVE OVERBURDEN WILL BE CONSTRUCTED AROUND PHASE 1 AS IT IS OPENED.TYPICAL DIMENSIONS; 60' AT BASE AND 10' THICK.



0 500 1000 FT 1" = 500' SHEET NO. 2 OF 5



E-PIT EXPANSION - PROFILE ADDRESS: RECON LLC 481 W. RECON CIR. PALMER, AK, 99645 POA-2019-0 CELL 6 Hilcorp Alas ENGINEER: ISAAC ROWLAND, P.E. Ugnuravik F PHASE 1 CONTACT: (907)322-5545 4/23/2019 Sheet 3 of 5 11" X 17" DRAWN BY: MCS 4/11/2019

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	PLANE ZONE 4, NAVD88(G12B)		
	COORDINATES LISTED IN U.S. SURVEY		
	FEET.		

- 2. THESE DRAWINGS DISPLAY THE MAXIMUM PIT SIZE FOR PHASE 1. THE FINAL DISTURBED FOOTPRINT MAY BE SMALLER DEPENDING ON GRAVEL NEEDS. THESE DRAWINGS ARE NOT FOR CONSTRUCTION.
- 3. PHASE 1 OF CELL 6 WOULD PRODUCE ESTIMATED 473,000 CYDS. OF BANK OVERBURDEN (615,000 CYDS WITH 30-PERCENT EXPANSION FACTOR) AND ESTIMATED 1,000,000 CYDS. OF GRAVEL.
- 4. ALL PIT SIDE SLOPES TO BE MINED AT 1.5:1 TO MAXIMIZE GRAVEL EXTRACTION AND MINIMIZE FOOTPRINT.
- 5. A THERMAL BARRIER BERM OF NATIVE OVERBURDEN WILL BE CONSTRUCTED AROUND PHASE 1 AS IT IS BEING OPENED.TYPICAL DIMENSIONS; 60' AT BASE AND 10' DEEP.

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00122 ska, LLC.		SHEET NO.
River		3 OF 5
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NOTES:

- 1. ON COMPLETION OF MINING THE OVERBURDEN WILL BE PLACED BACK INTO PIT TO REDUCE AND BUTTRESS SIDE SLOPES AND LIMIT AREA REQUIRED FOR STORAGE.
- 2. THE INITIAL PLACEMENT OF THE OVERBURDEN WILL BE OVERBUILT APPROXIMATELY 5-FEET ABOVE NATURAL GRADE. THIS WILL ALLOW FOR CONSOLIDATION AND THE EVENTUAL ESTABLISHMENT OF LITTORAL HABITAT.
- 3. APPROXIMATELY 4 ACRES OF LITTORAL HABITAT IS EXPECTED TO BE ESTABLISHED IN PHASE 1. APPROXIMATELY 25% OF THE TOTAL WATER SURFACE.
- 4. ALL SLOPES REDUCED TO 3:1 OR FLATTER AT CLOSURE.
- 5. A CONTINUOUS THERMAL BARRIER BERM OF OVERBURDEN WILL COMPLETED AFTER THE OVERBURDEN HAS BEEN PLACED BACK INTO THE PIT.
- 6. FINAL WATER LEVEL ESTIMATED TO BE 1-FOOT TO 2-FEET BELOW NATURAL GRADE.
- 7. ACCESS ROAD AND OVERBURDEN STOCKPILE WILL BE REMOVED.

NORTH

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SHEET NO.

4 OF 5



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MINING AND REHABILITATION PLAN FOR UGNU MINE SITE E MILNE POINT UNIT, NORTH SLOPE BOROUGH, ALASKA

as required by Material Sale Contract ADL #420862 USACE Permit No. POA-2019-00122, Beaufort Sea 342

Hilcorp Alaska, LLC April 8, 2019

INTRODUCTION

Hilcorp Alaska (Hilcorp) submits this mining and rehabilitation plan for the operation of Ugnu Mine Site E in the Milne Point Unit (MPU). The mining and rehabilitation plan was developed to fulfill requirements of the federal permit issued for the mine. The State Material Sale Contract also requires an Alaska Department of Natural Resources (ADNR) Division of Mining Land and Water (DMLW) approved Mining and Reclamation Plan.

HISTORY

Ugnu Mine Site E is located approximately 2 miles east of the Oliktok Road, approximately 5 miles southeast of the Oliktok Point and 2 miles southeast of Simpson Lagoon within the Milne Point Unit (Figure 1). The Ugnuravik River is situated approximately ½ mile to the east of the mine site. Immediately west and adjacent to Ugnu Mine Site E is the Ugnuravik #1 pit. The Ugnuravik #1 pit and Mine Site E are separated by a 50-foot wide dike. Mine Site E currently consists of five cells (Cells 1, 2, 3, 4 and 4A) with a combined area of approximately 157 acres. The Ugnuravik #1 pit is also known as Cell #3.

Sohio Alaska Petroleum Company (Sohio) submitted an application to the agencies on December 3, 1982 for the proposed Ugnuravik #1 Gravel Pit for the construction of an offshore Mukluk Island exploration project, and future expansion for offshore drilling and development in the Kuparuk River Unit. The U.S. Corps of Engineers (USACE) issued Department of Army (DA) Permit #4-820630 on January 31, 1983.

On June 22, 1983, the USACE issued a public notice for an expansion of the Ugnuravik #1 Gravel Pit operated by Sohio. Texaco Inc. had applied to expand the Ugnuravik #1 Pit easterly. ARCO Alaska, Inc. (AAI) first obtained the required permits to extract gravel from this site in early 1984. The permits allowed ARCO to construct an access road to the mine site and to open a new pit located 1200 feet east of the existing Ugnuravik #1 pit (also known as the Sohio mine site). The original Sohio and AAI pits constitute the west and east thirds of the present site (Cell #1, Cell #2 and Cell #3). AAI obtained the required

permits for a site expansion into the central third of the present site in early 1985. Overburden from the expansion area was placed into the east aliquot of the site.

On September 1, 1994, BP Exploration (Alaska) Inc. (BP) submitted an application to extend DA Permit No. 4-820630 for Ugnuravik #1 for a period of ten years and modify the permit to include excavation activities, which were now regulated under Section 404 of the Clean Water Act. BP planned to continue mining operations excavating within the existing pit with no footprint expansion to mine up to 700,000 cubic yards. BP included the current mine site rehabilitation plan approved by the State of Alaska for the Mine Site E area, which included Ugnuravik Pit #1 in their application. Since Mine Site E was operated by AAI, the mine site Rehabilitation Plan was prepared by AAI. The Mine Site E Rehabilitation Plan assumes that Mine Site E would not be expanded beyond the currently permitted boundaries, which were Cell #1, Cell #2 and Cell #3. If the site would be expanded or used differently, a revised rehabilitation plan would be submitted to the agencies. The Mine Site E Rehabilitation Plan also assumed that the most suitable rehabilitated use of Mine Site E would be as habitat.

A Conclusive Consistency Determination (State I.D. NO. AK9410-01OG) was issued on October 31, 1994. The USACE issued DA permit No. M-820630 on November 16, 1994 to continue mining within the existing pit with no footprint expansion. BP submitted a request for renewal on September 16, 2004 for another term of 10 years as the USACE permit was scheduled to expire on October 31, 2004. BP indicated that they were no longer mining from the Ugnuravik #1 pit, but the rehabilitation of the site was intended to occur in conjunction with ConocoPhillips (CPAI)'s Mine Site E. The rehabilitation plan for the Ugnuravik #1 Gravel mine site is included in CPAI's Mine Site E Rehabilitation Plan, approved by the State of Alaska. BP's current approved rehabilitation plan for Kuparuk Mine Site E is the mine site rehabilitation plan prepared by AAI, which was submitted with BP's previous application on September 1, 1994.

The Alaska Department of Natural Resources (ADNR) Division of Mining Land and Water (DMLW) Material Sale Contract, ADL 80500 for mining at Ugnuravik Pit #1 was granted to Sohio on January 11, 1978. Ownership was transferred from Sohio to BP in February 1978. ADL 80500 was closed on January 11, 1984. Material Sale Contract, ADL 409442 was issued July 17, 1983 and Material Sale Contract, ADL 413724 was issued November 25, 1988 for Ugnuravik Pit #1. Inactive Master Material Sale Site ADL 419307 was issued for the Ugnuravik Mine Site on November 22, 2011. Master Material Sale Site ADL 416074 for Mine Site E (containing approximately 157 acres) was issued on November 9, 2011.

On December 29, 1989, Al Ott with the Alaska Department of Fish and Game (ADF&G) commented on the Rehabilitation Plan for the Ugnuravik #1 pit. He indicated that he understood that the rehabilitation of the Ugnuravik #1 pit will be linked to plans for the adjacent Mine Site E. He recommended that AAI and BP work together on the development of a rehabilitation plan for the Ugnu/Mine Site E area.

Development and rehabilitation of Cells 3, 4, and 4A of Mine Site E were initially approved by USACE in DA permit number POA-2005-1295 for Pioneer for the Oooguruk development project. Pioneer was subsequently sold to Caelus Natural Resources Alaska, LLC (Caelus). The cells were also approved by the USACE DA Permit number POA-2005-1243 for Kerr-McGee Oil and Gas Corporation. The DA permit number POA-2005-1243 was subsequently transferred to ENI. Development plans for Mine Site E have been modified routinely since the projects began. Excavation and Rehabilitation Plans for Mine Site E – Cells 3, 4 and 4A were prepared by PND Engineers, Inc. for Caelus Natural Resources Alaska, LLC. The plans were intended to provide an update for the excavation of material from Cell 4A and the restoration of Cells 3 and 4.

The North Slope Borough's original Interim Zoning Ordinance permit for ice road construction and camp to open a new gravel pit, Ugnuravik Pit # 1 was granted to Sohio on February 2, 1983.

The Alaska Department of Environmental Conservation (ADEC) authorized discharge under the Alaska Pollutant Discharge Elimination System (APDES) for facilities related to oil and gas extraction under General Permit number AKG-33-2000 effective March 1, 2017.

2019 MINING AND REHABILITATION PLAN

This Mining and Rehabilitation Plan reflects proposed future gravel extraction operations and re-vegetation techniques consistent with proven success and other recently approved rehabilitation plans.

The mine site plan meets the following objectives:

- Maximize gravel recovery at an existing site while considering habitat in order to minimize the area disturbed,
- Segregate the mine site expansion from Ugnuravik River to avoid a potential breach between the mine and the river at high flow periods, and
- Conserve stockpiled, segregated organic overburden for use in potential site reclamation and restoration projects.

The existing gravel mine site configuration is shown on Figure 2. Figure 2 provides the location of the mine site and identifies the previously permitted existing pit. The current Ugnu Mine Site E permitted area is approximately 157 acres, more or less. Hilcorp proposes an expansion to the permitted area of approximately 50.5 acres in one cell. Final site configuration is dependent on gravel requirements. Cell 6 is to the east of Cell 1 and is approximately 50.5 acres in size. Approximately 11 acres would include overburden storage, thermal barrier and access road. The approximate area of Cell 6 that will be impacted by gravel mining activities in Phase I is approximately 27acres. The area to be

mined in Cell 6 is approximately 900 feet long and 850 feet wide and totals 16 acres. Cell 6 would produce an estimated 1,000,000 cubic yards of gravel.

The expansion area to the east will follow approximately the 16 foot contour along its eastern boundary. Preserving this topography along the eastern boundary will provide a natural flood-prevention barrier. An overburden stockpile along the northern boundary will also provide additional protection between the mine site and the Ugnuravik River. The mining and rehabilitation plan assumes that the entire expansion area will be worked prior to final closure. The final area impacted by mining will be reduced if a lesser volume of gravel is required than is potentially extractable.

EXISTING CONDITION

The mine site is located west of Ugnuravik River, a tidally-influenced river flowing into Simpson Lagoon. The Ugnuravik has been specified as being important for the spawning, rearing, or migration of anadromous fishes as broad whitefish and least cisco. Resident fish species such as Arctic grayling also occur in this river. The mine site is located within Section 19 of Township 13 North, Range 10 East, and Section 24 of Township 13 North, Range 9 East, Umiat Meridian (see Figure 1), approximately 2 miles east of the Oliktok Road and can only be accessed in the winter by ice road from Milne Point.

The Ugnu Mine Site E expansion area occupies a wetland area that is classified as Tussock Tundra and Moist Sedge-Shrub Tundra¹. The proposed Mine Site E expansion area will consist of multiple connected phases forming a single large borrow site. The final site configuration will be dependent on the gravel needs.

Mining will only be done in the winter from an ice road constructed across the Ugnuravik River. Lakes and adjacent areas around the mine site are used by shorebirds such as plovers, sandpipers, and phalaropes, and by waterfowl such as black brant, Canada goose, pintail, oldsquaw, king eider, and pacific loon. Most avifauna in the area are migratory and will not be affected by the mining operations in the expansion area, which will only occur in the winter months.

Use of the area by mammals is expected to be minimal in the winter. A Polar Bear Den Survey of the ice road route and Mine Site E area will be conducted in the Winter 2019/2020 prior to initiating the project. Hilcorp has developed a Bear Interaction Plan for the North Slope to assure that the impacts of humans on bears are minimized during oil field activities. All employees are trained on General Avoidance and Encounter Procedures, Polar Bear Specific Procedures and Grizzly Bear Specific Procedures. Caribou

¹ Roth, J.E., K.L. Beattie, and A.F. Wells.2009. An Ecological Land Survey in the Milne Point Area, 2008. Final Report prepared for BP Exploration (Alaska), Inc., Anchorage, AK by ABR, Inc., Fairbanks, AK. 79 pp.

may be present during the summer, and arctic fox and small mammals such as shrews and microtines may be present in the mine site vicinity throughout the year.

Overburden material is currently stored in three areas. A rectangular overburden pile was created to the north of Cell #1. Overburden material from the surface stockpile located at Cell 4A was placed within Cell 3 to create shallow water habitat and islands within the northern portion of the cell. Cell 3 has not yet filled to expected final water surface elevation and has been periodically utilized as a water source for construction activities. All usable gravel fill has been excavated from within Cell 4 to an approximate depth of -50 feet British Petroleum Mean Sea Level (BPMSL). The perimeter side slopes within the cell were excavated at 1:1 during mine development and later constructed flatter (minimum 3H:1V) with overburden as part of Cell 4 rehabilitation activities.

All overburden material previously stockpiled on the surface of Cell 4A was removed down to the original tundra substrate. The stockpiled material was used for rehabilitation of Cell 3 and flattening of side slopes within Cell 4. Overburden material is also stockpiled on an east stockpile north of Cell#1. Upon closure of Cell #1, existing overburden will be removed to within 1 foot of the existing grade and placed in Cell #1.

As some measure of flexibility is required in mining and rehabilitation, the plans and figures presented in this document are provided as guidance, and not as a precise description of final configuration. However, the outer permit boundary and size of the mine site and the re-vegetation performance standards listed in Table 1 are considered compliance requirements under the permits that regulate this project.

Permits authorizing the current mining and rehabilitation plan are listed in the "History" section of this plan.

MINING PLAN

General Information

- 1. The Ugnu Mine Site E expansion cell will be separated from the existing Ugnu Mine Site E by a dike of native soil.
- 2. Proposed Mine Site E Expansion to consist of multiple connected phases forming single large borrow site.
- 3. Cell #6 is to the east of Cell #1 and is approximately 50.5 acres in size. Cell 6 may produce up to 2,000,000 cubic yards of gravel in two phases.
- 4. Final Site configuration will be dependent on gravel needs. Pit depth and size will be dependent on what is actually out there. We require enough gravel for 2 to 3 pads initially, which could be adequately covered with Phase 1 of Cell 6. However, Hilcorp is requesting flexibility, if in the future; more gravel is required for additional pads and future field development.
- 5. All pit slopes will be at 1.5:1 to maximize gravel extraction and minimize footprint.

- 6. Once initial phases have been mined, overburden will be placed back into the pit to reduce and buttress side slopes and limit area required for storage.
- 7. All slopes will be reduced to 3:1 or flatter at closure.
- 8. A thermal barrier berm constructed from native overburden will be placed around each phase as they are opened. A Thermal barrier berm of native overburden will be constructed around Phase I as it is being opened. Typical dimensions would be 60 feet at the base and 10 feet thick.
- 9. The proposed Ugnu Mine Site E Expansion (Cell 6) is to the east of the existing Ugnu Mine Site E as the expansion will be accessed by an ice road from the Milne Point F Pad area into the northeast corner of the Mine Site E expansion
- 10. Final Site configuration will be dependent on gravel needs. Cell 6 is the shortest distance possible between the Milne Point Unit Development Projects and the Ugnu Mine Site E Expansion area.
- 11. The proposed Ugnu Mine Site E expansion must be excavated to meet the gravel needs for planned Milne Point Unit Development Projects, including R Pad Development south of F Pad and additional pad expansions required for drilling new wells to increase production within the MPU.
- 12. The 50.5 acre new permitted expansion boundary which includes an overburden storage area and buffer is identified in Figure 2. The overburden of peat and organic silt from the proposed excavation area will be suitable for site restoration work. Approximately 16 to 20 feet of overburden will be removed. The segregated overburden will be stockpiled to the north of the new pit expansion area (Phase I). Inorganic overburden can be used for restoration and erosion control projects.
- 13. The Phase 1 of the expansion is expected to produce up too 1,000,000 cubic yards of gravel obtained in standard 20-foot lifts. Gravel extracted may be stockpiled at various locations within the permitted footprint.
- 14. Although most of the mining will be done in the winter, we could continue mining during periods of thaw if required and, if necessary, de-water the new expansion pit.

Summer Mining Plan as a Contingency

- 1. Summer mining may occur as a contingency if necessary and will consist of mining gravel vertically to a depth of between 6 and 8 feet below the existing depth.
- 2. Gravel will be mined below the static water elevation, if it is practical to do so and assumes continued authorization to discharge accumulated gravel mine water under the provisions of an Alaska Pollutant Discharge Elimination Systems (APDES) permit issued by the Alaska Department of Environmental Conservation. Mining below the static water table will be conducted so as to create a benched or shelved final configuration. Generally, the shelf will extend laterally for a distance of approximately 100 feet. Beyond the shelf area, mining will continue vertically until it is determined to be no longer practical for reasons of safety, gravel quality, or operational efficiency. Side slopes of the cut will be contoured to a 1:1.5 side slope as mining progresses (Fig 4).

Winter Mining Plan

- 1. Mining during the winter months will consist of deep mining, to a depth of approximately 40 to 60 feet MSL. A sloped access ramp will be constructed into the pit as mining progresses deeper into the pit. This deep mining will accomplish two important goals: the disturbance of surface area will be reduced through greater recovery of the natural resource gravel within a specific area and the mined material can be stockpiled within the perimeter of the expanded extraction site, if not immediately transported offsite for construction.
- 2. Side slopes in Ugnu Mine Site E expansion during active winter mining will be contoured to a 1:1.5 side slope in those areas not already contoured during the summer. Some contouring may have to be performed during the following summer season. Final side slopes will be constructed to a 3:1 slope, which is protective against thermokarsting.
- 3. Most of the overburden removal in the new expansion area will be conducted in the winter months to avoid any potential disruption of nesting birds.
- 4. Mining and overburden removal would extend from the winter access ice road into the proposed new pit expansion area in Cell 6. The ice road will be constructed to access the northeast corner of the Mine Site E expansion leading into Phase 1 of Cell #6.

REHABILITATION PLAN

INTRODUCTION

This plan describes procedures to be used for rehabilitating the Ugnu Mine Site E Expansion located in the Milne Point Unit on the North Slope of Alaska.

Because flexibility is needed in rehabilitation, most of this plan is provided for information purposes only, with the understanding that some changes may be needed as rehabilitation progresses. Flexibility in the rehabilitation plan allows information from this site and other rehabilitation sites to be considered in the future; however, the monitoring requirements (see Table 1) and the Performance Standards (see Table 2) should be considered compliance requirements.

Surrounding Vegetation: The vegetation surrounding the Mine Site E Expansion has a rolling to flat landscape with minimal topographic relief. The wetland habitats of the Ugnuravik River consist mostly of moist upland communities and wet meadow communities which are typical of the North Slope coastal plain. The moist upland vegetation occurs on the lowland areas that are well drained. The plant species of this vegetation type are primarily influenced by the moisture content of the soil and vary as moisture decreases from solely cottongrass to areas dominated by dwarf shrubs. The major species of the cottongrass tussock communities include: cottongrass (Eriophorum vaginatum), Bigelow's sedge (Carex bielowii) and dwarf birch (Betula nana). The dwarf shrub-heath communities are characterized by: dwarf birch (Betula nana), heather

(Cassiope tetragona), Labrador tea (Ledum palustre), and netted willow (Salix reticulata). The wet meadow vegetation type is typical of the wetter areas with seasonally saturated soils which typically occur near the edges of ponds and streams. Depressed center polygons also typically include this plant community type. The dominant plant species of the wet meadow communities include: water sedge (Carex aquatilis), cottongrass (Eriophorum spp.), tundra grass (Dupontia fisheri), Bigelow's sedge (Carex Bigelowii), and other sedges (Carex spp.), rushes (Juncus spp.), horsetail (Equisetum spp.). Other grasses, mosses, lichens, and algae are also found in this vegetation type.

Rehabilitation Approach: Restoring the mine site to pre-mining conditions after gravel extraction is complete is impossible, so a plan to create both a deep freshwater reservoir and functional littoral habitat is planned. Thermal stabilization berms are planned to minimize thermokarsting. If Phase 2 is mined, upon site closure and rehabilitation, Hilcorp will consult with ADF&G on a connection to the Ugnuravik River at the southeast corner of the site to allow the site to flood and provide fish habitat.

Goals and Objectives: The goal of the Milne Point Mining and Rehabilitation Plan for the Ugnuravik Mine Site expansion is to establish productive, diverse, and self-sustaining plant communities on terrestrial areas and a diversity of wildlife habitat upon final mine site abandonment. The plan also describes the creation of shallow littoral habitat and optimization of shoreline length and diversity.

SITE PREPARATION

- 1. During mining, initial rehabilitation (backfilling with overburden, establishing shallower side slopes) will also be occurring as extraction becomes complete in areas. This continual approach to initial rehabilitation will minimize the potential for thermokarsting, minimize repeated shuffling of overburden and minimize the overall duration required for rehabilitation. As the mine pit is naturally filled by runoff and melt water, a freshwater reservoir will develop. This will be a valuable fresh water source that will prevent other natural lakes from being drained and it will also provide bird habitat. The freshwater reservoir could remain a valuable freshwater source isolated from the Ugnuravik River. Although it will vary based on many factors, it is estimated that the mine will fill with water to 15 feet elevation approximately 15 years after mining is completed. Hilcorp believes it is best to let the mine fill slowly with water over several years in order to let the overburden settle naturally and avoid washouts.
- 2. We do not expect flooding from the Ugnuravik River due to its size and the nature of the coastal plain, but if severe flooding were to occur, overflowing the dike, breaching could be conducted to the extent practicable to allow flow through the mine-site created lake. In the event that severe flooding occurs, the goal is to construct a downstream connection that would allow flow through the mine-site created lake. Similarly, If the reservoir fills more than indicated by design, an overflow weir or culverts will be

installed which will allow water to overflow into a small stream towards the Ugnuravik River. If the lake design elevations are exceeded, the frozen, raised thermal berms will prevent a catastrophic failure of the mine site lake, but installing overflow culverts to control the drainage would minimize thaw to the underlying permafrost and would help avoid creating new flow paths into the tundra surface with mine lake discharge. With either of these possibilities, it is necessary to be time and situation specific; therefore plans for the breach or outlet will only be designed if deemed necessary by site conditions.

- 3. Once mining is completed, overburden will be placed back into the pit to reduce and buttress side slopes and limit area required for storage. The majority of the overburden placed in the original pit will be used for the construction of littoral benches. The initial placement of the overburden will be overbuilt approximately 5-feet (about 22 feet elevation) above natural grade. This will allow for consolidation and the eventual establishment of littoral habitat. This approach is designed to create a ragged, sloping shoreline and functional habitat. Creation of nesting islands was evaluated and dismissed as a viable habitat creation strategy because it is Hilcorp's view that the islands typically subside enough to lose their usefulness as habitat in a short amount of time. Because the pond will take many years to fill, the level of the replaced overburden can be adjusted as the material thaws and settles. After the first several years, the littoral benches will be inspected to determine the level of settlement and whether they need to be adjusted by adding material or removing material prior to placement of tundra mat and revegetation work. Final water level is assumed to be 15 feet elevation. Final configuration will depend on the final depth of the pit. All slopes will be reduced to a 3:1 slope at closure. Approximately 4 acres of littoral habitat will be established in Phase 1, which is approximately 25% of the total water surface.
- 4. Hilcorp will construct a continuous thermal barrier berm of overburden after the overburden has been placed back into the pit. This barrier will help to preserve the underlying permafrost and prevent the melting of ice wedges and thermokarsting. Without this insulation, exposed ice wedges may melt and erode back from the edge of the pit with the potential to drain adjacent wetlands. The slope stability gained by this practice will ensure that the cell can eventually provide valuable habitat for avian species. The berms will also prevent transmission of water between mining cells, which is a major safety concern in an active mine site. The result of these berms is a net benefit for wetland preservation. The thermal barrier berm of native overburden will start to be constructed around Phase I as it is opened. The initial thermal barriers will be constructed to maximize protection from overland runoff and minimize thawing during mine site operation. Typical dimensions of the thermal barrier will be 60 feet at the base and 10 feet thick.
- 5. Unused overburden will be stockpiled on existing overburden piles to the north of Cell #1. The overburden stockpile will be graded to 3:1 or flatter. Overburden may also be placed to the north of Phase 1 of Cell #6.

- 6. The final grade around the mine pit relative to final water level will be no more than 3:1 out to 5 or 6 feet of water depth. After rehabilitation, the depth of the cell will be about 70 feet, the depth of the water will be about 68 feet, and the distance from the surface of water to the edge of the inside edge of the berm surround the cell will be about 3 feet. All slopes will be reduced to a 3:1 slope at closure.
- 7. The access road and overburden stockpile will be removed for site closure.

SITE REHABILITATION SCHEDULE

Early stages of rehabilitation will begin concurrently with active mining. Current development plans in Milne Point Unit call for the mine site to be active for another 5 years. Formal site preparation and rehabilitation will commence at final Cell 6 abandonment.

The proposed mining and rehabilitation schedule is presented in the table below.

Timeline of Mining and Rehabilitation			
Activity Rehabilitation		Estimated Date*	
Cell 6, Phase 1 Active	Continual backfilling, side	2019-2024	
Mining	slope establishment as		
	mining continues.		
Cell 6, Phase 1 End of	Inspect littoral area, adjust	4 years after placement	
Mining	by adding or cutting down	(2028)	
	to reach design elevations		
Cell 6, Phase 1 End of	Allow mine to naturally fill	2024 - 2039	
Mining	with water		
End of Mine Site Life	Rehabilitation treatment	2039-2049	
	and monitoring		

Table 1: Timeline of Mining and Rehabilitation

*Expansion and rehabilitation phase estimated dates are subject to change based on gravel mining needs. Rehabilitation estimated dates subject to change based on site reaching design criteria (i.e. overburden consolidating and water filling mine site).

REHABILITATION TREATMENTS

Final configuration will depend on depth of pit. Approximately 4 acres of littoral habitat will be established in Phase 1, which is approximately 25% of the total water surface.

Once the overburden at the edges of the pit has thawed and settled over several seasons, and the littoral area has been adjusted to match design elevations, a layer of organic-rich

overburden salvaged from Cell 6 or from the overburden stockpile north of cell 1 will be placed around the margins of the pit that will be revegetated.

Once the water level has neared design elevation, willow cuttings, tundra plugs and/or Arctophila sprigs will be transplanted onto the above-water portion of the berms. Seeding with other indigenous vascular plants, and the placement of live plant materials and soil salvaged from Cell 6 will also be used. Eventually, the establishment of a plant community dominated by indigenous vascular plants is desirable. Live plant materials will be collected from the adjacent tundra or elsewhere on the North Slope, under permit from the Alaska Department of Natural Resources.

In the shallow littoral areas, tundra plugs and/or sprigs of the aquatic grass Arctophila fulva will be transplanted along the planned final shoreline.

The thermal barriers (berms) are expected to revegetate only to a limited extent due to severely dry conditions because the ground surface will be high above the tundra grade. However, the lack of vegetation cover is not expected to negatively affect the thermal stability that the berms provide.

Goals	The primary goal is to promote the establishment of productive wetland communities and to create a diversity of potentially valuable wildlife habitats, including littoral habitat for nesting and littoral areas for aquatic vegetation. A secondary goal is to establish a new, stable soil thermal regime that allows the ground surface to remain stable and vegetation to remain productive.
Objective	Establishment of indigenous plant species similar to those in the surrounding tundra.
Performance Standard	By the end of the growing season in Year 5 (2044), the total live cover of indigenous vascular plants in the treated area should be at least 25% of that measured in nearby undisturbed tundra (i.e., reference tundra).
Monitoring Methods	Vegetation cover will be assessed qualitatively each summer. Also, Hilcorp personnel will monitor the site and discourage wildlife from grazing vegetation on the site. In 2049, vegetation cover will be monitored quantitatively using the point intercept method.

Table 2. Objectives and performance standards for Cell 6, Ugnu Mine Site E, Milne Point Unit

PERFORMANCE STANDARDS

The primary and secondary performance standards for each site component are presented in Table 2 below.

Eventually, the establishment of a plant community dominated by indigenous vascular plants is desirable. Ideally, total cover of natural colonizers and other indigenous plants (ILVC) should be $\geq 10\%$ within 10 years. The community should include ≥ 5 species, with each contributing $\geq 0.2\%$ to the ILVC. This is the minimum cover of an individual species that can be measured using standard methods, and indicates the potential for successful establishment of these species over the long term.

Site Component	Objectives	Performance Standards
Littoral Habitat Areas	Create productive wildlife habitat, especially for water birds.	≥10% total live cover of indigenous vascular plants and ≥5 species of indigenous vascular plants, each with ≥0.2% cover, within 10 years.
Thermal Barrier Berm	<u>Primary objective</u> : promote thermal stability around the edges of the mine site.	No vegetation performance standard (vegetation has negligible effect on the primary objective).
Thermal Barrier Berm	Secondary objective: promote establishment of a plant community dominated by indigenous species.	≥5 species of indigenous vascular plants, within 10 years.
Side Slopes	<u>Primary objective</u> : promote thermal stability around the edges of the mine site and flooded pits.	No vegetation performance standard (vegetation has negligible effect on the primary objective).
Side Slopes	Secondary objective: promote establishment of a plant community dominated by	≥5 species of indigenous vascular plants, within 10 years.

Table 3: Performance Standards

MONITORING FOR PERFORMANCE STANDARDS

In summer 2049, after 10 years of growing time, ABR will monitor vegetation quantitatively using the point-intercept method to determine whether the vegetation performance standard has been met. Also, annual monitoring will include periodic inspections of vegetation and site stability during summer by Hilcorp, ACS, and ABR. The impact of grazing on vegetation recovery will be assessed.

REPORTING

A short letter report summarizing monitoring results will be submitted by 1 February of each year listed in Table 1. The report will be provided to the following resource agencies:

- 1. State of Alaska Department of Environmental Conservation
- 2. State of Alaska Department of Natural Resources Division of Mining Land and Water
- 3. North Slope Borough Planning Department

REMEDIAL ACTION

Preliminary rehabilitation is expected to begin as areas get completely mined. The timing of the revegetation treatments will depend on the rate at which the physical characteristics of the site develop. For example, tundra plugs and Arctophila sprigs cannot be planted until the water level has reached the design elevation, which is expected to require ~ 15 years post construction completion. A general revegetation schedule is presented in the table below.

If the results of annual monitoring indicate that the performance standard is unlikely to be met by Year 5 (2044), additional rehabilitation treatment will be considered in consultation with agency representatives.

Table 4. Proposed schedule for application of rehabilitation treatments, monitoring, and reporting.		
Year*	Treatment & Monitoring	Reporting
Year 1	Place organic material from Cell 6 or overburden pile Transplant tundra plugs, <i>Arctophila</i> sprigs to shallow littoral areas Transplant willow cuttings to shore areas.	Progress report.

Year 3	Transplant tundra plugs of indigenous species to berms and side slopes, Arctophilia sprigs to shallow littoral areas.	Progress report.
Year 5	Measure vegetation cover and species composition, and compile a species list, using a standard method. Sample soil where revegetation success appears lacking. Observe surface stability qualitatively. Measure relative elevations.	Progress report.
Year 10	Measure vegetation cover and species composition, and compile a species list, using a standard method. Observe surface stability qualitatively.	Final report.

*Years after stabilization of site and design elevations reached

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.
- Kidd, J.G. and B. Streever. In preparation. Consistency of plant cover estimation using two vegetation sampling devices, Prudhoe Bay Oilfield, Alaska. Proceedings of the Arctic Science Conference, September 24-26, 2007, Anchorage, AK.