Brooks Range Petroleum

July 25, 2012

Ms. Mary Romero -- Project Manager
U.S. ARMY CORPS OF ENGINEERS, ALASKA DISTRICT
P.O. BOX 6898
JBER, AK 99506-0898

Dear Ms. Romero:

Brooks Range Petroleum Corporation is pleased to submit the attached "Application for Permit" for Brooks Range Petroleum Corporation's proposed Mustang Development Project on the North Slope of Alaska. Along with this "Application for Permit", we are submitting as supplemental reference documents the following attachments:

- *"Environmental Report"*
- *"Request for Jurisdictional Determination Approval Report"*
- *"Wetlands Functional Assessment and Characterization Report"*

We appreciate your efforts over the last few months in guiding Brooks Range Petroleum staff through the application submission process. If you have any questions, please do not hesitate to call me at (907) 865-5808.

Sincerely,

Mark C. Wiggin
Engineering and Development Manager

Cc: File -- *Mustang Development: USACE 404 "Application for Permit"*

510 L Street, Suite 601 Anchorage, AK 99501 (907) 339-9965 (907) 339-9961 fax

APPLICATION FOR PERMIT

MUSTANG DEVELOPMENT PROJECT
NORTH SLOPE, ALASKA

POA-2012-236

July 25, 2012

Submitted to:

Department of the Army,
United States Army Corps of Engineers,
Alaska Region

Submitted by:

Brooks Range Petroleum Corporation
510 L St., Suite 601
Anchorage, AK 99501

MUSTANG DEVELOPMENT PROJECT

Brooks Range Petroleum Corporation (BRPC) submits the following Application for a Department of Army Permit for the Mustang Development project. An Environmental Report (OASIS 2012a), a Request for Approved Jurisdictional Determination Report (OASIS 2012b), and a Wetlands Functional Assessment and Categorization Report (OASIS 2012c) are being provided as supplemental documents to assist in the evaluation of this application.

BRPC, as the operator, is proposing to develop oil reservoir prospects near the Kuparuk oil field. The project, designated as the Mustang Development project, is west of the Kuparuk River and just east of the Miluveach River, 13 miles south of the Beaufort Sea. The project will produce sales quality oil from a productive formation, the Kuparuk C sand. Production would likely continue for 15 years.

The proposed development project is located in the North Slope Borough (NSB) within leased lands owned by the State of Alaska. The proposed Mustang Development project includes several project components: a gravel production pad, gravel access roads, a new gravel mine, ice roads, drilling of production and injection wells, a three-phase processing facility, construction of an oil pipeline and a water pipeline, construction of buildings (offices, control room, warehouse, and a maintenance facility), and communications infrastructure. The proposed processing facility would produce sales quality oil for transport to the Alpine common carrier pipeline system. The proposed water pipeline would connect the Alpine source water to the Mustang Development for use in the water reservoir pressure maintenance and waterflood. Permit Number POA-2012-236, Beaufort Sea, has been assigned by the U.S. Army Corps of Engineers (USACE) to the project.

The Mustang Development project is subject to a unified environmental review process pursuant to National Environmental Policy Act and USACE regulations. All project components will be constructed by BRPC and selected contractors.

The application form is presented first, followed by a Table of Contents and Blocks that provide detailed information requested in several of the application boxes. Each Block is referenced to the application form by number. Following the Blocks are references and a set of figures. Lastly, the Mustang Development Project Borrow Pit Mining and Rehabilitation Plan is included as Appendix A.

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U.S. ARMY CORPS OF ENGINEERS **APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT** *(33 CFR 325)*	OMB APPROVAL NO. 0710-0003 EXPIRES: 31 AUGUST 2012

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
POA-2012-236			

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Mark Middle - Last - Wiggin	First - DAVE Middle - Last - TRUDGEN
Company - Brooks Range Petroleum Corporation	Company - OASIS ENVIRONMENTAL / ERM
E-mail Address - mwiggin@BRPCAk.com	E-mail Address - d.trudgen@oasisenviro.com
6. APPLICANT'S ADDRESS:	9. AGENT'S ADDRESS:
Address- 510 L Street, Suite 601	Address- 825 West 8th Ave
City - Anchorage State - AK Zip - 99516 Country - USA	City - Anchorage State - Ak Zip 99501 Country - USA
7. APPLICANT'S PHONE NOs. w/AREA CODE	10. AGENTS PHONE NOs. w/AREA CODE
a. Residence b. Business c. Fax	a. Residence b. Business c. Fax
(907) 339-9965 (907) 339-9961	301.4499 907.264.4448

STATEMENT OF AUTHORIZATION

11. I hereby authorize, DAVE TRUDGEN to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

Mark Wiggin — SIGNATURE OF APPLICANT

7-26-12 — DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
Mustang Development Project

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Miluveach River and Beaufort Sea	Address N/A
15. LOCATION OF PROJECT Latitude: N 70.248656 Longitude: W 150.282429	City - State- Zip-

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)
State Tax Parcel ID See attached Block 16 Municipality
Section - Township - Range -

17. DIRECTIONS TO THE SITE

Block 17 includes directions to the proposed project site (attached separate sheet).

18. Nature of Activity (Description of project, include all features)

Block18 provides a description of the proposed project activities (attached separate sheet).

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

Block 19 describes the proposed project purpose and need (attached separate sheet).

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Block 20 discusses the reasons for discharge and the cubic yardage of material to be discharged (attached separate sheet).

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards

See Block 21(attached separate sheet)

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres

or

Linear Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

Block 23 includes a mitigation statement which discusses avoidance, minimization, and compensation procedures for the proposed project (attached separate sheet).

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- See Block 25 (attached separate sheet)

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
See Block 26 attached					

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Mark Wiggin 7-25-2012

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

ACP ..... Arctic Coastal Plain
AKILF..... Alaska In-Lieu Fee Program
bpd..... barrels per day
BRPC..... Brooks Range Petroleum Corporation
cy ..... cubic yard
DD..... decimal degrees
ft..... feet
HSM..... horizontal support member
ILF..... In-Lieu Fee
IRT ..... Interagency Review Team
KRU ..... Kuparuk River Unit
NAD83 ..... North American Datum 1983
NEPDG ..... National Energy Policy Development Group
NSB ..... North Slope Borough
NWI..... National Wetlands Inventory
OASIS..... OASIS Environmental, Inc.
SMU..... Southern Miluveach Unit
TAPS ..... Trans Alaska Pipeline System
TCF..... The Conservation Fund
USACE..... U.S. Army Corps of Engineers
VSM ..... vertical support member

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BLOCK 15: LOCATION OF PROPOSED PROJECT

Latitude and longitude of the Mustang Development project components are included in Table 1.

TABLE 1: MUSTANG DEVELOPMENT PROJECT COMPONENT LOCATIONS (NAD83 DECIMAL DEGREES, DD)

Project Component	Latitude (DD)	Longitude (DD)
Gravel pad	70.248656 N	150.282429 W
Pad access road – start at Tarn/Meltwater Road	70.269719 N	150.117515 W
Pad access road – end at gravel pad	70.248837 N	150.278034 W
Gravel mine	70.257633 N	150.300110 W
Mine access road – start at gravel pad	70.249238 N	150.274440 W
Mine access road – end at mine	70.255901 N	150.292576 W
Pipeline – start at gravel pad	70.247430 N	150.283820 W
Pipeline – end at Alpine Facility	70.246030 N	150.277580 W

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BLOCK 16: OTHER LOCATION DESCRIPTIONS

The Section, Township, and Range locations of the Mustang Development project components are located in Table 2 and can be seen in Figure 1.

TABLE 2: OTHER MUSTANG DEVELOPMENT PROJECT COMPONENT LOCATIONS (HARRISON BAY A-1 AND B-1 QUADS; UMIAT MERIDIAN)

Project Component	Section	Township	Range
Gravel pad	2	10N	7E
Pad access road	31	11N	8E
	32	11N	8E
	33	11N	8E
	6	10N	8E
	1	10N	7E
	2	10N	7E
Gravel mine	2	10N	7E
	35	11N	7E
Mine access road	2	10N	7E
Pipeline	2	10N	7E

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BLOCK 17: DIRECTIONS TO SITE

Operations are proposed to be executed from a new gravel drilling and production pad located in the Southern Miluveach Unit (SMU), adjacent to the western boundary of the Kuparuk River Unit (KRU), and approximately 13 miles from the Beaufort Sea Coast (Figure 1). A gravel road will be built in order to provide year-round access to the production facilities.

From Prudhoe Bay, the project site can be accessed through the greater Prudhoe Bay road infrastructure. Beginning at the Deadhorse Airport, follow the Spine Road to the wye intersection of the Oliktok and Tarn/Meltwater roads; then follow the Tarn/Meltwater Road until just southwest of the Kuparuk River Unit Drill Site 2M where the proposed Mustang Project access road will leave the Tarn/Meltwater Road and proceed west to the proposed project drilling and production pad. Total road travel is approximately 48 miles from the Deadhorse Airport to reach the proposed Mustang access road.

Latitude and longitude locations are provided in Block 15; Section, Township, and Ranges are provided in Block 16.

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BLOCK 18: NATURE OF ACTIVITY

Full details of the Mustang Development project are described in the "Mustang Development Project Description" (BRPC 2012).

The Mustang Field will be a development of the same reservoir interval—Kuparuk "C" sand—as is being produced in the Kuparuk River Unit. Maximum oil production rate is predicted will be 15,000 bpd and total expected recovery will be approximately 40 million barrels oil over an expected field life 15 years. Reservoir water flood and pressure support will employ KRU Seawater Treatment Plant water. Surface facility development for the Mustang Field will make provision for up to 38 wells on a minimum of 15-foot well centers. Power for process facilities and non-process infrastructure will be generated onsite with dual-fueled turbine generation packages. All produced gas volumes not used for fuel gas will be re-injected into the productive horizon for pressure support. Lift gas will be the lift mechanism for the field.

The separation process will be a 2-phase separation with inlet heater, inlet separator, and treater followed by crude cooling, crude sales measurement, and shipping pumps to the Alpine Transportation Company pipeline. Well allocations will be accomplished using a test separator configuration at the drill site adjacent to the wells.

Primary Development Elements

The overall scope of the development includes the following major elements: 1) gravel mine development, gavel roads, and production pad; 2) drill site modules, central processing facility modules, and cross country pipelines; 3) non-process buildings and equipment; 4) communications tower and related hardware; 5) injection and production wells; 6) temporary drilling support facilities, vehicles, and equipment. The Mustang oil field will be developed as a standalone process facility concept, one largely independent of connections to existing North Slope processing facilities. The only process connections between the Mustang facility and existing field process infrastructure will be two pipeline connections; 1) approximately an 6" diameter crude sales pipeline with connection to the Alpine Transportation Company 14" diameter crude sales pipeline, and 2) approximately an 6" diameter water pipeline with connection to the Alpine 12" source water pipeline, both approximately 750 feet from Mustang pad.

Development Elements and Associated Components

As a standalone, independent oil field, Mustang will necessitate installation of many of the same facility and project components associated with other North Slope oil field developments. The Mustang project will include the following major components:

Gravel Mine, Roads and Pad

(See Appendix A, "Mustang Gravel Mine Development and Rehabilitation Plan")

- Ice roads to support gravel mine development and pad / road construction in winter-2013 through April-2013;

- A 500 ft by 500 ft wide ice pad to be constructed adjacent to the access road, approximately one mile east of the Mustang production pad, used to support installation of the production facilities during the winter of 2012 and 2013;
- Development of a gravel mine 3,400 feet north of Mustang production pad;
- A 0.67 mile, 32 feet wide, gravel mine access road (4.3 acres) between gravel mine and access road to production pad;
- An approximately 4.4 mile, 32 feet wide production pad access road (29 acres) to connect Mustang Pad to KRU road near KRU Drill Site 2M; and
- Gravel production pad [~19 acres] for wells, central production facilities, and non-process infrastructure.

Surface Process Facilities and Cross-Country Pipelines

- Three-phase central processing facility to produce sales-quality crude;
- Tank Farm;
- Well tie-ins, pipe rack, headers, and well test separation for production allocation;
- Oil pipeline for transport of sales oil to the Alpine Pipeline;
- Water pipeline for seawater transport from the Alpine source water pipe-line to the Mustang Field; and
- Pipe rack and ancillaries for up to 38 production and injection wells and associated well tie-ins.

Non-Process Buildings / Equipment

- Buildings will include:
  - Operations / Drilling Camp ~ 120-bed
  - Construction Camp ~ 250-bed
  - Operations Support Center [OSC]
    - Warehouse
    - Maintenance facility
    - Storage
    - Offices
    - Process Control room
  - Construction Support Center [CSC]
    - Warehousing and issue counter
    - Welding
    - Laydown
    - Maintenance
- Non-process equipment and vehicles will potentially include:
  - Rolling stock such as loaders / vac trucks / diesel fuelers

- Light Plants / portable generation
- Passenger vehicles / transport buses / work trucks

Communications infrastructure

- Tower
- Communications Module

Wells

- Initial 12 producers and 11 injectors on 30 foot well centers with provision for up to 38 wells on 15 foot well centers

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BLOCK 19: PROJECT PURPOSE AND NEED

The purpose and need for the proposed action is to allow BRPC to develop hydrocarbon accumulations on state oil and gas leases near the Miluveach River and generate financial return on its investment. BRPC proposes to conduct this action in a safe, cost-effective manner that is efficient in concept and designed to minimize impacts to the surrounding environment.

The purpose of the Mustang Development project is to produce petroleum from the Kuparuk "C" sand reservoir and to deliver the oil to the Alpine common carrier pipeline and subsequently to the TAPS for shipment to market. Developing this resource will help increase domestic oil production for the United States. Maximum production of oil is expected to be approximately 15,000 bpd. BRPC expects to recover 40 million barrels of oil from the prospect. The project could sustain economic production for up to 15 years.

The project will also provide economic benefits to the State and local communities including the NSB through tax revenue and creation of jobs. These benefits include temporary jobs during drilling and construction, long-term jobs supporting production operations, and post-operation jobs for decommissioning the facilities. Over the life of the project, significant benefits will accrue to the State and the NSB through the payment of royalties and taxes.

President George W. Bush issued Executive Order 13212 on May 18, 2001, which directed the National Energy Policy Development Group (NEPDG) to promote domestic oil and gas production to meet the country's energy needs in the 21st Century. The NEPDG report (2001) directs federal agencies to expedite permits and other federal actions necessary for energy-related project approvals on a national basis. More recently, on July 12, 2011, President Barack Obama issued an Executive Order 13580 establishing an interagency working group tasked with coordinating domestic energy development and permitting in Alaska (Office of the Press Secretary 2011). This order reiterates the need for increased domestic energy resource development, both on and offshore, and advocates for efficient domestic energy development and permitting in Alaska that is in compliance with health, safety and environmental protection standards.

Consistent with these policy directives, BRPC is developing the Mustang Development project to recover oil from domestic reserves for production and transport of oil to U.S. markets.

The U.S. imports approximately 45 percent of the oil that it consumes (The White House Blog 2012). Domestic oil production is expected to decline over at least the next decade. The U.S. Department of Energy reports that overall domestic oil and gas production is declining, stifling domestic economic growth since the trade deficit caused by oil imports represents a major transfer of wealth and jobs from the U.S. to foreign competitors (USDOI and BLM 2004a).

Although domestic oil production contributes to the health of the nation's economy, it has an especially significant effect on the State of Alaska, by generating revenue through

jobs, investment, taxes, and royalties. Development of this project will also provide new revenues to the NSB government as tax revenues continue to decline from existing oil fields.

The Prudhoe Bay and Kuparuk oil fields have peaked in production. Historically, large oil companies have dominated development of these fields, but smaller reserves are not necessarily economically viable for larger companies to develop. As a smaller independent oil company, BRPC is actively seeking to develop some of these smaller reserves that have been investigated, but have not been moved towards development by other companies. The Mustang Development project meets the needs of domestic oil production and jobs by actively developing known reserves.

Schedule

Estimated timeframes for major project elements are depicted in Table 3 below. This schedule is based on current project and component execution planning and presently anticipated dates for receipt of permits and other regulatory approvals.

North Slope construction work is slated to begin the 1st quarter of 2013 with development of the 41.58-acre gravel mine and building of the gravel roads and production pad. Throughout the summer of 2013, gravel conditioning operations will continue in preparation for 3rd quarter 2013 main pad construction operations. North Slope installation of process and utility systems will begin 3rd quarter 2013 and will continue through 2nd quarter 2014. Functional check-out and commissioning operations in the 1st and 2nd quarters 2014 will lead to a field start-up and first oil in 2nd quarter 2014. Development drilling of approximately 23 wells will begin 4th quarter 2013 and continue for approximately 2 years.

TABLE 3: APPROXIMATE START DATES FOR MUSTANG DEVELOPMENT PROJECT ELEMENTS

SCHEDULE	2012			2013				2014	
	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q
Engineering, Permitting, and Procurement									
Gravel Acquisition with ADNR									
POs for Long Lead Engineered Equipment									
Finalize POs for Equipment and Modules									
Open Gravel Mine and Place Pad and Road									
Build Pipeline									
Installation of Process/Utility Systems									
Start-up of Field Production									

BLOCK 20: REASONS FOR DISCHARGE

North Slope Wetlands

Wetlands subject to regulation under Section 404 of the Clean Water Act comprise the vast majority of the North Slope, including the Mustang Development project. Project area wetlands are regulated as waters of the U.S. under Section 404, administered by the USACE.

Alaska's North Slope is underlain by continuous permafrost; this perennially frozen ground creates a near-surface confining layer, leading to the ubiquitous wetlands characteristic of the coastal plain. The near continuous wetland characteristics associated with the North Slope is further indicated by the results of numerous project specific wetland inventories and the National Wetland Inventory Maps. Both sources show that wetlands are continuous throughout the North Slope and specifically within the proposed project area.

Proven Arctic engineering practices evolved through 40 years of oil and gas exploration and development on the North Slope have demonstrated that placement of gravel fill is necessary to preserve the thermal integrity of the permafrost, and to provide stable roads and working surfaces, and foundations for the installation of facilities. At the same time, technology and Best Management Practices on the North Slope have evolved to avoid or minimize impacts of fill placement, specifically project footprints and related impacts. Such measures are detailed in the Mitigation Statement provided in Block 23.

There are no practicable, non-wetland alternatives to the proposed project, i.e., there are no upland alternatives to develop Mustang Development hydrocarbon resources. The nearest extensive upland areas (i.e., areas with limited jurisdictional wetlands) are in the northern foothills of the Brooks Range, 30 miles south of the project. This distance is far beyond the technological capabilities of directional drilling or practicable placement of non-drilling facilities.

Facilities

The facilities and their locations have been designed to incorporate requirements for safety, construction, operations, and environmental compliance and performance in a remote area of the North Slope. The proposed roads, pad, and facilities are essential for safe and effective operations at Mustang production facilities. The pipelines are needed to connect the processing facilities to the Alpine common carrier pipeline. A gravel road is required to provide a reliable year-round means to transport personnel and equipment in support of operations, safety, and emergency response activities.

As described below, Section 404 regulated project components include a gravel pad, gravel access roads, a gravel mine site, and two VSM supported pipelines (oil and water)[1].

[1] Through there are two pipelines, they are supported on common VSMs resulting in a single pipeline corridor.

Gravel Infrastructure

Most surface facilities will be located on gravel pads (exceptions include pipeline VSMs and temporary ice roads). The gravel pad and gravel access roads will provide a stable platform to operate facilities through the project design life. Gravel for these structures will be extracted from a new mine site (See Appendix A and Figures 10-14).

One gravel pad will be constructed to serve as the platform for all facility operations (Figure 5). The pad's greatest dimensions will be 1,319 ft by 877 ft and will have a minimum fill depth of 6 feet (Figure 7). All-season gravel access roads will connect the gravel pad with the Tarn/Meltwater road and the gravel mine site to the gravel pad access road (Figures 2-4, and 6).

Approximately 5.07 miles of gravel roads will be constructed within the project area. Minimum fill depth of the roads is 5 feet with a 2H:1V side slope ratio. The gravel access road is planned to be 4.4 miles in length and 32 feet wide on the road surface (approximately 55 feet wide at bottom of toe) and will cover approximately 28.82 acres. The gravel mine access road will be approximately 0.67 miles long, covering 4.3 acres. A total of 40 to 50 cross-drainage culverts with diameters of 24 or 36 inches will be installed in the roads to mitigate potential water impoundment. The location and distance between the culverts will be determined by local hydrologic and topography features.

Oil and Water Pipelines

Hydrocarbons that are produced from the Mustang Development wells will be delivered to the Alpine common carrier pipeline via a sales quality oil pipeline. A steel platform (10 ft by 10 ft) will be constructed for pigging operation at the junction with the Alpine pipeline, supported on 4 VSMs. The pipelines will be 6 inches in diameter, and will be supported by 22 VSMs (two of which will be on the gravel pad), which are 16 inches in diameter and installed 20 feet into the ground (Figure 9). The VSMs will be spaced at approximately 55-foot intervals.

The oil pipeline is designed to transport a maximum of 15,000 bpd. The water pipeline will share the same VSM and horizontal support member (HSM) supports as the oil pipeline. Water will flow in the opposite direction of the oil, from Alpine's water pipeline to the Mustang gravel pad to maintain production pressure and waterflood for enhanced oil recovery.

Gravel Mine Site

Appendix A provides the Mustang Development Project Borrow Pit Mining and Rehabilitation Plan. Gravel from the new mine site will be used to construct the project's pad and access roads. Civil design work for the Mustang Development, along with the findings and conclusions of the 2012 gravel exploration program, suggest a total material requirement for construction of the gravel pad and roads of 612,539 cubic yards (cy); however, due to uncertainties around the actual gravel content and ice content in the mine area, the total cubic yardage of extracted material volume from the Primary Mine Area could be as high as 766,000 cy.

The borrow site will be developed as two separate areas or cells – Primary and Contingent. . The primary mine area includes southern three-quarters of the site, consisting of 29.3 acres and will be 30 to 40 feet deep. The contingent mine area consists of the remaining 12.3 acres, but will only be extracted if necessary for future development. Organic overburden will be collected and stored on a single-season ice pad within the contingent mine area's limits. Unusable mineral overburden will be mined and most will be used to construct thermal dikes. The remaining mineral overburden will be stockpiled within the primary mine area's limits.

During rehabilitation, the mineral overburden will be used for slope stabilization, to make an irregular shoreline, create littoral zones, and develop islands. The organic material will be spread as topsoil on the disturbed areas around the mine site and on the surface of the islands.

Project Component Figures

The set of figures in this application include site maps, plan views, and cross-sections for all gravel structures, including the access roads, Mustang production pad, and gravel mine site. Table 4 provides the project gravel footprint by vegetation type in acres. See Block 21 Discharge Materials and Table 4 for a further description of the project footprint and gravel placement requirements.

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BLOCK 21: DISCHARGED MATERIALS

Gravel fill will be extracted from a new mine site, approximately 3,400 feet north of the Mustang Development gravel pad site. Approximately 1,280,800 cy of material will be extracted, with 715,800 cy being usable gravel. Extracted gravel will be used for constructing the gravel pad and access roads for the project. The overburden (organic tundra layer and inorganic mineral layer) from the mine site will be stockpiled and used during the mine rehabilitation process. Vertical support members for the pipelines are made of steel. The steel supports are installed in the tundra and backfilled with a sand and gravel slurry. See Table 4 for a summary of placement volumes and acres affected by discharged material.

TABLE 4: MATERIAL VOLUMES, AFFECTED ACRES AND MATERIAL TYPES FOR MUSTANG DEVELOPMENT PROJECT COMPONENTS

Project Component	Initial Extracted Volume (cy)	Initial Placement Volume (cy)	Affected Acres	Type of Material
Gravel mine	1,280,800	-	41.58	Gravel fill, organic and mineral
Overburden	(326,400)	-	-	Organic and mineral
Required gravel	(612,539)*	-	-	Gravel fill / ice
Gravel pad	-	276,750	19.34	Gravel fill
Pad access road	-	207,222	28.82	Gravel fill
Mine access road	-	26,477	4.37	Gravel fill
Mine berm	-	33,207	5.04	Organic and mineral overburden
Over-build 20% of gravel components	-	102,090	-**	Gravel fill / ice
Pipeline VSMs	-	24.77	<0.01	Sand / gravel slurry and steel
Totals	**1,280,800**	**645,770.77**	**99.2**	

Footnotes:

*Due to uncertainties around the actual gravel content and ice content in the mine area, the total cubic yardage required to construct the gravel pad and roads could be as high as 766,000 cy.

**Over-build gravel fill material will be added on top of road and pad surfaces as necessary in the winter and will settle during the summer. No additional acres will be impacted when over-build is added.

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BLOCK 22: SURFACE AREA OF WETLANDS AND OTHER WATERS FILLED

A total of approximately 99.2 acres of tundra wetlands will be filled. The site locations of the gravel mine, gravel pad, and access roads consist primarily of moderate to high value wetlands. The function and value of these affected acres is discussed in further detail in the "Mustang Development Project Wetland Functional Assessment and Categorization Report" (OASIS 2012c). See also the "Mustang Development Project Request for Approved Jurisdictional Determination Report" (OASIS 2012b) for more information. The affected acres of each Walker classification type are shown in Table 5.

Gravel will be transported by large dump trucks and will be placed, leveled, and compacted with dozers, loaders, graders, and a vibrating rolling compactor. The VSMs will be installed by drilling an auger hole, placing the VSM to design elevation, and backfilling the hole with a sand and gravel slurry.

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TABLE 5: ESTIMATED MUSTANG DEVELOPMENT PROJECT FOOTPRINTS BY VEGETATION TYPE IN ACRES

Walker Classification Level C	Description	NWI* Class/ Subclass	NWI Hydro Modifier	Impacts Associated with Proposed Project Components							
				Gravel Pad	Gravel Pad Access Road	Gravel Mine	Mine Access Road	Mine Berm	Pipeline VSMs	Total Acres	Percent of Total
IIa	Shallow water: shallow ponds w/aquatic vegetation	PAB	H	0	0.06	0	0	0	0	0.06	0.06%
IIIa	Wet Sedge Tundra	PEM1	E, F, H	<0.01	0.32	0	0	0	0	0.32	0.32%
IIIc	Wet Sedge Tundra/Water Complex (pond complex)	PEM1/AB	F, H	0	2.60	0	0	<0.01	0	2.60	2.26%
IIId	Wet Sedge/Moist Sedge. Dwarf Shrub Tundra Complex (wet patterned-ground complex)	PEM1/SS1	B, E, F	11.32	13.28	39.41	1.57	4.32	<0.01	69.89	70.49%
IVa	Moist Sedge, Dwarf Shrub/Wet Graminoid Tundra Complex (moist patterned-ground complex)	PEM1/SS1	B, E	0	8.94	0	2.80	0	0	11.74	11.84%
Va	Moist Sedge, Dwarf Shrub Tundra	PEM1/SS1	B	<0.01	1.48	0	<0.01	0	0	1.48	1.50%
Vb	Moist Tussock Sedge, Dwarf Shrub Tundra	PEM1/SS1	B	8.02	2.14	2.17	0	0.72	<0.01	13.05	13.17%
Total Acres				19.34	28.82	41.58	4.37	5.04	<0.01	99.2	100.00%

Footnote:

*NWI: National Wetlands Inventory

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BLOCK 23: MITIGATION STATEMENT

The following details how BRPC has avoided and minimized impacts to wetlands and other waters of the U.S. for the proposed Mustang Development project; and how unavoidable impacts will be compensated. The following response addresses Block 23 in the 404 Application as well as the 'Mitigation Statement' requirements in accordance with 33 CFR Part 332 and 325.1(d)(7).

Avoidance of impacts to waters of the U.S., including wetlands

Please describe how, in your project planning process, you avoided impacts to waters of the U.S., including wetlands, to the maximum extent practicable. Examples of avoidance measures include site selection, routes, design configurations, etc...

As discussed under Block 20 above, there are no practicable, non-wetland alternatives to develop the Mustang Project. However, BRPC has avoided construction of additional drilling pads by utilizing directional drilling techniques. This allows full reservoir development from a single pad, thus maximizing oil production and development while eliminated impacts to wetlands.

Secondly, construction will occur in winter, when BRPC will utilize ice roads for construction of the gravel infrastructure to avoid tundra and soils damage. All equipment and vehicles will remain on the ice roads for the construction period and until they transition to the use of the newly constructed gravel roads.

Minimization of unavoidable impacts to waters of the U.S., including wetlands

Please describe how your project design incorporates measures that minimize the unavoidable impacts to waters of the U.S., including wetlands, by limiting fill discharges to the minimum amount/size necessary to achieve the project purpose.

The project components have been positioned to avoid streams, rivers, lakes and ponds, and most high value wetlands to the greatest extent practicable. Project features have also been designed to minimize footprint and yet safely and practically develop the field. The following provides details of how BRPC has minimized their impacts to wetlands and waters of the U.S.

Pipeline Length and Design

BPRC has elected to process the three phase fluids on the pad to produce sales quality oil for transport in the common carrier Alpine Pipeline. By selecting this method of production, both the oil and water pipelines will connect to the existing Alpine pipelines approximately 750 feet away. This has eliminated the need for a much longer three phase pipeline, and associated wetland fill, to an offsite facility to process the oil. It has also eliminated the need for two separate pipeline corridors and associated VSM structures for the oil and water pipelines. As currently designed the oil and water pipelines are co-located on the same VSMs resulting in a single pipeline corridor. This reduces the number of VSMs necessary to support the pipelines, and

therefore reduces wetland impacts. The relatively short length of the proposed oil pipeline (750 feet) will reduce the spill risk considerably compared to a longer oil pipeline.

BRPC has incorporated into the oil pipeline design the use of pig valves, rather than the more typical pig launching facilities ("pigs" are mechanical devises that are used to inspect and clean the inside of the pipeline and travel through the pipe with the flow of oil). The design of the pig valves reduces the amount of space needed to launch and receive the pigs and thus has eliminated the additional gravel pad space necessary for a more typical pig launching facility.

From an oil spill and safety standpoint, the pipelines can be visually inspected from the road. This allow more frequent inspections and potentially a more rapid discovery of a problem should one ever occur.

The pipeline is designed to be a minimum of 7 ft above the ground surface to allow unfettered passage of wildlife.

Gravel Infrastructure Design

Site location for the gravel pad, access roads and mine site were selected by BRPC to reduce the quantity of gravel deposited, acreage of wetlands affected, and risk of potential oil spills. BRPC proposes to construct only one gravel pad, and will drill 38 wells through horizontal extended reach drilling from that single pad. Drilling technology and optimization of pad size and location have eliminated the need for multiple gravel pads in the Mustang Development. The initial production wells will be drilled on 30-ft centers with provisions to drill up the 38 wells on 15-ft centers. This surface wellhead spacing minimizes the footprint of the pad without causing thaw bulbs of neighboring wells to encroach on one another.

The proposed project will utilize an existing road that connects the facility to Prudhoe Bay. Because of this utilization, only an additional 5.07 miles of road need to be constructed for gravel pad and mine access. The gravel pad site is 4.4 miles from the existing Tarn/Meltwater Road. This is the shortest distance that could safely access the propose pad location when taking into account higher value wetlands and other oilfield infrastructure. Shorter access roads would have to cross under an existing powerline and over or under the existing Alpine Pipeline. The pad and roads themselves will have minimum thickness of 6 and 5 feet of gravel respectively, as is standard North Slope construction practice to maintain the integrity of the underlying permafrost.

The size of the gravel pad was minimized by optimizing production facility designs and equipment layouts (Figure 5). The current pad dimensions are the minimum size necessary to provide safe operations and meet required drilling and processing needs. Pad design incorporates a double well row concept rather than a single well row. By using this method BRPC was able to reduce the length of the pad by approximately 250 ft. Pad orientation was moved to avoid placement of gravel in an adjacent lake.

During conceptual design, the size and shape of the production pad was proposed to be a 1,000 ft by 1,000 ft rectangle oriented to the northwest. The design offered a straightforward approach that provided flexibility for siting the production facilities on the pad, but would have impacted a small lake to the northeast. As the design process matured, BRPC recognized the potential impacts to the high value wetland (Category II) habitat complex associated with this lake. The

pad and access roads were re-designed to avoid this wetland complex while still providing efficient siting for the production facilities. This design avoided impacting an additional 3.62 acres of wetlands and the adjacent lake is avoided entirely.

All overburden from the gravel mine site will be placed on an ice pad. The overburden will be placed back into the mine pit thus avoiding impacts to the wetlands under the ice pad.

Fugitive dust generation from the gravel pad and roads will be controlled by watering the surfaces when necessary.

Hydrologic Considerations

The proposed gravel infrastructure locations of the Mustang Development have been planned to minimize impacts to natural stream flows. No major streams will be filled or crossed by the gravel fill. A total of 40 to 50 cross-drainage culverts with diameters of 24 or 36 inches will be installed to match the topography of the surrounding terrain to avoid ponding and allow water movement under the roads.

High value wetlands were avoided to the extent possible by positioning the pad and roads on drier ground. Large ponds and lakes were avoided altogether. The project design avoids the floodplain of the Miluveach River to the west of the project.

Spill Prevention and Response

Spill prevention and response measures will be implemented to lessen possible impacts to wetlands and waters. Personnel will be trained in both prevention and response techniques. Prevention procedures occur during all stages of production, storage, transport, and operations. BPRC will develop and implement an Oil Discharge Prevention and Contingency Plan, SPCC Plan, Facility response Plan, and Blowout Contingency Plan.

The pipeline design incorporates spill leak detection systems, anti-corrosion protection, and internal and external inspection. Pigs will be used to monitor the internal conditions of the pipeline (primarily for corrosion) and to clean the pipeline. The exterior of the pipeline will be visually inspected on a routine schedule.

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

Please describe your proposed compensatory mitigation to offset unavoidable impacts to waters of the U.S., or, alternatively, why compensatory mitigation is not appropriate or practicable for your project. Compensatory mitigation involves actions taken to offset unavoidable adverse impacts to waters of the U.S., including wetlands, streams and other aquatic resources (aquatic sites) authorized by Corps permits. Compensatory mitigation may involve the restoration, enhancement, establishment (creation), and/or the preservation of aquatic sites. The three mechanisms for providing compensatory mitigation are mitigation banks, in-lieu fee of mitigation, and permittee-responsible mitigation. Please see the attached definitions for additional information.

The project will pursue compensatory mitigation via an In-Lieu Fee (ILF) program within the Arctic Coastal Plain (ACP) physiographic province. ILF is the only practicable means for wetland

compensation as there are no wetland mitigation banks within the ACP, nor are there adequate non-wetland sites available for permittee-responsible mitigation. The Conservation Fund's (TCF) Alaska ILF program (AKILF)[2] will be used solely for the preservation of wetlands and related applicable aquatic sites as mitigation for unavoidable impacts to wetlands and waters of the U.S. caused by the project. Unless specified under a separate agreement, the AKILF will not be used for the establishment, restoration or enhancement of wetlands, but it will be used for preservation.

The AKILF will seek to preserve high-functioning wetlands according to the priorities identified by the Interagency Review Team (IRT), local, state, and federal land management agencies. There are extensive opportunities for wetlands preservation in Alaska; approximately 30 million acres of private land are located within the boundaries of Alaska's state and federal conservation areas, including parks, refuges, forests, and critical habitat areas. Because of the process by which these lands were selected, these private lands often encompass high-value wetlands. The Conservation Fund has preserved over 300,000 acres of habitat in Alaska since 1994, the vast majority of which are wetlands. Preserving these lands contributes toward overall conservation of the ecological functions and services in the watershed that wetlands and associated upland habitats provide.

As detailed in TCF's prospectus (currently under review by the IRT), seven principal criteria will be used to identify specific properties for acquisition:

- Ecologically significant wetlands or waters with high values and functions;
- Willing seller;
- Priority for land managing agency or entity;
- Strategic location for landscape-scale conservation and effective management;
- Threat of loss or conservation;
- Opportunity for matching funds; and
- Local project support.

As specified in 33 CFR 332.3(h), preservation may be used as compensatory mitigation when the following criteria are met:

1. The resources to be preserved provide important physical, chemical, or biological functions for the watershed;
2. The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the district engineer must use appropriate quantitative assessment tools, where available;

[2] TCF is currently revising its program to incorporate requirements of the April 10, 2008 mitigation regulations pursuant to 73 FR 70 (19,519) (see also RGL 09-01). The revised program is still subject to review by the IRT, and will not likely be completed prior to USACE action on a permit for the BRPC Mustang Development Project. However, according to the Compensatory Mitigation for Losses of Aquatic Resources, 73 FR (19,593, 19,594) (33 CFR pt. 325) §332.8(v)(2), TCF can secure an extension on their existing instrument until June 9, 2013 at the discretion of the district engineer.

3. Preservation is determined by the district engineer to be appropriate and practicable;
4. The resources are under threat of destruction or adverse modifications; and
5. The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g. easement, title transfer to state resource agency, or land trust).

Generally, TCF seeks to protect larger, ecologically meaningful properties rather than smaller, isolated tracts. The Conservation Fund will work to prioritize lands for potential acquisition based on ecological significance, through working closely with natural resource managers and biologists. The Conservation Fund will consult the IRT on project selection, and projects must be approved by the District Engineer.

Typically a mitigation statement or plan would include subsections describing the mitigation site selection rational, protection instrument, work plan, maintenance plan, performance standards, monitoring requirements, long-term management plan, adaptive management plan, and financial assurances. Because the project is pursuing compensation through The Conservation Fund's AKILF these additional subsections are not applicable to this project because all aspects of the acquisition and long-term management of the compensatory lands will be handled by the AKILF program per their approved ILF program instrument.

Determination of Compensatory Credit Needs

After incorporating all appropriate and practicable avoidance and minimization measures, the proposed design for the Mustang Development project will result in approximately 99.2 acres of unavoidable impacts to wetlands due to placement of fill and other activities in jurisdictional wetlands (Table 5). There are no anticipated unavoidable impacts to other waters of the U.S. associated with this project such as rivers or streams.

Compensatory credit needs were determined by identifying where unavoidable wetland impacts will occur within the project area, evaluating the ecosystem functions performed by those wetlands, and then applying standard mitigation ratios to the appropriate wetland categories. Supporting information for this analysis is found in three primary project documents. Details associated with the project design alternatives and impact analysis is provided in a project report titled "Mustang Development Project Environmental Report." Details associated with the wetland delineation and jurisdictional status of those wetlands is provided in a project report titled "Mustang Development Project Request for Approved Jurisdictional Determination Report." Details associated with the functions and values of the wetlands within the project area are provided in a project report titled "Mustang Development Project Wetland Functional Assessment and Categorization Report."

The functional assessment results were used to categorize wetlands on a scale of I (high functioning, high value wetlands) to IV (low functioning, low value wetlands). A detailed description of how the functional assessment results were categorized is provided in the "Brooks Range Mustang Development Wetland Functional Assessment and Categorization Report." In summary, each individual function was assigned a category, taking into consideration the relative importance and prevalence of each function within the ACP. The highest category present in a given area was assigned as the wetland's category. Wetlands

performing a multitude of functions were considered higher value than those performing few functions, and, thus, a specified wetland area was revised upward (to a higher category) when the area performed five or more functions. Wetlands performing five to seven functions were increased by one category, and wetlands performing eight or more functions were increased by two categories.

In an effort to avoid and minimize impacts to high valued wetlands, the proposed project has shifted impacts away from unique and highly functioning wetlands towards lower functioning, common wetlands as much as possible.

Table 7 summarized the anticipated wetland impacts, the proposed exchange ratio and proposed ILF preservation credits. Overall, the proposed project will affect 10.25 acres of Category I wetlands, 64.42 acres of Category II wetlands, 24.47 acres of Category III wetlands, and no acres of Category IV wetlands. Recent North Slope developments, as well as USACE guidance document RGL 09-01, were used to develop proposed exchange ratios for each category. Base on a 3:1 ratio for Category I wetland impacts; a 2:1 ratio for Category II wetland impacts; and a 1.5:1 ratio for Category III and IV impacts; the proposed project will require the purchase of 196.33 acres (credits) through the AKILF program to offset the anticipated 99.2 acres of project related wetland impacts (Table 7).

Note that Tables 5-7 are based on draft designs. Wetland impact acreage and calculated ILF preservation credits may change for the final Section 404 application, however the Proposed Exchange Ratios will not. Slight discrepancies in acreage totals may occur due to rounding errors.

TABLE 6: PROPOSED PROJECT DESIGN WETLAND IMPACTS BY FUNCTIONAL CATEGORY IN ACRES

Wetland Functional Category	Description	Gravel Pad	Proposed Access Road	Gravel Mine	Mine Road	Gravel Mine Berm	VSMs	Totals
I	High Functioning Wetlands. These are valuable, high functioning wetlands that may be regionally rare, difficult to replace, and are generally less common than wetlands in other categories.	0	10.26	0	0	<0.01	0	10.26
II	High to Moderate Functioning Wetlands. These wetlands may provide habitat for very sensitive or important wildlife or plants; be difficult to replace; or provide very high functions, particularly for wildlife.	11.32	7.81	39.41	1.57	4.32	<0.01	64.42
III	Moderate to Low Functioning Wetlands. These wetlands can provide important functions and be important for a variety of wildlife. These wetlands are generally less diverse than Category II wetlands.	8.02	10.75	2.17	2.80	0.72	<0.01	24.47
IV	Degraded and Low Functioning Wetlands. These wetlands are typically the smallest, often isolated with very little vegetation diversity, and generally already degraded by human activities. Regional differences allow for a more narrow definition of this category.	0	0	0	0	0	0	0
Totals		19.34	28.82	41.58	4.37	5.04	<0.01	99.2

TABLE 7: PROPOSED PROJECT DESIGN MITIGATION RATIOS AND ILF PRESERVATION CREDIT REQUIREMENTS IN ACRES

Wetland Functional Category	Description	Total Impacted Wetland Acres	Proposed Exchange Ratio	ILF Preservation Credits
I	High Functioning Wetlands. These are valuable, high functioning wetlands that may be regionally rare, difficult to replace, and are generally less common than wetlands in other categories.	10.26	3 : 1	30.78
II	High to Moderate Functioning Wetlands. These wetlands may provide habitat for very sensitive or important wildlife or plants; be difficult to replace; or provide very high functions, particularly for wildlife.	64.42	2 : 1	128.84
III	Moderate to Low Functioning Wetlands. These wetlands can provide important functions and be important for a variety of wildlife. These wetlands are generally less diverse than Category II wetlands.	24.47	1.5 : 1	36.71
IV	Degraded and Low Functioning Wetlands. These wetlands are typically the smallest, often isolated with very little vegetation diversity, and generally already degraded by human activities. Regional differences allow for a more narrow definition of this category.	0	1.5 : 1	0
Totals		99.2		196.33

BLOCK 25: ADJOINING PROPERTY OWNERS

Table 8 lists property owners and locations of properties that are near the project vicinity.

TABLE 8: ADJOINING FEDERAL, STATE AND PRIVATE LANDOWNERS

Mailing Address
State of Alaska, Department of Natural Resources Office of the Commissioner 550 W. 7th. Avenue, Suite 1400 Anchorage, AK 99501

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BLOCK 26: LIST OF PERMITS AND CERTIFICATIONS

Table 9 lists the regulatory actions to take place for the project to be properly permitted and certified.

TABLE 9: KEY REGULATORY ACTIONS

AGENCY	PERMIT/APPROVAL	SCOPE AND JURISDICTION
FEDERAL		
U.S. Army Corps of Engineers	Section 404	Fill in wetlands (waters of the U.S.) including pads, road and mine site
U.S. Environmental Protection Agency	North Slope General National Pollutant Discharge Elimination System Permit (Notice of Intent and supporting documents)	Wastewater discharges from camp facilities and dewatering mine site
	Spill Prevention, Control and Countermeasures Plan	Fuel storage and handling
U.S. Fish and Wildlife Service	Polar Bear Letter of Authorization	Incidental disturbance of polar bears (construction and operations)
	Endangered Species Act Section 7 Consultation (related to federal permit processes)	Project activities that may affect threatened and endangered species (e.g., spectacled eiders, polar bears) – wetlands fill and disturbance
STATE		
Alaska Department of Environmental Conservation, Division of Spill Prevention and Response	Oil Discharge Prevention and Contingency Plan	Spill prevention, response and cleanup measures related to drilling, storage, production and transportation
Alaska Department of Environmental Conservation, Division of Air Quality	Air Quality Control Minor Permit; Title V Air Quality Control Operating Permit Air Quality Control Minor General Permit (MG1)	Air emission sources – process facilities, drilling and related air impacts (e.g., dust) Drilling operations
Alaska Department of Environmental Conservation, Division of Environmental Health	Temporary Storage of Drilling Waste	Drilling waste storage facility at production and drilling pad (design review)
Alaska Department of Environmental Conservation, Division of Water	Section 401 Water Quality Certification	Section 404 discharges (fill materials) – pads, road
Alaska Department of Natural Resources, Division of Oil and Gas	Lease/Unit Plan of Operations	Surface use to support subsurface development on lease/unit (facilities and activities) – construction and production
Alaska Department of Natural Resources, Division of Oil and Gas	Right-of-Way Easements (Title 38.05)	Surface use for new road and use of existing roads
Alaska Department of Natural Resources, Division of Mining, Land and Water	Land Use Permits	Project surface use and activities outside the lease/unit
	Temporary Water Use	Water extraction from lakes, ponds, rivers
	Material Sales Contract	Gravel extraction from state-owned lands and mine site rehabilitation

AGENCY	PERMIT/APPROVAL	SCOPE AND JURISDICTION
Alaska Department of Fish and Game	Title 16 Fish Habitat Permit (only see this if due to blasting, just need to check with Fish and Game)	Activities and construction in fish bearing waters (rivers, lakes, etc.) including drainage structures, water extraction, and gravel mine dewatering and mine site rehabilitation
Alaska Department of Natural Resources, State Historic Preservation Office	Section 106 Clearance	Project construction activities that may affect archeological, historical, and cultural resources
Alaska Oil and Gas Conservation Commission	Permits to Drill Annular Disposal Area Injection Order	Production, enhanced oil recovery, and disposal wells (Class II)
LOCAL		
North Slope Borough	Development Permit(s)	Surface use activities within the North Slope Borough including construction, drilling, and production activities

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OASIS Environmental, Inc. an ERM Company. 2012b. Mustang Development Project Request for Approved Jurisdictional Determination Report. To be submitted to the U.S. Army Corps of Engineers.

OASIS Environmental, Inc. an ERM Company. 2012c. Mustang Development Project Wetland Functional Assessment and Categorization Report. To be submitted to the U.S. Army Corps of Engineers.

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FIGURES

Map features presented here are derived from photogrammetric mapping, site surveys, and civil engineering data. Features are displayed using the Alaska State Plane Coordinate System, Zone 4 projection and North American Datum 1983 (NAD83) datum. Elevation information is based on vertical tidal datum of Mean Lower Low Water. Use National Tidal Datum Epoch 1983-2001, Prudhoe Bay, AK for transformations to other known vertical datums.

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APPENDIX A

Mustang Development Project
Borrow Pit Mining and Rehabilitation Plan

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BORROW PIT MINING AND REHABILITATION PLAN

MUSTANG DEVELOPMENT PROJECT NORTH SLOPE, ALASKA

POA-2012-236

July 25, 2012

Submitted to:

Department of the Army, United States Army Corps of Engineers, Alaska Region

Submitted by:

Brooks Range Petroleum Corporation

510 L St., Suite 601
Anchorage, AK 99501

1.0 INTRODUCTION

1.1 Purpose

The proposed Mustang Development project area is located on North Slope of Alaska, adjacent to the western boundary of the Kuparuk River Unit, east of the Milluveach River. Brooks Range Petroleum Company (BRPC) proposes to develop a gravel mine / borrow site approximately 3,000 feet northwest of the existing North Tarn 1A well where the Mustang Development is proposed (Sheet 1 of 14, *"Vicinity Map"*). The gravel mine will provide sufficient gravel resources for building of the Mustang production pad, site access road from KRU Drillsite 2M, mine access road, and for future gravel maintenance operations.

After mining activities are completed in spring 2013, the environment created will include habitats that were not present at the site prior to mining. Specifically, the plan provides for the revegetation of exposed soils, creation of islands for waterfowl nesting, and creation of shallow littoral and deep water habitats. The deep water area could also possibly serve as a water source for future field operations.

1.2 Regulatory History

No existing gravel extraction sites are in operation in the vicinity of the Mustang Development. A new borrow pit is proposed to support the development and maintenance of the project.

1.3 Approach

BRPC is proposing to permit a 41.6 acre, 1 million cubic yard gravel extraction site approximately 3,000 feet northwest of the Mustang Development pad (Sheet 2 of 14, *"Plan View Road (West)"*). The borrow site will be developed as two separate areas or cells – Primary and Contingent. The Primary Mining Cell will consist of the southern ¾ of the overall site. This Primary Cell is approximately 29.3 acres in extent and will be excavated to a depth of approximately 30 to 40 feet below ground surface (Sheet 10 of 14, *"Primary Phase Mining Plan"*). Mining of gravel resources in the Primary Cell—only a portion of the overall identified resources in the area—should meet all the projected needs of the proposed Mustang development including roads and production pad. The second area is the northern ¼ of the identified gravel resources area is referred to as the Contingent Cell. The Contingent Cell encompasses the remaining 12.3 acres and would only be developed to meet a gravel shortfall related to the Mustang Development or, as needed for some future development or maintenance operation. (Sheet 13 of 14, *"Contingent Mining Plan"*).

The Primary and Contingent mining plan will be implemented in four stages.

Stage 1: Segregate and stockpile organic overburden. Organic overburden consists of the top 1 to 2 feet of material. Typically, the top ½ foot is organic mat and the material directly below is dark brown organic silt. This material will be used as topsoil for final restoration.

Stage 2: Remove and stockpile mineral overburden. This material will be used for development of thermal dikes, restoration slope smoothing, littoral zone creation, and development of habitat islands.

Stage 3: Mineral Extraction.

Stage 4: Overburden replacement and restoration.

1.4 Specific Issues

Littoral habitat—Creating as much littoral habitat as is practical by placing and grading overburden from both mining phases.

Stability of side slopes—All mined slopes must be restored to a 3:1 slope maximum in order to be thaw stable once they become submerged.

Diversity of wildlife habitats-- Creating both littoral and deep water habitats is beneficial to the areas ecological diversity.

Thermal Dikes—Thermal dikes will be a part of the final restoration to stabilize the upstream sides of the borrow site and prevent thawing of the permafrost, geotroughs, ice wedges, etc.

Access – A haul road to the bottom of the mine site will be developed. Uphill sideslopes will be developed at a 3:1 slope and downhill slopes will be built as a 2:1slope.

2.0 SITE DESCRIPTION

The Mustang Development pad is located in Section 2, Township 10 North, Range 7 East, Umiat Meridian. The pad is approximately 1,000 feet north of the Alpine Pipeline, 1,500 east of Miluveach River, and will be access by a 4.4 mile all-season road off of the existing Tarn Road system. The mineral extraction site is approximately 3,000 feet northwest of the pad and is orientated across the common section line between Section 2, T10N, R7E and Section 35, T11N, R7E. The area in the vicinity of the mine site is moderately well drained rolling terrain with intermittent small tundra ponds. The mine site is located on a gentle down grade between the Miluveach River to the west and a 450 acre lake approximately 1 mile uphill to the east. The grade difference across the site appears to be 10 to 15 feet or approximately 1 percent. The north limits of the mine site are bound by a well-defined drainage channel which serves as an outlet for the 450 acre lake. It appears that the channel only flows intermittently.

The site will be accessed in southeast corner of the site. As the pit is developed, a road will be constructed to the bottom of the pit. Within the pit, an all-season road will be extended to the active extraction face. This will allow access to gravel for summer maintenance (Sheet 1 of 14 *"Vicinity Map"*).

3.0 REHABILITATION PLAN

3.1 Goals and objectives

The rehabilitation plan will prepare the mine site for final closure. It is not possible to restore the site to pre-mining conditions. Therefore, the objective of the rehabilitation plan will be to create a diversity of potentially valuable wildlife habitats including, nesting/loafing islands for water birds, littoral zones for establishing aquatic vegetation and deep water habitat. The area of newly created open water for development of the entire 41.6 acre mine site is estimated to be approximately 34.8 acres.

The rehabilitation plan addresses several issues: 1) grading measures to improve slope stability, creation of littoral zones, and varying shorelines and 2) a revegetation plan. The grading plans are targets or general goals, which are subject to many variables. The overburden settlement, volume of material and construction grading are expected to vary. The general character of the plan will be adhered to. Any major deviations will be reviewed with the resource agencies.

3.2 General Description of Work

The organic overburden from Primary Mining Phase will be removed and placed on an ice pad over a portion of the Contingent Mining Phase (Sheet 12 of 14, "Primary *Phase Overburden Stockpile Plan*"). Once the organic overburden has been collected, the unusable mineral overburden will be mined. The mineral overburden will be used to construct the thermal dikes and the remainder will be stockpiled on the ice pad and within the Primary Phase cell limits. During the Primary Phase construction, the north and east wall will be benched in a manner that the resultant slopes are at 3:1 maximum. The south and west wall will be mined at 1:1 slopes. The mineral overburden will be used to stabilize the slopes, make an irregular shoreline along the limits of excavation, create littoral zones, and develop habitat islands. The organic overburden will be spread as topsoil on all disturbed area except the cell floor the interior mine access road.

Material extraction from the Contingent Phase will be developed in essentially the same manner with the following exceptions. All walls will have a final mined slope of 3:1 maximum. The organic overburden will be stockpiled in the previously developed mine area and used for final restoration of the Contingent Phase. Lastly, the mineral overburden will be used to create the second phase thermal dikes and expand the Primary Phase littoral zone and wetland habitat.

The maximum depth of the lake is expected to be approximately 24 feet. Local runoff and snowfall is expected to be the main source of inflow to the lake. The final design water level is anticipated to take about 15 - 20 years after mining is stopped.

The access road to the site will remain open for the life of the mine site. Man-made debris will be removed from the mine site during rehabilitation. Unvegetated disturbed areas, such as dikes, abandoned roads, and nesting islands are intended to be revegetated during site rehabilitation.

3.3 Design Elements

To prepare this plan, several design elements must be considered. These include side slope stability, overburden settlement, final water level, creation of littoral zones and islands, and revegetation.

3.3.1 Slope Stability

Relatively large thaw settlements will occur when frozen overburden is covered by water that does not freeze solid. Due to the variations in ice content in the overburden, the amount of settlement will be highly variable. We estimate for the submerged overburden that thaws, the settlement will be in the range of 30% to 70% of the initial thickness. Therefore, for a 20-foot thickness of overburden waste that is initially frozen, the thaw settlement after “deep” submergence will average about 10 feet but can vary from 5 feet to 15 feet.

This large settlement will not be an issue in the proposed littoral zones because the shallow water and subsurface soils will refreeze each winter. In addition, islands are planned at the perimeter of the littoral fill to ensure a frozen area adjacent to the deep water.

Submerged slopes will be stable at the 3:1 constructed slopes, and even though below water settlements will result in localized steepening, the submerged slopes below wave action will be stable even if as steep as 2:1.

3.3.2 Water Level

The key design decision will be the final water level remaining inside the mined cells. This level will drive the design and construction of shallow areas and islands. To reduce hydraulic head, minimize the fill needed to create littoral habitat, and provide perimeter shore protection, a water level of 47.5 feet British Petroleum Mean Sea Level (BPMSL) was chosen as the planned water level.

3.3.3 Littoral Zone

Approximately 32% of the open water area of the Primary Phase will be littoral zones with water depths of 3’ or less. Overburden within the littoral zone is expected to refreeze every winter. Depth of freeze can vary due to surface snow depth and drifting conditions. The overburden placed to create littoral areas is expected to settle 3 – 5 feet.

The construction grading plan will leave this area high to allow for the anticipated settlement. After three to five years the area will be stable and touch up grading will be completed to achieve the littoral zone goals.

Any material extraction within the Contingent Phase will be used to create a deep water habitat.

3.3.4 Islands

Four islands approximately 0.3acres, 0.2 acres, 0.1 acres, and 0.1 acres, will be constructed within the western half of the first phase pit limits (Sheet 11 of 14, "*Primary Phase Rehabilitation Plan*"). These islands will provide nesting and loafing areas for birds. The islands will be placed a minimum of 30 feet away from the shore. The sides of the islands will be sloped at approximately 1:10 to allow birds easy access to the islands. The top of the island will be placed 2 feet above the planned water surface elevation.

Likewise, if the Contingent Phase is fully developed, the restoration plan will create 3 additional islands (Sheet 14 of 14, "*Contingent Phase Rehabilitation Plan*"). The three islands are approximately 0.10 acres, 0.12 acres, and 0.14 acres.

3.3.5 Revegetation

All disturbed terrestrial areas outside or along the perimeter of the mine areas will be seeded with a mix of native grass cultivars, developed in consultation with ADNR Division of Agriculture Plant Materials Center, with the goal of providing short-term establishment of seeded grass that will not persist, allowing native tundra plant species to invade the site over time. The interior walls of the primary and contingent mine areas will also be seeded to establish grass cover until such time that the mine cell fills with water and can support aquatic vegetation. In addition, unvegetated disturbed areas, such as dikes, and nesting islands will be seeded. The Project will use a mix of Poa glauca (40%), Arctagrostis latifolia (40%), and P. alpina (20%). Deschampsia caespitosa will be considered as an alternate to P. alpina based on availability; the limited supply of *Puccinellia borealis* precluded its use in the Project seed mix. The seed mix will be applied at a rate of 20 lbs/acre on slopes, and 5-10 lbs/acre on relatively level surfaces. This reduced application rate is intended to help balance the goals of providing effective erosion protection and allowing native species to re-establish over time.

In the Prudhoe Bay area, a balanced fertilizer application of 10-20-20 Nitrogen Phosphorus Potassium (N-P-K) is commonly used to encourage revegetation and establishment of seeded species on disturbed sites. Available soil nutrients and potential deficiencies are expected to be similar in the mine area to those in the Prudhoe Bay area. Based on experience across the North Slope, phosphorous is typically the limiting nutrient in soils for this region. An application of about 60 lbs/acre of phosphorous alone is often sufficient to encourage natural colonization from the surrounding plant communities (BPXA et al., 2004). Preliminary plans call for application of 400 lbs/acre 10-20-20 N-P-K fertilizer, although site-specific conditions including the

areal extent of disturbance and surrounding community types, and/or soil nutrient analyses will ultimately determine the appropriate application of fertilizer.

Over time, the mine will fill with water originating primarily from snowmelt and the designed littoral zones will be able to support an aquatic vegetation community. At such time, wet and/or shallowly flooded areas will be revegetated by transplanting (sprigging) indigenous species to improve habitat conditions. *Arctophila fulva* is an indigenous grass that provides quality habitat for many species of birds. Sprigging *A. fulva* has been successful at many areas around Prudhoe Bay and at the Badami mine site overburden stockpile where artificial ponds were created. This species is capable of establishing and reproducing under a variety of soil moisture conditions ranging from terrestrial to shallow flooded zones. Other aquatic species including *Hippuris vulgaris* and *Ranunculus spp*. have also been successfully transplanted to improve aquatic habitat conditions. Ultimately, the availability of species found in the surrounding communities will determine those selected for transplanting at the mine site. Given that the mine site may take 10-plus years to fill with snowmelt, sprigging may not commence until at least the eighth year after mining ceases. Until the mine cell conditions have evolved to support sprig survival (i.e. ponding or perched water) the interior mine slopes and littoral benches will be seeded as described above to prevent erosion. As soils are generally phosphorous limited in the Prudhoe Bay area, a 0-45-0 N-P-K slow release tablet may be applied with A. fulva sprigs.

3.3.6.1 Performance Standards

By the tenth year following the application of native grass cultivar treatments, disturbed areas will be expected to support at least 10% total live vascular cover (TLVC) comprised of at least five naturally colonizing species with 0.2% cover each. These performance standards should lead to a 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. Transplanted species are expected to persist, but there will be no quantitative performance standard associated with these species (Table 1).

3.3.6.2 Monitoring for Performance Standards

Monitoring will be used to evaluate progress towards the performance standards in accordance with Table 2.

Revegetation of terrestrial areas will be monitored using a point intercept sampling technique along a fixed transect. Aquatic areas will be monitored using repeat photography from established photo-point locations. If intermediate sampling and monitoring indicates that progress of revegetation is not sufficient to meet the proposed standards, additional remedial actions may be considered to increase plant cover. Final monitoring will determine whether the revegetation performance standards have been met.

3.3.6.3 Reporting

Progress reports will be submitted by 1 February of the year following site visits according to the schedule in Table 2. Reports will be provided to the appropriate regulatory agencies.

3.3.6.4 Remedial Action

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

Table 1: Goals, Objectives, Performance Standards and Monitoring Methods

Goals	Establish diverse and productive aquatic and wetland plant communities similar to those of the surrounding area, thereby improving the appearance of the site and improving its suitability for some species of wildlife.
Objectives	**Terrestrial**: Short-term establishment of seeded grass and primary colonizers subject to competition and invasion by indigenous species over time. **Aquatic**: Establishment and persistence of transplanted species.
Performance Standard	**Terrestrial**: By year 10, 10% cover by live vascular plants comprised of at least 5 naturally colonizing species with at least 0.2% cover each.
Monitoring Methods	**Terrestrial Mine Site Areas**: Point intercept sampling along fixed transects. **Aquatic**: Repeat photography.

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

Year	Treatment & Monitoring	Reporting
First summer following completion of mining activities	Sample soil and have it tested for fertility and other features. Inspect site to determine extent of rehabilitation activities required. Collect photo records.	Internal activities report

Year 0	Apply fertilizer and seed to disturbed/unvegetated areas including interior mine slopes and littoral benches. Measure and record the elevation of surface water inundation within the mine to begin tracking the fill rate of the pit. Collect photo records.	Progress report
Year 2	Measure vegetation cover and species composition using point intercept sampling in seeded/fertilized areas, and compile a species list. Observe surface stability. Measure and record the elevation of surface water inundation within the mine to track the fill rate of the pit. Collect photo records.	Progress report
Year 4	Measure vegetation cover and species composition using point intercept sampling in seeded/fertilized areas, and compile a species list. Observe surface stability. Measure and record the elevation of surface water inundation within the mine to track the fill rate of the pit. Collect photo records.	Progress report
Year 6	Measure vegetation cover and species composition using point intercept sampling in seeded/fertilized areas, and compile a species list. Sample soil where revegetation success appears lacking. Observe surface stability. Measure and record the elevation of surface water inundation within the mine to track the fill rate of the pit. Collect photo records.	Progress report
Year 8	Measure vegetation cover and species composition using point intercept sampling in seeded/fertilized areas, and compile a species list. Note any areas that may need additional treatments. Observe surface stability and install aquatic sprigs if conditions have recently established to support their survival. Measure and record the elevation of surface water inundation within the mine cell(s) to track the fill rate of the pit. Collect photo records.	Progress report

Year 10	Measure vegetation cover and species composition using point intercept sampling in seeded/fertilized areas, and compile a species list. Observe surface stability and sprig survival if previously installed, or install aquatic sprigs if conditions have recently established to support their survival. Measure and record the elevation of surface water inundation within the mine to track the fill rate of the pit. Collect photo records. This will be the final year of terrestrial monitoring if performance standards have been met.	Final report for terrestrial monitoring if revegetation efforts are successful; otherwise Progress Report. Progress Report for aquatic monitoring
Year 12	If terrestrial vegetation efforts did not meet performance standards repeat year 10 Monitoring. Assume Sprigs have been planted by this time, photo document sprig survival and evaluate for further treatments if necessary.	Final Report for terrestrial monitoring Progress report for aquatic monitoring.
Years 14 and up	Assume terrestrial revegetation efforts have met Performance Standards Photo document Sprig survival, and evaluate for further treatments if necessary.	Progress reports until Performance Standards have been met and then Final Report.

3.3.7 Changes

The changes either BRPC or their contractors make to the mining and rehabilitation plan that expand the footprint of the mine site, change the season in which work items are to be complete, change the various specifications and standards laid out in the plan, or affect other aspects of Corps jurisdiction, shall be approved by the Corps before the proposed change can be implemented.

4.0 PHASING AND SCHEDULING

Schedule

Material extraction from the mine site is scheduled to begin during the winter of 2012-2013. Civil design work for the Mustang Development, along with the findings and conclusions of the 2012 gravel exploration program, suggest a total material requirement

for construction of the gravel pad and roads of 612,539 cubic yards (cy); however, due to uncertainties around the actual gravel content and ice content in the mine area, the total cubic yardage of extracted material volume from the Primary Mine Area could be as high as 766,000 cy. Approximately 326,000 cubic yards of overburden will be removed, stockpiled, and used for topsoil, slope stabilization, and the construction of the nesting islands. Primary site rehabilitation will occur during the spring of 2013 with additional grading operations taking place throughout the summer.

The overburden fill will initially be placed three feet higher than the final grade to allow for settlement. After 3-5 years the littoral area will be thaw stable. The area will be regarded to meet the goal of less than 3 feet of depth.

5.0 SITE MONITORING

This rehabilitation plan represents a set of objectives and goals that are expected to be conceptually met. The general plan intent will be adhered to. However, some deviations and changes are inevitable due to the many variables involved in the project. For example, differential settlements as soils thaw and changes in overburden excavation volumes occur on every gravel extraction project. It is anticipated that deviations from the plan's objectives will be minimal but the site will be monitored so that significant deviations, should they occur, can be either rectified or addressed in further revisions to the plan.

5.1 REMEDIAL ACTIONS

In the event of a significant deviation from the plan BRPC will consult with the resource agencies and develop an appropriate response.