ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT FACT SHEET – PROPOSED FINAL

General Permit AKG283100 - Geotechnical Surveys in State Waters of the Beaufort and Chukchi Seas

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Wastewater Discharge Authorization Program

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Issuance of an Alaska Pollutant Discharge Elimination System (APDES) general permit to:

GEOTECHNICAL SURVEYS IN STATE WATERS OF THE BEAUFORT AND CHUKCHI SEAS

The Alaska Department of Environmental Conservation (DEC or Department) is issuing an APDES general permit AKG283100 – Geotechnical Facilities in State Waters of the Beaufort and Chukchi Seas (Geotechnical GP or permit). The Geotechnical GP authorizes and sets conditions on the discharge of pollutants from these facilities to state waters. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from these operations and outlines best management practices to which these operations must adhere.

This fact sheet explains the nature of potential discharges from geotechnical facilities operating in state waters in the Beaufort and Chukchi Seas and the development of the permit including:

- a description of the industry
- a listing of effluent limits, monitoring requirements, and other conditions
- technical material supporting the conditions in the permit

The Department has both an informal review process and a formal administrative appeal process for final APDES permit decisions. An informal review request must be delivered within 15 days after receiving the Department's decision to the Director of Water at the following address:

Director of Water

Alaska Department of Environmental Conservation
410 Willoughby Street, Suite 303
Juneau AK, 99811-1800

Interested persons can review 18 AAC 15.185 for the procedures and substantive requirements regarding a request for an informal Department review.

See http://www.dec.state.ak.us/commish/InformalReviews.htm for information regarding informal reviews of Department decisions.

An adjudicatory hearing request must be delivered to the Commissioner of the Department within 30 days of the permit decision or a decision issued under the informal review process. An adjudicatory hearing will be conducted by an administrative law judge in the Office of Administrative Hearings within the Department of Administration. A written request for an adjudicatory hearing shall be delivered to the Commissioner at the following address:

Commissioner
Alaska Department of Environmental Conservation
410 Willoughby Street, Suite 303
Juneau AK, 99811-1800.

Interested persons can review 18 AAC 15.200 for the procedures and substantive requirements regarding a request for an adjudicatory hearing. See http://www.dec.state.ak.us/commish/ReviewGuidance.htm for information regarding appeals of Department decisions.

Documents are Available

The permit, fact sheet, and related documents can be obtained by visiting or contacting DEC between 8:00 a.m. and 4:30 p.m. Monday through Friday at the addresses below. The permit, fact sheet, and other information are also located on the Department's Wastewater Discharge Authorization Program website: http://www.dec.state.ak.us/water/wwdp/index.htm .

Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 555 Cordova Street, Anchorage, AK 99501 (907) 269-6285	Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 410 Willoughby Avenue, Suite 310 Juneau, AK 99801 (907) 465-5180
Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 610 University Avenue Fairbanks, AK 99709-3643 (907) 451-2183	

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 GENERAL PERMITS

1.1 Legal Basis

Section 301(a) of the Clean Water Act (CWA) and Alaska Administrative Code (AAC) 18 AAC 83.015 provide that the discharge of pollutants is unlawful except in accordance with an Alaska Pollutant Discharge Elimination System (APDES) permit. Often the discharge of pollutants is regulated through an individual APDES permit; however, Title 18 of the Alaska Administrative Code, Chapter 83, Section 205 (18 AAC 83.205) authorizes the issuance of a general APDES permit to categories of discharges when a number of point sources are:

- located within the same geographic area and warrant similar pollution control measures;
- involve the same or substantially similar types of operations;
- discharge the same types of wastes;
- require the same effluent limits or operating conditions;
- require the same or similar monitoring requirements; and
- in the opinion of the Department, are more appropriately controlled under a general permit than under individual permits.

18 AAC 83.210(a) allows a general permit to be administered according to the individual permit regulations found in 18 AAC 83.115 and 18 AAC 83.120. Like an individual permit, a violation of a condition contained in a general permit constitutes a violation of the CWA and subjects the permittee of the facility with the permitted discharge to the penalties specified in Alaska Statute (AS) 46.03.020(13). In accordance with 18 AAC 83.155, general permit AKG283100 – Geotechnical Surveys in State Waters of Beaufort and Chukchi Seas (permit or Geotech GP) and those authorizations

under the general permit will remain in force and effect via administrative extension should the Alaska Department of Environment Conservation (DEC or the Department) be unable to reissue the permit prior to its expiration date.

1.2 Individual Permit

A permittee authorized to discharge under a general permit may request to be excluded from coverage by applying for an individual permit. This request must be made by submitting APDES permit application Form 1 and Form 2C with supporting documentation to DEC.

The Department may require any entity authorized by a general permit to apply for and obtain an individual permit, or any interested person may petition the Department to take this action. Per 18 AAC 83.215, the Department may consider the issuance of an individual permit when: the discharger is not in compliance with conditions of the general permit a change has occurred in technology or practices; effluent limits guidelines (ELGs) are promulgated; a water quality management plan is approved; DEC determines that the discharge is significant; or a Total Maximum Daily Load (TMDL) has been completed.

1.3 General Permit Coverage

The Department and the U.S. Environmental Protection Agency (EPA) jointly developed permits that authorize discharges from geotechnical facilities in their respective jurisdictional waters. Coverage and definitions in the federal and state permits may differ. In the state permit, the term geotechnical facility refers to any floating or fixed facility actively conducting and geotechnical survey (See Permit Appendix C – Definitions). The Geotech GP only covers the wastewater discharges from geotechnical facilities specifically described therein. Coverage does not apply to wastewater discharged to impaired water bodies (as listed on the CWA Section 303(d) list if the wastewater contains the pollutant that causes or contributes to the impairment.

1.4 Coverage Area

The permit provides coverage for geotechnical facilities in state waters of the Beaufort and Chukchi and Seas up to the three nautical mile demarcation line in the territorial see ranging between Point Hope at 166°50’20” west longitude and the border with Canada at 141°00’00” west longitude (See Figure 1). There are two categories of state waters within the Beaufort and Chukchi Seas, coastal waters and territorial seas. Coastal waters are defined as those waters landward of the inner boundary of any baseline. This permit does not authorize discharges to state coastal waters, only to those state waters of the territorial sea.

Figures 1 through 6 are maps that provide an approximate Area of Coverage for the permit. An applicant seeking coverage under the Geotech GP must demonstrate the proposed locations are within state waters of the territorial sea.

DEC had included portions of National Oceanic Atmospheric Administration (NOAA) navigational charts in the draft Fact Sheet. During the development of the Response to Comments document, DEC discovered that bathymetric information (water depth) varied according to what scale of NOAA chart was examined. Due to this variation, DEC has elected to replace these maps with Figures 1 through 6 (no depth information) to avoid the possibility of inaccurately portraying actual water depth within the potential area of coverage. Applicants will have to demonstrate in their notice of intent (NOI) that they meet all the permit requirements, including water depth, in order to receive a discharge authorization.

Figure 1. Potential Area of Coverage

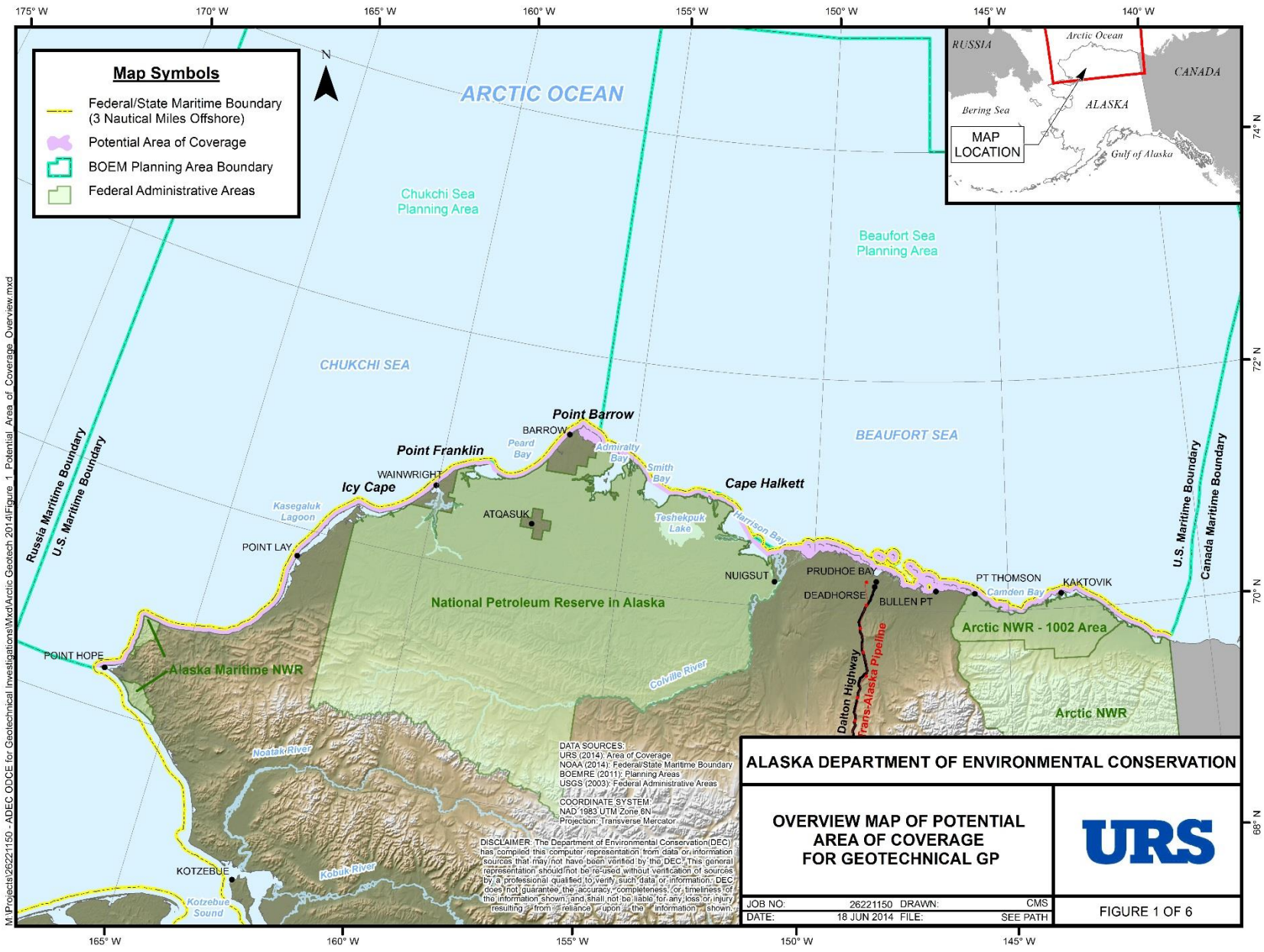


Figure 2. Potential Area of Coverage, Point Hope to Point Lay

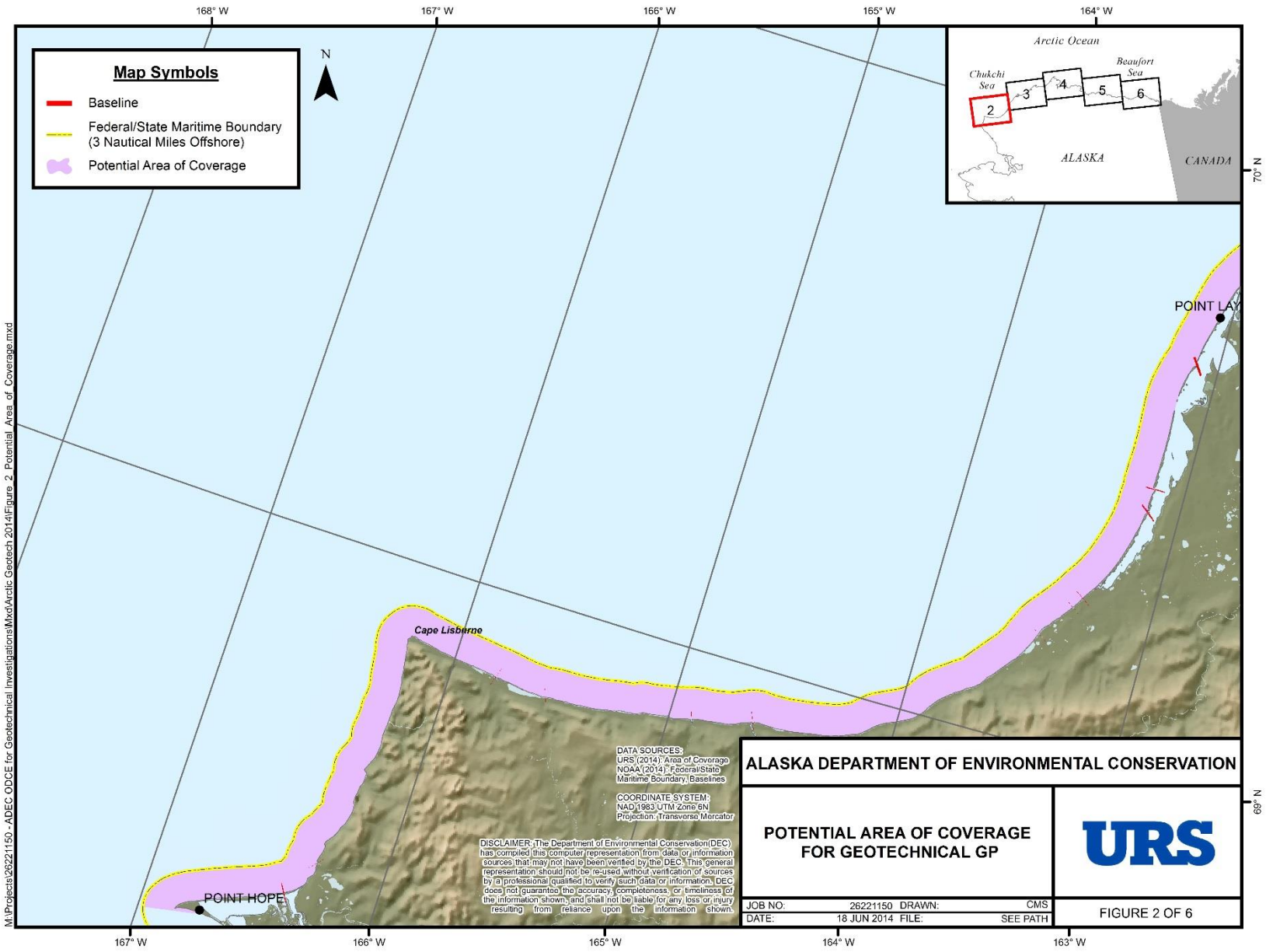


Figure 3. Potential Area of Coverage, Point Lay to Peard Bay

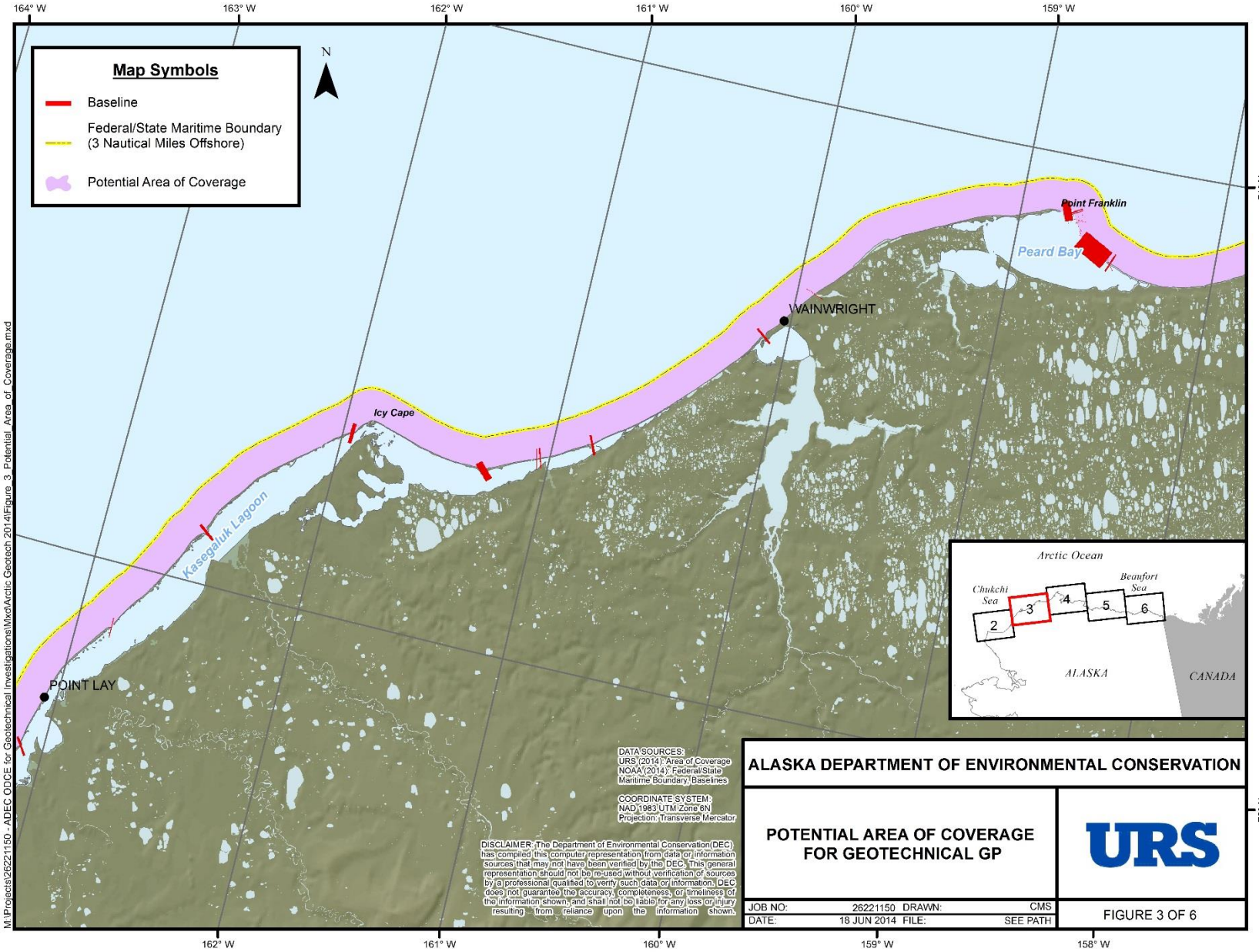


Figure 4. Potential Area of Coverage, Barrow to Cape Halkett

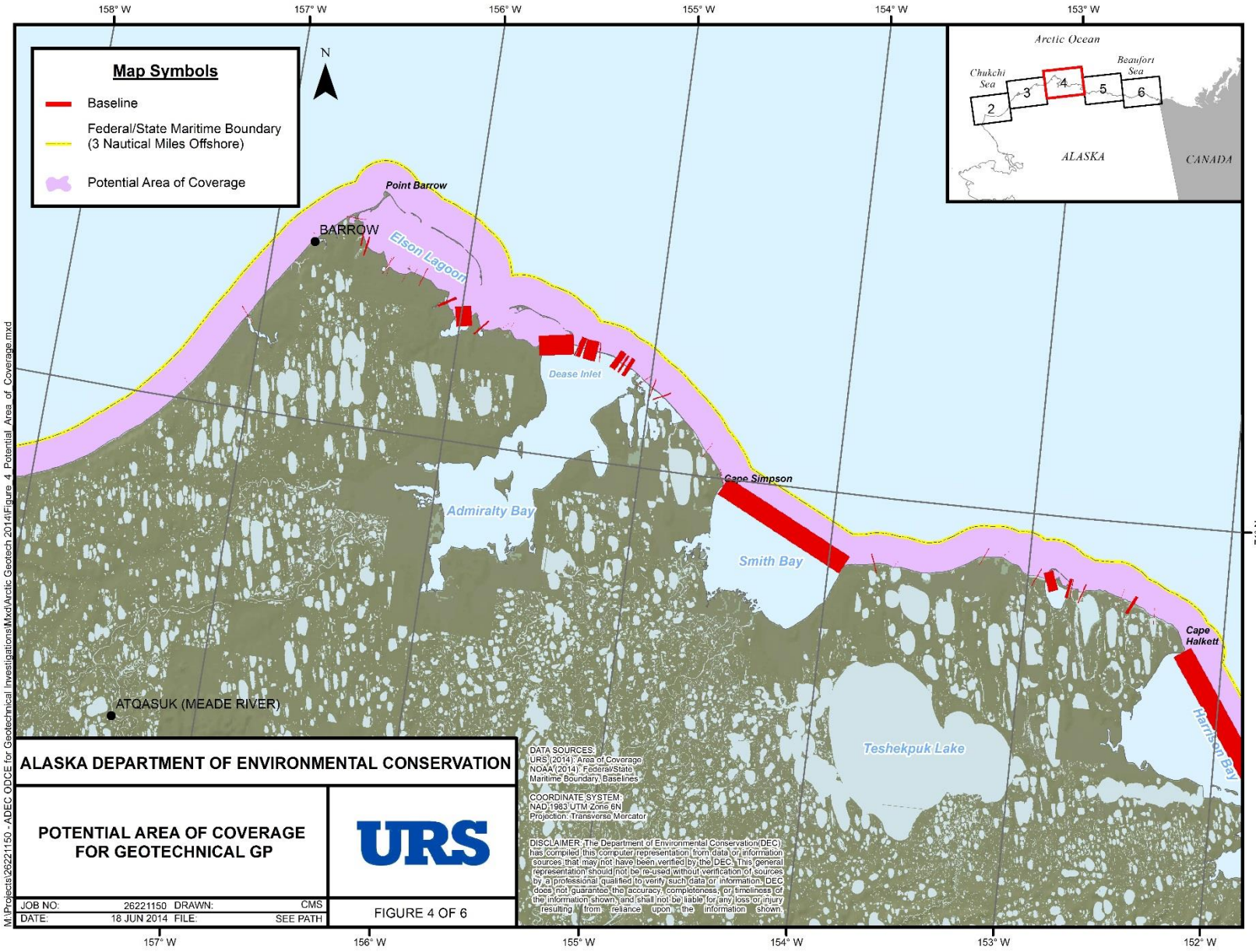


Figure 5. Potential Area of Coverage, Nuiqsut - Prudhoe Bay Area

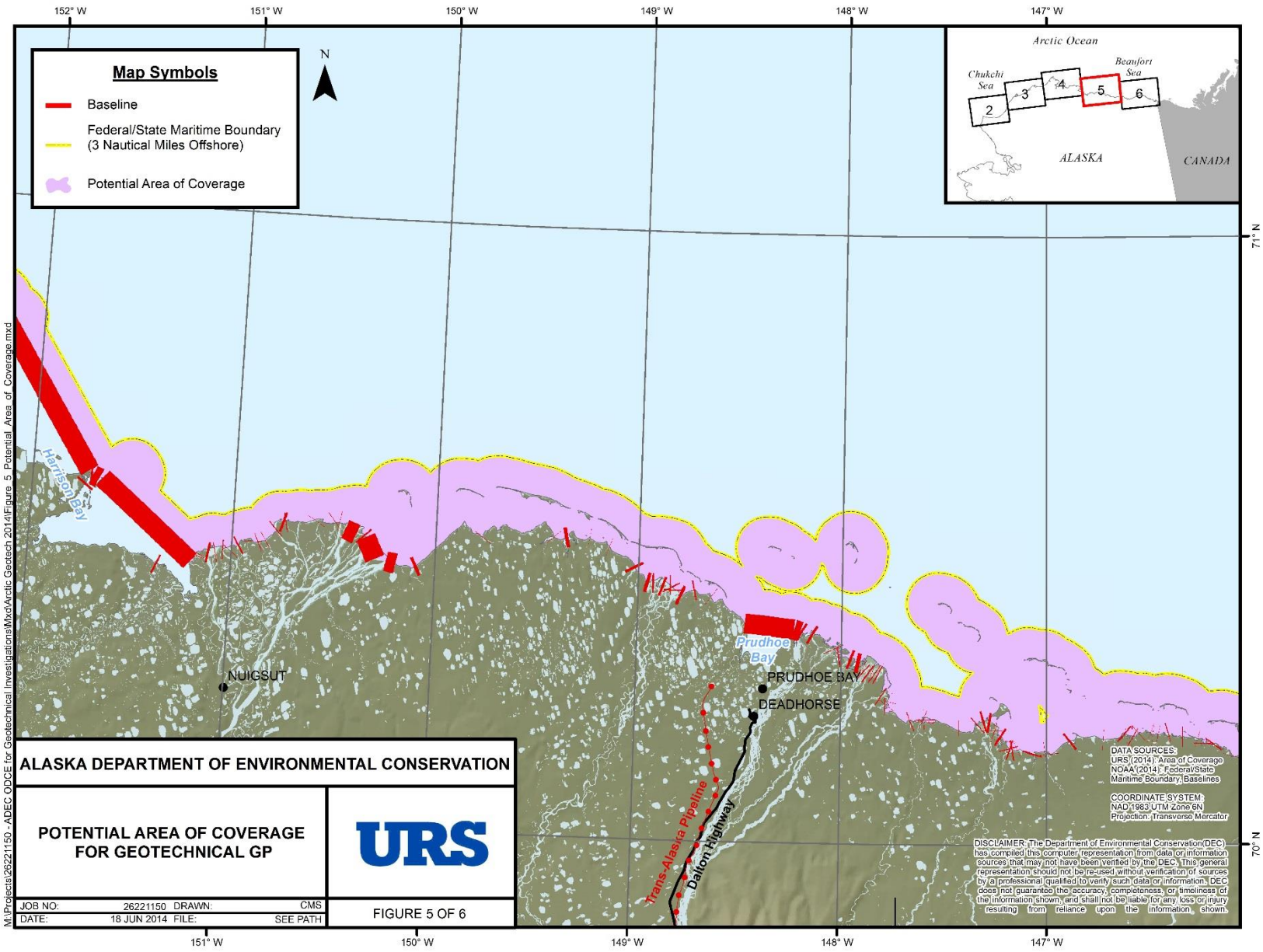
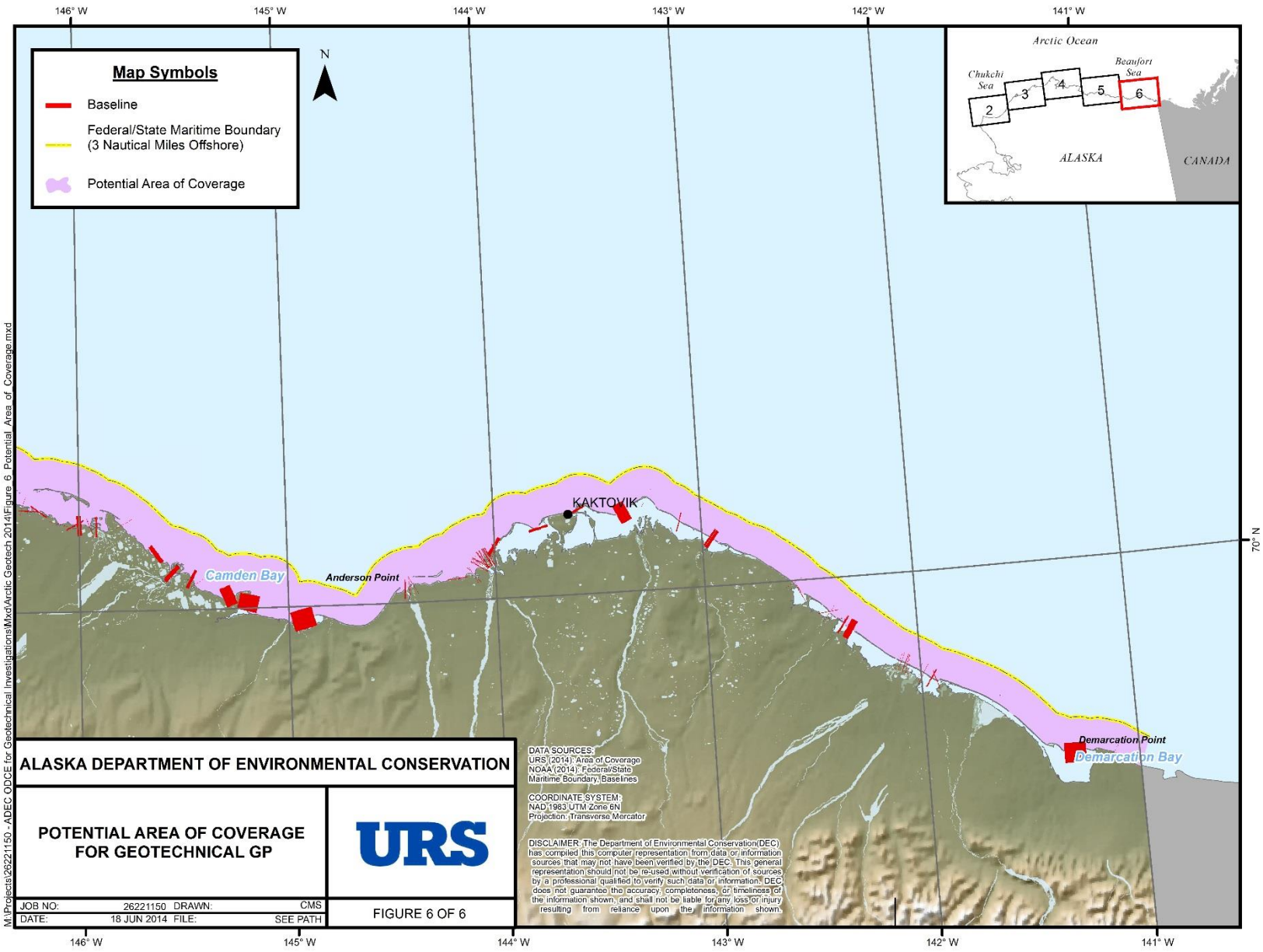


Figure 6. Potential Area of Coverage, Kaktovik Area



2.0 INDUSTRY DESCRIPTION

Marine geotechnical surveys are typically performed to collect information on sediment properties to inform design decisions associated with placement of structures in offshore areas (e.g. oil and gas development). Specifically, marine sediment samples are collected to:

- Evaluate the engineering behavior of subsurface materials;
- Determine the relevant physical, mechanical and chemical properties of these materials;
- Assess risks posed by site conditions, including seafloor or shallow depth geologic hazards;
- Locate potential archaeological resources and potential hard bottom habitats for avoidance; and
- Assess specific locations to inform the placement of platforms, pipelines, or other infrastructure.

The oil and gas industry (industry) is expected to be the primary applicant for the Geotech GP. Industry has indicated that much of the initial work will begin in federal waters in 2014 to evaluate locations for pipelines and platforms with work entering state waters in 2015 to evaluate potential pipeline corridors to shore. Some geotechnical surveys may also occur in state waters for the purpose of siting exploratory drill platforms in the Beaufort Sea.

Geotechnical surveys serve an important function supporting the objectives of oil and gas exploration and development in Alaska. For oil and gas development on available public lands in Alaska, the first step is obtaining a lease from the agency that manages those lands. The State of Alaska, Department of Natural Resources (DNR) manages state-owned uplands and submerged lands. The U.S. Department of the Interior Bureau of Ocean Energy Management (BOEM) manages oil and gas activities on submerged lands on the Outer Continental Shelf (OCS). The following section provides a history of offshore leasing in the Beaufort and Chukchi Seas.

2.1 Bureau of Ocean Energy Management Lease Activity

BOEM, previously known as the U.S. Minerals Management Service (MMS), released a 1998 assessment of the quantities of undiscovered oil and gas that lie beneath submerged federal lands offshore of Alaska as of 1995. The assessment concluded that approximately 90 percent (%) of the undiscovered conventionally recoverable oil in offshore Alaska occurs within the Chukchi shelf (13 billion barrels) and Beaufort shelf (9 billion barrels) provinces, part of the greater Arctic Alaska oil and gas province.

Most of the economically recoverable oil resources occur beneath the Beaufort shelf (2.27 billion barrels) and the Chukchi shelf (1.14 billion barrels of oil). Elsewhere in the Alaska offshore, only Cook Inlet offered any economically recoverable oil, then estimated at 0.27 billion barrels.

MMS updated the 1995 estimates (December 2000) of undiscovered oil and gas resource potential of OCS. This assessment provided an estimate of both technically and economically recoverable resources to assist with the development of a new five Year Oil and Gas Leasing Program scheduled for mid-2002 through mid-2007.

In 2006, the MMS published a revised assessment of undiscovered oil and gas resource potential of the OCS. This assessment provided a then current estimate of both technically and economically recoverable resources to assist with the development of the 2007 through 2012 Five Year Oil and Gas Leasing Program. Analysis performed for the Five Year Program weighed the positive economic value of marketable oil and gas against possible environmental consequences of development and production.

The Proposed Final Five-Year Program for 2012 to 2017 introduces several enhancements to the Alaska OCS lease sale process. These enhancements include targeted leasing, an interactive mapping tool, and a mitigation program tracking table.

The Leasing Section of BOEM's Alaska OCS Region implements the federal government's OCS Oil and Gas Leasing Five-Year Program within the bounds of the Alaska OCS Region. The section ensures that OCS Lands Act (OCSLA) requirements and procedures are followed in the preparation and conduct of sales listed in the Five-Year Program.

In this capacity, the section works closely with the Alaska Region's other program offices (Environment, and Resource Evaluation) to develop appropriate lease mitigation and terms of sale to help ensure expeditious and orderly development -- subject to environmental safeguards -- of the United States of America's oil and gas resources. The section adjudicates bids and issues leases to the highest responsible qualified bidder(s) after completion of fair market value review.

These rights are conveyed by contracts referred to as leases. Each lease covers an area that is no more than 5,760 acres, and is generally a square measuring three miles by three miles.

Under a lease, a company has the right to apply for permits to explore and develop the mineral resources within that area. Before approving the leases, BOEM carefully reviews all applications to ensure that the activities will be conducted in a safe and environmentally sound manner and that the interests of key stakeholders are effectively addressed.

2.2 BOEM Lease Sale History in the Arctic OCS

BOEM and its predecessor MMS has offered the following lease sales in federal waters in the Beaufort and Chukchi Seas.

Table 1: BOEM OCS Lease Sales

Lease Sale Number	Location	Auction Date
186	Beaufort Sea	September 24, 2003
193	Chukchi Sea	February 6, 2008
195	Beaufort Sea	March 30, 2005
202	Beaufort Sea	April 18, 2007

On September 24, 2003 MMS (now BOEM) offered 3,831,167.4 acres for lease. Bids were tendered by three companies on 73,576.10 acres.

In February 2008, BOEM held a lease sale in Anchorage, Alaska for Sale 193, an OCS oil and gas lease area in the Chukchi Sea ranging from approximately 25 miles to 50 miles offshore of the coast of Northern Alaska. A total of 488 blocks within Sale 193 were sold. In the Beaufort Sea there are 186 active BOEM leases in federal waters with over 90 % issued in the two most recent BOEM sales -- 195 (2005) and 202 (2007).

2.3 Relevant State of Alaska Department of Natural Resources Lease Sales

DNR held a lease sale for state lands in the Beaufort Sea Lease Sale Area (approximately 2,000,000 acres) on November 7, 2012. The Beaufort Sea Lease Sale Area was divided into 573 tracts ranging in size from 640 to 5,760 acres. There are 220 active leases in this area that lie within the North Slope Borough and consist of State-owned tide and submerged lands in the Beaufort Sea between the Canadian border and Point Barrow. The state lease sale area is adjacent to the two BOEM Beaufort Sea OCS sale areas. There are currently no state lease holdings in state waters in the Chukchi Sea nor are there lease sales anticipated in the foreseeable future. DNR previously offered the following Beaufort Sea leases for sale.

Table 2: DNR North Slope Competitive Sales

Date	Sale	Competitive Sale Area
12/09/64	13.	Fire Island, West Forelands, Trinity Island., Prudhoe West; offshore/uplands
07/14/65	14.	Prudhoe West to Canning River.; offshore/uplands
01/24/67	18.	Katalla, Prudhoe; offshore/uplands
09/10/69	23.	Colville to Canning River.; offshore/uplands
12/12/79	30.	Beaufort Sea (Joint Federal & State Sale): offshore Milne Point east to Flaxman Island.
05/26/82	36.	Beaufort Sea: Point Thomson area; offshore/uplands
05/17/83	39.	Beaufort Sea: Qwydyr Bay to Harrison Bay; offshore/uplands
05/22/84	43.	Beaufort Sea: Pitt Point east to Harrison Bay; offshore
05/22/84	43A.	Colville River Delta/Prudhoe Bay Uplands Exempt: West of Kavik River.; offshore/uplands
09/24/85	45A.	North Slope Exempt: Canning R. to Colville R.; offshore/uplands
02/25/86	48A.	Mikkelsen Exempt: Mikkelsen Bay, Foggy Island Bay; offshore/uplands
05/17/83	50.	Camden Bay: Flaxman Island to Hulahula River.; offshore
09/28/88	55.	Demarcation Point: Canning River. to U.S./Canadian border; offshore
01/24/89	52.	Beaufort Sea: Pitt Point to Tangent Point; offshore
09/24/85	45A.	North Slope Exempt: Canning River. to Colville River.; offshore/uplands
06/24/91	65.	Beaufort Sea: Pitt Point to Canning River; offshore
06/02/92	68.	Beaufort Sea: Nulavik to Tangent Point; offshore
12/05/95	80	Shaviovik: Sag River to Canning River, southern Kaparuk Uplands, Gwydyr Bay, Foggy Island Bay, onshore/offshore
10/01/96	86A.	Colville River Exempt: Colville River offshore, state/ASRC onshore/offshore
11/18/97	86.	Central Beaufort Sea: Harrison Bay to Flaxman Island
11/15/00	BS Areawide 2000	All available acreage within the Beaufort Sea region.
10/24/01	BS Areawide 2001	All available acreage within the Beaufort Sea region.
10/24/02	BS Areawide 2002	State acreage within the 3-mile limit, between Dease Inlet and Barter Island
10/29/03	BS Areawide 2003	State acreage within the 3-mile limit, between Dease Inlet and Barter Island
10/27/04	BS Areawide 2004	State acreage within the 3-mile limit, between Dease Inlet and Barter Island
3/1/06	BS Areawide 2006	State acreage within the 3-mile limit, between Dease Inlet and Barter Island
10/25/06	BS Areawide 2006A	State acreage within the 3-mile limit, between Dease Inlet and Barter Island
10/25/07	BS Areawide 2007	State acreage within the 3-mile limit, between Dease Inlet and Barter Island
10/22/08	BS Areawide 2008	State acreage within the 3-mile limit, between Dease Inlet and Barter Island
	BS Areawide 2009	Sale was postponed
2/24/10	BS Areawide 2010	State acreage within the 3-mile limit, between Dease Inlet and Barter Island
10/27/10	BS Areawide 2010A	State acreage within the 3-mile limit, between Dease Inlet and Barter Island

Source: http://dog.dnr.alaska.gov/Leasing/Documents/SaleResults/LeaseSales_SaleDate_Areas_2011.pdf

2.4 U.S. Army Corp of Engineers (USACE) Nationwide Permit 6 - Survey Activity

USACE plays a very significant role in authorizing geotechnical surveys within state waters when drilling fluids are not used. Under CWA Section 404(e), the USACE can issue general permits to provide expedited review of projects that have minimal impact on the aquatic environment. Geotechnical surveys that use only seawater as the lubricating and cooling fluid have minimal individual and cumulative adverse environmental effects and are typically covered under Nationwide Permit 6 – Survey Activity (NWP 6). However, if drilling fluids are used in geotechnical drilling applications a CWA Section 402 permit may be required. In general, the Department does not issue a CWA Section 402 APDES permit for an activity that the USACE has or will issue a permit under CWA Section 404(e) for which the state has provided a CWA Section 401 Certification of Reasonable Assurance (certification). On March 13, 2012 DEC issued a certification to the USACE, Alaska District, Regulatory Branch for the nationwide permits reissued in 2012, including NWP 6. However, DEC did not specifically address the use of drilling fluids in the certification of NWP 6. Furthermore, the NWP 6 did not consider the discharge of drilling fluids. Therefore, the Geotech GP provides Section 402 coverage for discharges derived from geotechnical drilling using water-based drilling fluids. The Geotech GP may also be used in conjunction with NWP 6 to cover other incidental discharges when water-based drilling fluids are not used at the geotechnical facility (See Section 4.3 Authorized Discharges).

2.5 Differences Between Exploratory and Geotechnical Drilling

In developing the Geotech GP, DEC reviewed permit requirements in general permits for oil and gas exploration given the similarities in the types of drilling fluids industry proposes to use in geotechnical drilling (See Section 3). However, there are distinct differences, including scale and magnitude, between exploration drilling and geotechnical drilling that were considered in developing permit requirements for the Geotech GP as discussed below.

There are a number of significant differences between oil & gas exploratory drilling and geotechnical drilling. The most significant difference is that exploratory drilling is designed to target and delineate deep hydrocarbon reservoirs while the activities authorized in the Geotech GP are for analyzing the properties of shallow marine sediments. The permit prohibits targeting hydrocarbon reservoirs or activities in shallow marine sediments that would be typically performed during hydrocarbon exploration (e.g. top holes or mudline cellars). Furthermore, the use of oil-based or synthetic fluids is prohibited in the permit so the primary parameters of concern are metals in the drilling fluids.

The discharge point where geotechnical drilling fluids and drill cuttings are discharged is also significantly different compared to exploratory drilling. In exploration, drilling fluids and drill cuttings are recovered topside to a mud pit to allow for removing cuttings from the fluid and reusing drilling fluids downhole. In this scenario, drill cuttings coated with drilling fluids are discharged at or near the sea surface. Discharges near the sea surface tend to be dispersed over a greater area due currents carrying the drilling fluids and drill cuttings as they settle to the seafloor.

In geotechnical drilling, the drilling fluids and drill cuttings are typically discharged to the seafloor as they exit the borehole. In this case, the drilling fluids and drill cuttings are deposited in a smaller area. For a given volume of discharge, geotechnical drilling is expected results in smaller, localized deposits and is likely to have less impact on the benthic environment. However, the reuse of drilling fluids in exploration serves to reduce the relative amount of drilling fluids in the discharge when compared to geotechnical drilling. The percentage of drill cuttings (coarse particle size) are expected to be higher for exploration than for geotechnical drilling and the percentage of drilling fluids (fine particle size) is expected to be lower. Therefore, the transport behavior of drilling fluids and drill cuttings from geotechnical drilling could be significantly different due to fine grained material being suspended and transported away from the borehole at the sea surface. The Geotech GP requires

data collection to evaluate plume behavior through the Environmental Monitoring Program (EMP). The Geotech GP also prohibits discharges of drilling fluids and drill cuttings to the water column to avoid deposition over a large area on the seafloor.

Because geotechnical surveys are shallow, less than 500 feet, the formation pressure at that depth does not require the use of a blowout preventer in the event shallow gas hazards are encountered. Therefore, the discharge of fluids from a blowout preventer is not required in the Geotech GP.

2.6 Description of Geotechnical Surveys

A variety of geotechnical survey equipment may be used to characterize the subsurface geology of the seafloor within the Area of Coverage in state waters of the Beaufort and Chukchi seas. The predominant technology anticipated to be use is conventional rotary core drilling (CRD), which would generate water-based drilling fluids and drill cutting discharges. Several additional technologies used for marine geotechnical investigations may include (but are not limited to) piston core sampling and Continuous Push Cone Penetration Test (CPT). The selection of a specific technique or suite of drilling techniques is driven by data needs, subsurface formations, and other factors.

2.7 Geotechnical Facilities

In the permit, a geotechnical facility is defined as any floating, moored, or stationary vessel, jack-up or liftboat barge actively conducting geotechnical surveying (See Permit Appendix C – Definitions). While actively performing a geotechnical survey, the geotechnical facility will remain stationary relative to the seafloor by means of either an anchoring system, or a dynamic-positioning system that automatically controls and coordinates movements using bow and/or stern thrusters as well as the primary propeller(s). During this activity, discharges from the geotechnical facility may be authorized under the permit. However, once a mode of transportation from the site begins, it is no longer considered a geotechnical facility and discharges are covered under EPA's 2013 Vessel General Permit (See Section 4.3 – Authorized Discharges).

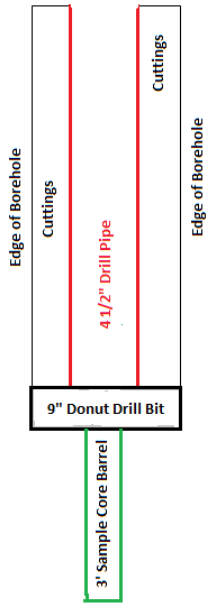
2.8 Conventional Rotary Drilling

Based on discussion with industry, CRD is expected to the most common method of performing geotechnical surveys in the permit coverage area. Although other techniques may be used, the discussion in this fact sheet focuses on the most probable method.

CRD requires placement of a 10 to 20 ton guide at the seafloor at the proposed borehole location. The guide provides stability around the drill string as it rotates into the subsurface. A core drill string is a series of long hollow pipes connected together with a cutting bit at the terminus. A bit has two characteristics, the composition of cutting material and the material surrounding the cutting head, called the matrix. Bits are self-sharpening. As a bit is used, the matrix gradually wears away to expose more of the cutting material. For hard rock, diamonds are used in a soft matrix, so that plenty of cutting material is exposed. For softer material, a less expensive cutting material (e.g. tungsten carbide chips) can be used, with a harder matrix so that the bit lasts longer. The driller determines the type of bit to be used depending on the drilling conditions.

As the drill string rotates, downward pressure and abrasion from the bit cuts into the sediment, pushing the core into the core barrel. A drilling fluid is generally used to dissipate friction and heat generated by the rotating bit, lubricate the core, remove the drill cuttings, and to stabilize the borehole. Because the bit is larger than the drill string, drilling fluids pumped down the string will push cuttings to the seafloor through the annular space between the pipe and borehole (See Schematic Illustration). In ideal conditions, drilling may only require the use seawater as the primary drilling fluid (NWP 6 applies). In less ideal conditions, drilling fluids and chemical additions may be necessary. Removal of cuttings could require the use of a salt water gel (Attapulgite, Sepiolite, or polymers) without other chemicals. In sandy formations or areas of shallow gas hazards, the use of barite

(barium sulfate) may be necessary to provide borehole stability. Barite is added to drilling fluid as a weighting agent, which prevents water and other material from seeping into the borehole from the surrounding formation (Neff 2008, EPA 2000). In these later cases, Discharge 001 – Drilling Fluids and Drill Cuttings in the Geotech GP must be authorized. The permit will authorize the discharge of water-based drilling fluids, salt water gels, and barite solutions and prohibit the use of oil-based or synthetic-based fluids.



Some geotechnical surveys may involve CRD from stable ice or trenching through the ice if an authorization under NWP 6 is obtained from the U.S. Army Corp of Engineers (USACE).

Winter geotechnical surveys may use truck-mounted CRD equipment to drill through the ice and into the seafloor. At least 3.9 ft (1.2 m) of sea ice is required to support heavy vehicles used to transport equipment for geotechnical surveys (NMFS 2011). Winter ice programs are similar to upland geotechnical programs in that boreholes are cased and drill fluids and cuttings are returned to the surface for recycling. Recaptured drilling fluids and cuttings are recycled until they no longer shear or lift. At this point they are pumped off into a storage pit, vacuum truck, or barrels for later disposal at an onshore facility and a new batch of drill fluid and mud additives mixed. By using land techniques, there are no drilling fluids or cuttings intentionally discharged into the sea.

These ice conditions vary, but generally exist from sometime in January until sometime in May in the Area of Coverage. Geotechnical surveys may be conducted from landfast ice (ice attached to the shoreline), and they may also be conducted in areas of stable offshore pack ice nearshore (NMFS 2011). Several vehicles are normally associated with a typical operation. One or two vehicles with survey crews move ahead of the operation and mark the sampling points. Occasionally, bulldozers may be needed to build snow ramps to smooth offshore rough ice within the survey area.

2.8.1 Sampling and Testing

2.8.1.1 Core Sampling

Based on industry input, samples are typically collected in five meter intervals. Two meters are drilled and then a 3 meter sample is collected in the undisturbed sediment (See Schematic Illustration). In soft formations, a core sampler may be dropped via gravity through the drill string to penetrate the sediment. Using a wireline technique such as this is advantageous because it can be done relatively quickly. In stiffer formations, the core sample may have to be collected by drilling the core sampler into the undisturbed sediment. This sampling

technique is more labor intensive and slow because the rod connected the sampler must be removed to collect the sample. If a driller wants to remove a core from a conventional core drill, the core barrel has to be removed from the hole. This is time-consuming, as each rod has to be removed one at a time. A 131 ft (40 m) CRD borehole with five meter sampling intervals is estimated to require approximately 8-12 hours. Based on industry input, geotechnical surveys are expected to take 2-3 days to evaluate deep boreholes for potential exploration drilling platform locations and 1-2 days to for shallow boreholes for pipelines or other infrastructure.

2.8.1.2 Cone Penetration Test

A CPT is often performed in undisturbed sediment to determine physical characteristics. The CPT is performed by pushing an instrumented cone into material at a constant rate. Instruments within the cone normally measure tip resistance, sleeve friction, and pore water pressure. CPT data are used to determine material classification with depth and to estimate various engineering properties for geotechnical analysis. CPT soundings can be very effective for site characterization, especially at sites with discrete stratigraphic horizons or discontinuous lenses of material. The cone is able to delineate even the smallest low strength horizons, which may be missed in conventional small-diameter core sampling programs. CPT sampling, by itself, does not generate any drill cuttings and does not require the use of drilling fluids or fluids.

2.8.1.1 Piston Core Sampling

Piston core sampling techniques are used to collect long soil sample cores that are virtually undisturbed by the sample collection process. A piston core device consists of a weight stand mounted above a length of core barrel. The device is lowered to the sea floor at a constant velocity. When the end of the corer reaches the seafloor, a piston is fired which forces the core barrel down into the soil. Using this forced method, long soil cores can be recovered and brought back up topside. While penetrating, the piston creates a partial vacuum within the core liner allowing the core sample to enter the tube relatively undisturbed (Noorany 1972). The device is then returned to the ship's deck, where the soil core is removed from the core barrel. Physical property results using piston core samples have been used to develop a better understanding of spatial variability of marine soil properties (Goff et al. 2002). Piston core sampling does not generate any drill cuttings and does not require the use of drilling fluids or fluids. Piston core technology is generally limited to 20 to 30 feet of maximum penetration in Arctic sediment conditions. whereas a 131 ft (40 m) CPT boring requires approximately 6-8 hours to drill from a floating facility using wireline techniques.

2.9 Projected Level of Geotechnical Activity in State Waters

Shell Exploration & Production (Shell) submitted an application on April 23, 2013 to EPA for conducting geotechnical surveys in federal waters in 2014. The application identified three operational areas: the Chukchi Sea, the Beaufort Sea, and Harrison Bay in the Beaufort. In addition, the application contained a project description that projected geotechnical surveys in both federal and state waters in subsequent years. However, the application did not consider additional geotechnical programs by other entities. Therefore, EPA and DEC engaged industry to develop general permits for the proposed activity by Shell and potential future efforts by other industry members with lease holdings in the Beaufort and Chukchi Seas.

DEC and EPA jointly developed an industry questionnaire as part of permit development to gather information on potential pollutant discharges and projected levels of activities. The Alaska Oil and Gas Association (AOGA) facilitated a coordinated industry response (CIR). The following information represents industry-projected levels of geotechnical activities in state and federal waters in the permit coverage area over the anticipated five-year term of the Geotech GP.

2.9.1 Industry Estimates

Shell is developing a geotechnical program for both the Beaufort and Chukchi Seas that includes shallow (< 50 feet) and deep (> 50 and < 500 feet) to support the design of potential pipelines and platforms. While deep boreholes could be up to 500 feet deep, they typically range from 200 to 300 feet in depth. Based on Shells application, up to 40 shallow pipeline boreholes may be completed in any given year in the Beaufort and Chukchi Seas to evaluate pipeline routes and up to 10 deep boreholes for pipelines and platform. Based on follow up questions with Shell, DEC concluded the probable maximum number of boreholes in both federal and state waters in 2014 is approximately 31. This estimate for 2014 is considered to be conservative.

The CIR presents information from multiple entities that may or may not utilize the Geotech GP in the five-year term. The combined totals for wells and estimated depths potentially overestimate the probable activity under the permit. The CIR did not provide specific information on the number of boreholes that are likely to be drilled specifically in state waters in any given year. In order to conservatively estimate the total boreholes for any given year, DEC assumed that 50 % of the boreholes would be drilled in state waters. Lastly, the use of drilling fluids is currently not easy to predict prior to collecting field data. To obtain a conservative estimate, all boreholes are assumed to require drilling fluids. For these reasons, DEC believes that the estimates for years 2015 through 2018 are likely conservative, but without estimates from all entities that potentially may use the permit, the Department maintains that these estimates are the best information currently available from industry for permit development.

2.9.2 Estimated Five-Year Geotech GP Borehole Totals

The CIR provided the following table that estimates of drilling fluids and drill cuttings generated by geotechnical drilling based on varying depths.

Table 3: Drilling Fluids and Drill Cuttings Discharged per Borehole by Depth

Tech	Borehole Diam.	Cuttings and Drill Fluids Discharged Per Borehole by Depth								
		50 Feet			200 Feet			499 Feet		
		Cuttings (ft^3)	Mud (ft^3)	Total (ft^3)	Cuttings (ft^3)	Mud (ft^3)	Total (ft^3)	Cuttings (ft^3)	Mud (ft^3)	Total (ft^3)
CRD	7 in	11	22	33	48	89	137	124	223	347
	8 in	15	22	37	64	89	154	165	223	388
	9 in	20	23	43	85	89	174	213	223	437
CRD on Ice	8 in	15	--	15	65	--	65	166	--	166

The CIR did not provide adequate means to determine how many boreholes at a given depth would be drilled in a given year of the permit. Therefore, DEC used the number of projected boreholes and the shallow and deep borehole depths to estimate the range of total drilled footage. For instance, when the listed borehole depth is greater than 50 meters and less than 499 meters, DEC calculated a range of depths using 50 meters and 499 meters. Using the most conservative assumptions based upon the industry response to the joint EPA / DEC questionnaire produces the following five-year projection. Table 4 summarizes the number of boreholes and potential annual depth based on the CIR.

Table 4: Projected Five-Year Totals

Year	Maximum Number of Boreholes in State Waters	Projected Range of Cumulative Borehole Depth (feet)	Exploration Borehole Equivalents (10,000 feet)
2014	31	1,550 – 12,475	0.166 to 1.25
2015	136	4,300 – 24,954	0.4 to 2.5
2016	136	4,300 – 24,954	0.4 to 2.5
2017	136	4,300 – 24,954	0.4 to 2.5
2018	136	4,300 – 24,954	0.4 to 2.5

As a comparison, DNR (DNR 2008) estimates that a typical exploration well generates 12,000 cubic feet of cuttings. A 499-foot geotechnical bore hole with a nine inch diameter is estimated to produce 213 cubic feet of cuttings, which is approximately 1.8% of the exploratory well volume.

The CIR included information on the annual activities in both state and federal waters. Tables 5 and 6 summarize estimated activities in state waters only.

Table 5: Projected 2014Geotechnical Survey Activity in State Waters

Program Goal	Technology	Depth of Borehole in feet	Water Depth Below MLLW	Borehole Diameter	Number of Boreholes	Season/Timing Performed	Location (Sea)	Anticipated Duration Per Borehole
Other	CRD on Ice	>50 and <499	<5 to <10	6.5”	25	Winter	Chukchi/Beaufort	up to 1 day
Jack Up Drill Unit	CRD /CPT	>50 and <499	< 20	4-12”	6	Open Water	Chukchi/Beaufort	up to 1 day
				Totals	31			

Table 6: Projected 2015 to 2018 Annual Geotechnical Survey Activity in State Waters

Program Goal	Technology	Depth of Borehole in feet	Water Depth Below MLLW	Borehole Diameter	Number of Boreholes	Season/Timing Performed	Location (Sea)	Anticipated Duration Per Borehole
Pipeline	CRD Liftboat	<50	4 to 20	9"	up to 40	Open Water	Chukchi/Beaufort	up to 1 day
Pipeline	CRD Liftboat	<200	4 to 20	9"	up to 10	Open Water	Chukchi/Beaufort	1 to 2 days
Pipeline	CRD on ice	<50	<20	8"	up to 40	Winter	Chukchi/Beaufort	< 1 day
Pipeline	CRD on ice	>50 and <499	<20	8"	up to 40	Winter	Chukchi/Beaufort	1 day or more
Jack up Drill Unit	CRD/CPT	>50 and <499	< 20	4-12”	6	Open Water	Chukchi/Beaufort	up to 1 day
				Totals	136			

3.0 REGULATORY HISTORY OF OIL AND GAS PERMITTING IN THE BEAUFORT AND CHUKCHI SEAS

As previously mentioned, the Geotech GP would represent the first permit developed specifically for the discharges associated with geotechnical surveys in Alaska. However, there have been other industry general permits developed for the coverage area that have similar discharges that are noteworthy.

EPA issued the first NPDES general permit for discharges associated with Oil and Gas Exploration Facilities on the Outer Continental Shelf and Contiguous State Waters (AKG28000) with an effective date of June 26, 2006. AKG280000 expired on June 26, 2011. Expired permit AKG28000 was administratively extended to authorize discharges from those operators who submitted notification of their intent for coverage to the EPA within a timely manner.

EPA re-issued permit AKG28000 as two general permits; AKG282100 for Oil and Gas Exploration Facilities on the Outer Continental Shelf and Contiguous State Waters in the Beaufort Sea, Alaska and AKG288100 for Oil and Gas Exploration Facilities on the Outer Continental Shelf in the Chukchi Sea, Alaska. These general permits have an effective date of November 28, 2012.

In the final DEC Section 401 Certification for NPDES Permit AKG282100 the State of Alaska specified the following permit stipulations under the authority of AS 46.03.110(d):

- **Plan Review for all Treatment Systems that Discharge to State Waters (Discharge 001 – Discharge 013)** Permittees must submit an engineering plan to DEC and receive written approval before constructing, installing, or modifying a domestic or nondomestic wastewater treatment works (per 18 AAC 72.200 and 18 AAC 72.600).
- **Table 1. Effluent Limitations and Monitoring Requirements for Drilling Fluids and Drill Cuttings (Discharge 001)** In accordance with 18 AAC 70.240 – 18 AAC 70.270, DEC authorizes a 100 meter radius mixing zone that extends from the sea surface to the seafloor for Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Iron, Mercury (total/methyl), Nickel, Selenium, Silver, Thallium, Tin, Titanium, Zinc, and Lead.
- **Drilling Fluids and Drill Cuttings (Discharge 001)** Permittees who propose to discharge drilling fluids and drill cuttings may apply for a zone of deposit under 18 AAC 70.210 from DEC. As outlined in the general permit, permittees who propose to discharge drilling fluids and drill cuttings to stable ice must submit a detailed alternatives analysis demonstrating that there are no technically feasible land-based disposal alternatives and means to transport these waste streams to alternative land-based disposal sites.
- **Domestic Wastewater (Discharge 003) and Graywater (Discharge 004)** Permittees who propose to discharge sanitary or domestic wastes may apply for a 100 meter mixing zone under 18 AAC 70.240 – 18 AAC 70.270 from DEC for dissolved oxygen, pH, total residual chlorine and fecal coliform bacteria by submitting Form 2M to DEC.
- **Drilling Fluids, Cuttings, and Cement at Seafloor (Discharge 013)** In accordance with applicable regulations, DEC authorizes a 100 meter mixing zone (18 AAC 70.240 – 18 AAC70.270) and a 100 meter zone of deposit (18 AAC 70.210) to accommodate these inadvertently discharged wastes when the well casing is set and when the well is abandoned.

4.0 PERMIT CONDITIONS

4.1 Discharge Prohibitions

The permit prohibits discharge to certain areas as determined necessary to prevent unreasonable degradation to the marine environment based on the findings of the Department's 2013 Ocean Discharge Criteria Evaluation (2013 ODCE), which was developed in accordance with 40 CFR § 125, §§ M. Area restrictions are based on coordination with other state or federal agencies. The following discharge prohibitions are included in the Geotech GP.

- The permit prohibits the discharge drilling fluids and drill cuttings (Discharge 001) to coastal waters and to water with less than the five meter (2.7 fathoms) below the mean lower low water (MLLW) depth. Discharges to these shallow waters disperse less than discharges to deeper waters and have greater potential to impact aquatic life found in these near shore locations.
- The permit prohibits any discharge associated with geotechnical surveys to stable ice.
- The permit prohibits any discharge associated with geotechnical surveys within 1,000 meters of the Boulder Patch in Stefansson Sound or between individual Boulder Patches where the distance between patches is greater than 2,000 meters but less than 5,000 meters.
- The permit prohibits the discharge of oil in any waste stream.
- The permit prohibits mud pit discharges at the sea surface.

4.2 Area Restrictions

The permit contains seasonal discharge restrictions within certain areas of general sensitivity and greater geographic extent. These areas include:

  - Kasegaluk Lagoon – no discharges from June 1 to July 15
  - Icy Cape Walrus Haulouts - no discharge when walrus are present (June to August)
  - Vicinity of Cross Island – no discharge from mid-August to September 30

4.3 Authorized Discharges

This permit authorizes discharges from stationary geotechnical facilities only while actively engaged in performing geotechnical surveys. As stated previously, the permit does not cover facilities while in a mode of transportation. Permittees are encouraged to seek coverage under the Vessel General Permit (VGP) issued by EPA for coverage while in transportation mode in state waters.

Geotechnical surveys include two drilling scenarios, one using water-based drilling fluids (geotechnical drilling) and the other using only seawater. An applicant that proposes to use water-based drilling muds must obtain coverage for Discharge 001 – Water-based Drilling Fluids and Drill Cuttings if the drilling fluids and cuttings are not recovered to the surface the geotechnical facility for latter disposal at a permitted upland location. An applicant that proposes to use seawater only as a lubricant during the geotechnical survey need not obtain coverage for Discharge 001 but can obtain coverage for the remaining discharges because the VGP does not provide coverage for these discharges while the geotechnical facility is actively conducting geotechnical surveys.

The permit authorizes the discharge of only those pollutants resulting from geotechnical facility processes, waste streams, and operations that have been identified in the Notice of Intent (NOI) and described in the written authorization provided by the Department. Based on discharges applicable to geotechnical surveys, the following wastewater discharges are authorized under the permit:

DISCHARGE NUMBER	DISCHARGES DISCRIPTION
001	Water-Based Drilling Fluids and Drill Cuttings
002	Deck Drainage
003	Domestic Wastewater (as defined in 18 AAC 72.990(23))
004	Graywater (as defined in 18 AAC 72.990(35))
005	Desalination Unit Wastes
007	Boiler Blowdown
008	Fire Control System Test Water
009	Non-Contact Cooling Water
010	Uncontaminated Ballast Water
011	Bilge Water
012	Excess Cement Slurry

Readers may note that Discharge 006 is not listed in contrast to the Beaufort Exploration general permit (AKG282100), as blowout preventers are not installed during geotechnical drilling.

This permit does not authorize discharges incidental to normal vessel operations from a geotechnical facility while they are acting as a vessel (i.e., when not conducting geotechnical surveys). "Vessel" means every description of watercraft or other artificial contrivance being used as a means of transportation on waters of the U.S. The operator should seek coverage under EPA's Vessel General Permit for Discharges Incidental to Normal Operations of Vessels (VGP, 2013), for those incidental discharges when behaving as a vessel.

Geotechnical surveys can generate several waste streams. These waste streams are related to the drilling process, operation and maintenance of equipment, and personnel housing on board geotechnical facilities. Geotechnical surveys are generally temporary in nature and characterized as short-term at any particular location. Discharges from such investigations in state waters are anticipated to be somewhat similar in composition to those from offshore oil and gas exploration, however, the volumes and areal dispersion of discharges from a geotechnical surveys would be considerably less and likely far shorter in duration than those from a typical exploration drilling program. (ODCE, 2013)

The following describes the discharges authorized by the Geotech GP.

4.3.1 Drilling Fluids and Drill Cuttings (Discharge 001)

Water-based drilling fluids are the circulating fluids used in CRD to clean and condition the borehole and to counterbalance formation pressure. Drill cuttings are particles generated by drilling into the subsurface formation carried out of the borehole with drilling fluids. The term water-based drilling fluids does not apply when seawater is used as the "only" fluid during geotechnical surveys.

4.3.2 Deck Drainage (Discharge 002)

Deck drainage refers to any wastewater generated from platform washing, deck washing, spillage, rainwater, and runoff from curbs, gutters, and drains, including drip pans and wash areas. Such drainage could include pollutants such as detergents used on the facility and equipment washing, oil, grease, and drilling fluids spilled during normal operations. Deck drainage must be treated using an oil-water separator (OWS).

4.3.3 Domestic Wastewater (Discharges 003 and 004)

While some geotechnical facilities discharge black water (human body waste discharged from toilets and urinals) and graywater (water from laundry, showers, and sinks) separately, sometimes these waste streams are combined. Although both black water and graywater are considered domestic wastewater in state definitions, the permit refers to domestic wastewater as either black water or black water combined

with graywater. Whereas, graywater refers to domestic waste that does not contain excrement or urine. These distinctions are discussed in more detail in Section 4.3.3.1.

4.3.3.1 Clarifications for Domestic Wastewater and Graywater Discharges

This section provides definitions and clarifications associated with Discharge 003 – Domestic Wastewater and Discharge 004 – Graywater to assist in understanding distinct differences between the APDES general permit developed by DEC and federal NPDES permits developed by EPA. The APDES permit defines graywater per 18 AAC 72.990(35), which is consistent with the definition for domestic wastewater established by EPA. Graywater (analogous to domestic wastewater in the federal permit) is defined as: "the materials discharged from sinks, showers, laundries, safety showers, eye-wash stations, hand-wash stations, fish cleaning stations, and galleys.

The greatest point of divergence between the APDES permit and the NPDES permit is in how the state defines domestic wastewater. The state regulatory definition of domestic wastewater in 18 AAC 72.990(23) includes both graywater and black water whereas EPA defines black water as sanitary wastewater and graywater as domestic wastewater. EPA applies different pollution control measures for domestic and sanitary wastewater. However, because graywater is considered a component of domestic wastewater under state regulation, graywater by itself is subject to the same regulatory requirements as domestic wastewater that contains black water only, or commingled black and graywater. The ramifications of this state regulation is that per 18 AAC 72.050, domestic wastewater discharges must meet minimum treatment requirements (i.e., secondary treatment as defined in 18 AAC 72.990(59)) unless a waiver from minimum treatment is granted by the Department under 18 AAC 72.060.

As discussed in Section 6.2.5 of this fact sheet, the permit requires graywater discharges (domestic wastewater) to meet secondary treatment as defined in 18 AAC 72.990(59). If the applicant segregates graywater and requests coverage that includes limits less stringent than the minimum treatment requirements of 18 AAC 72.050, the applicant must also obtain a waiver for minimum treatment under 18 AAC 72.060 prior to obtaining authorization for domestic wastewater discharges. Waivers will only be approved if the applicant can demonstrate that public health and the environment are protected.

4.3.4 Desalination Unit Waste (Discharge 005)

Desalination unit waste is residual high-concentration brine, associated with the process of creating potable water from seawater. The concentrate is similar to sea water in chemical composition; however, anion and cation concentrations are higher and may include chemical additives such as biocides and membrane cleaning solutions. Discharges from desalination units can vary in volume depending on potable water needs and equipment and methods used in the desalination process.

4.3.5 Boiler Blowdown (Discharge 007)

Boiler blowdown is the discharge of water and minerals drained from boiler drums to minimize solids buildup in the boiler. Discharge volumes from boiler blowdown are relatively small but may have elevated minerals concentrations.

4.3.6 Fire Control System Test Water (Discharge 008)

Fire control system test water is sea water that is released while training personnel in fire protection, and testing and maintaining fire protection equipment.

4.3.7 Non-Contact Cooling Water (Discharge 009)

Non-contact cooling water is seawater that is used for non-contact, once-through cooling of various machinery and equipment on the drilling facility. Non-contact cooling water consists of the highest volume of the discharges authorized under the Geotech GP. The volume of non-contact cooling water depends on the configuration of heat exchange systems on the geotechnical facility. Some systems use smaller volumes of water that are heated to a greater extent, resulting in a higher temperature differential between wastewater and receiving water. Other systems use larger volumes of water to cool equipment, resulting in a smaller difference between the temperatures of wastewater and receiving water. Depending on the heat exchanger materials and the system's design, biocides or oxidizing agents might be needed to control biofouling on condenser tubes and intake and discharge conduits.

4.3.8 Uncontaminated Ballast Water (Discharge 010)

Ballast water is seawater added or removed to maintain the proper ballast level and ship draft. For purposes of the Geotech GP, ballast water also includes water used for jackup rig-related seafloor support capability tests, such as preload water. If ballast water is contaminated, it must be treated in an OWS similar to deck drainage and bilge water.

4.3.9 Bilge Water (Discharge 011)

Bilge water is seawater that collects in the lower internal parts of the hull. Bilge water could become contaminated with oil and grease and with solids, such as rust, when it collects at low points in the bilges.

4.3.10 Excess Cement Slurry (Discharge 012)

In the unlikely event that the substrate conditions warrant the borehole to be "plugged," a heavy cement slurry would be used. As general practice, boreholes drilled for geotechnical investigations are not plugged, however this discharge is included in the permit in order to authorize the discharge of cement should the need to plug a borehole arise.

4.4 Permit Requirements

The discharges associate with geotechnical drilling and other incidental waste streams are very similar to other industry permits in the Beaufort and Chukchi Seas. The basis of the permit is 40 CFR § 435, the NPDES permit for Oil and Gas Exploration Facilities on the Outer Continental Shelf and Contiguous State Waters in the Beaufort Sea, Alaska (AKG282100), the NPDES permit for Oil and Gas Exploration Facilities on the Outer Continental Shelf in the Chukchi Sea, Alaska. (AKG288100), and other state regulations, including those clarified in Section 4.3. The permittee must satisfy the following permit requirements while conducting geotechnical activities.

4.4.1 Plan Reviews and Engineer Reports for Domestic Wastewater Discharges (003)

First time applicants or existing permittees who are conducting major renovations on their domestic wastewater system (graywater, black water or commingled black and graywater) must submit engineering plans to the Department for approval per 18 AAC 72.200. The plan review is essential to ensure that the treatment system is designed to protect public health and the environment and comply with permit requirements.

4.4.2 Plan Reviews and Engineer Reports for Graywater Discharges (004)

First time applicants or existing permittees who are conducting major renovations must submit engineering plans of the graywater system to the Department for approval per 18 AAC 72.200. The applicant must also submit a request for waiver and an engineering report prepared by a licensed Alaskan

engineer per 18 AAC 72.060. A permittee proposing to discharge graywater must comply with this requirement and treat the graywater to primary treatment levels per 18 AAC 72.050(e). Note that conditions in the approval of plan submittals and waiver requests may include collecting influent and effluent samples and analyzing for five-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS).

4.4.3 NOI Schedule for New Applicants and Existing Permittees

The Geotech GP requires an annual Notice of Intent (NOI) from applicants. Applicants must submit a Notice of Intent (NOI) to DEC 90 days prior to discharge for the first year the geotechnical facility operates. The 90-day notice is to allow for adequate time to review the NOI and plan approvals. In subsequent years of operations, permittees must submit a new NOI 45 days prior to discharge and must detail new activities plus any previously noticed activities that were not completed during the previous year Drilling Fluids Plan Submitted with NOI

Applicants that conduct geotechnical drilling at the geotechnical facility must develop and implement a Drilling Fluids Plan and submit it with the NOI. The intent of this requirement is to ensure these documents are readily available for review and comment by DEC but approval is not required prior to implementing the plan. If changes to the Drilling Fluids Plan are made in subsequent years, the applicant must resubmit with the NOI or certify that the previous Drilling Fluids Plan remains unchanged.

4.4.4 Annual Report Requirement

The permit requires operators to submit an annual report that summarizes geotechnical drilling activities and studies completed from January 1 to December 31 of any given year.

4.4.5 Chemical Additives Reporting

The permit requires the permittee to maintain a precise chemical inventory of all constituents used in miscellaneous discharges or drilling fluid systems, including drilling fluid additives. The inventory is to be submitted with the annual report and retained in records for a minimum of five years.

4.4.6 Best Management Practices Plan Certification with NOI

The permit requires submitting a Best management Practices (BMP) Plan with the first NOI and a certification that the BMP Plan has been revised and implemented prior to discharging for subsequent years of operation under the permit.

4.5 Notice of Intent

An applicant seeking coverage under the permit must submit a NOI to DEC per 18 AAC 83.210(b) for each year of operation under the permit. The regulation requires the following information to be included in the NOI:

1. Applicant Information. The NOI requires the applicant to provide the owner's or permittee's name, mailing address, contact name, and telephone number, as well as the facility's name, mailing address, contact name, and telephone number.
2. Location of discharge. The NOI requires the applicant to provide accurate descriptions for location of operations and discharges if applicable, the latitude and longitude of each borehole and the water depths below MLLW at each borehole. In addition, the permit requires the applicant to provide the type of drilling equipment used for geotechnical work (i.e., jackup, drillship, semisubmersible, etc.)

3. Vicinity Map: The NOI requires the applicant to submit a vicinity map of proposed geotechnical boreholes referencing any Tier 1 or Tier 2 to sensitive areas in section 5.10 of the ODCE and Table 7 of the GP. Also see EMP Plan requirements.
4. Commencement date of discharge. The permit requires the applicant to provide the initial date and expected duration of operations.
5. EMP Study Plan. The permit requires that applicants seeking a discharge authorization for Discharge 001 submit an Environmental Study Plan with the NOI for review and approval by the Department.
6. BMP Plan: A BMP Plan must be prepared and submitted with the first NOI. A BMP Plan certification statement must be submitted by the permittee with NOIs in subsequent years of operation.
7. Drilling Fluids Plans: A drilling fluids plan must be submitted with the first NOI for department review and comment. The Drilling Fluid Plan certification statement must be submitted by the permittee with NOIs in subsequent years of operation.
8. Boreholes. The permit requires the applicant to submit the following for each borehole: the planned date of drilling; the borehole transect name or number, the borehole number (i.e., #1, #2, etc.); the borehole diameter; the category of fluid(s) used (e.g., water-based, etc.); and the type or group of fluid used (e.g., lignosulfonate fluids, lime fluids, etc.);
9. Discharges. The permit requires the applicant to identify the types of discharges from each borehole and geotechnical facility.
10. Line Drawing. The NOI requires the applicant to submit a line drawing depicting waste streams from the facility including estimated flow rates and other information necessary to characterize the discharges.
11. Plan Approval and Waivers for First Time Applicants. 18 AAC 72.050 requires the applicant to demonstrate to the Department that a domestic wastewater discharge meets minimum treatment requirements found in 18 AAC 72.050 prior to discharging graywater to waters of the U.S. A waiver of the minimum treatment may be requested per 18 AAC 72.060. Plan approval is also required before constructing, installing, or modifying any part of a domestic wastewater collection, treatment, or disposal system per 18 AAC 72.200. In addition, a permittee that constructs, alters, installs, modifies, or operates a non-domestic wastewater treatment works or disposal system must obtain written approval of engineering plans per 18 AAC 72.600.

4.5.1 Deadlines for Submitting NOI

A new applicant conducting geotechnical drilling at the geotechnical facility must submit an NOI to DEC 90 days prior to discharge for the first year of operation. The 90-day notice will allow for adequate time for DEC to review the NOI and plan approvals. NOIs for subsequent years of operation must be submitted 45 days prior to discharge.

4.5.2 Date of Authorized Discharge

18 AAC 83.210(f) requires a general permit to specify the date(s) when it authorizes a permittee to begin discharging. Commencement of discharges from a facility may occur any time after issuance date of a written authorization from DEC. The written authorization will assign the facility an APDES general authorization number for the site(s) specified in the NOI. Relocation to another site will not require the permittee to submit another NOI to the Department 45 days prior to commencing discharge at the new site unless the site was not noticed with the previous NOI.

4.5.3 Transfers

18 AAC 83.150 allows permit coverage for a given geotechnical facility to be transferred from an existing owner to a new owner. The permit authorizes a transfer only for an existing location designated in the original NOI. Discharge authorizations for a particular facility may not be transferred to another facility at the same site, nor will the transfer apply to the same facility at a new location.

4.5.4 Termination Notification

DEC may terminate coverage under an APDES permit for the reasons described in 18 AAC 83.140 using the procedures provided in 18 AAC 83.130. If a permittee desires to terminate coverage, the permit requires the permittee to provide notice of termination to DEC within 30 days following cessation of discharges. The notice must include certification that the geotechnical facility is not subject to an enforcement action or citizen suit. The notice must also include any final reports required by the permit.

5.0 RECEIVING WATERS

The Area of Coverage is located in the Arctic climate zone, which is characterized by low temperatures, nearly constant wind, low precipitation, and the extreme solar radiation conditions of high latitudes. Important meteorological conditions that could affect the discharges covered by this document include air temperature, precipitation (rain and snowfall), and wind speed and direction.

Air temperature controls ice formation and breakup, and whether ice would need to be managed as part of geotechnical investigative activities. Precipitation determines the quantity and concentration of pollutants discharged from deck drainage, and wind speed and direction influence coastal oceanographic conditions (ice distribution, tidal current speed and direction, vertical and horizontal mixing, and wave action).

The Beaufort Sea is a semi-enclosed basin with a narrow continental shelf extending 19 to 50 miles (30 to 80 km) from the coast (Chu et al. 1999). The continental shelf of the Beaufort Sea is relatively shallow, with an average water depth of about 121 feet (37 m). Bottom depths on the shelf increase gradually to a depth of about 262 ft (80 m), then increase rapidly along the shelf break and continental slope to a maximum depth of around 12,467 ft (3,800 m) (Weingartner 2008, Greenberg et al. 1981).

The Chukchi Sea is predominantly a shallow sea with a mean depth of 131 to 164 ft (40 to 50 m). Gentle mounds and shallow troughs characterize the seafloor morphology of the Chukchi Sea (Chu et al. 1999). The Chukchi Sea shelf is approximately 311 mi (500 km) wide and extends roughly 497 mi (800 km) northward from the Bering Strait to the continental shelf break (Weingartner 2008). The western edge of the Chukchi Sea shelf extends to Herald Canyon, and the eastern edge is defined by Barrow Canyon (Pickart and Stossmeiser 2008), which separates the Beaufort and Chukchi seas.

5.1 Water Quality Standards

Section 301(b)(1)(C) of the CWA requires the development of limits in permits necessary to meet water quality standards (WQS) by July 1, 1977. State regulations at 18 AAC 83.435 require that the conditions in APDES permits ensure compliance with applicable WQS. The WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the beneficial use classification of each water body. The receiving waters covered by the permit are marine waters of the United States located in the State of Alaska. Marine waters are classified in the WQS at 18 AAC 70.020(a)(2) as Classes (2)(A), (B), (C), and (D) for use in aquaculture, seafood processing, and

industrial water supply contact and secondary recreation growth and propagation of fish, shellfish, other aquatic life, and wildlife and harvesting for consumption of raw mollusks or other raw aquatic life. The Department has determined that all of the marine use classes must be protected in state waters in the area of permit coverage.

5.2 Ocean Discharge Criteria Evaluation

The Ocean Discharge Criteria Evaluation (ODCE) requirements found in 40 CFR § 125, which is adopted by reference in 18 AAC 83.010(c), establishes guidelines for permitting discharges into the territorial seas, the contiguous zone, and the ocean. The ODC are intended to "prevent unreasonable degradation of the marine environment and to authorize imposition of effluent limitations, including a prohibition of discharge, if necessary, to ensure this goal" (See 49 Fed. Reg. 65942 (Oct. 3, 1980)).

Under the ODCE, an APDES permit may be issued if the Department determines that a discharge will not cause unreasonable degradation to the marine environment. If insufficient information exists to make such a determination prior to permit issuance, DEC may only issue the permit if the discharge will not cause irreparable harm to the marine environment while additional monitoring is undertaken, and if there are no reasonable alternatives to on-site disposal. DEC conducted an evaluation using ODCE established in accordance with CWA Section 403 and 40 CFR §125, as adopted by reference at 18 AAC 83.010(c). Based on the available information, DEC determines whether the discharge will cause unreasonable degradation of the marine environment. 40 CFR § 125.121, adopted by reference at 18 AAC 83.010(c)(8), states unreasonable degradation of the marine environment means:

- significant adverse changes in ecosystem diversity, productivity, and stability of the biological community within the area of discharge and surrounding biological communities;
- threat to human health through direct exposure to pollutants or through consumption of exposed aquatic organisms; or
- loss of aesthetic, recreational, scientific or economic values which is unreasonable in relation to the benefit derived from the discharge.

40 CFR § 125.122, provides 10 criteria to consider in the determination of whether there is unreasonable degradation or irreparable harm. The 10 ODCE include:

1. quantities, composition, and potential for persistence or bioaccumulation;
2. transport of the pollutants by biological, physical, or chemical processes;
3. composition and vulnerability of the biological communities exposed to the discharges including unique, threatened, or endangered species or those that are critical to the structure or function of the ecosystem;
4. importance of the receiving water area to surrounding biological community;
5. existence of special aquatic sites (including parks, refuges, etc.);
6. potential direct or indirect impacts to human health;
7. existing or potential recreational or commercial fisheries;
8. any applicable requirements of an approved Coastal Zone Management plan;
9. potential impacts on marine water quality; and
10. other factors relating to the effects of the discharge as may be appropriate.

After consideration of the 2013 ODCE and limits, prohibitions, and other permit requirements, DEC determined that discharges authorized by the permit and discharged in accordance with permit requirements will not cause unreasonable degradation to marine environment when receiving waters have adequate dispersion and mixing.

5.3 Mixing Zone

5.3.1 Mixing Zone Authorization

Mixing zones in the permit are based on applicable state mixing zone regulations and further supported by the technical findings of the 2013 ODCE. The mixing zone in the permit has been developed in compliance with 18 AAC 70.240 – 70.270, as amended June 26, 2003. The Department may authorize a mixing zone under the permit upon receipt of a complete application; the NOI serves as the application for the permit and provides the information required by regulation (See Appendix B - Mixing Zone Analysis Checklist). A mixing zone may be authorized based on meeting all regulatory criteria, which include consideration of: the size of the mixing zone, treatment technology, existing uses of the water body, human consumption, spawning areas (not applicable to marine waters and by extension the permit), human health, aquatic life, and endangered species. Subsequent Sections 5.3.2 through 5.3.8 describe the rational used to meet the mixing zone criteria. The following mixing zones may be authorized under the permit:

- The permit authorizes a standard size 100 meter radius, cylindrically shaped regulatory mixing zone for Drilling Fluids and Cuttings (001. The 100-meter mixing zone applies to Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Iron, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.
- The permit authorizes a standard size 100-meter radius, cylindrically shaped regulatory mixing zone for total residual chlorine (TRC) for Domestic Wastewater (003) and Graywater (004).

5.3.2 Mixing Zone Size

The Department authorizes a standard 100 meter radius, cylindrically shaped mixing zone based on state mixing zone regulations. The Department also uses the 2013 ODCE as a technical reference in support of establishing this regulatory mixing zone. ODCE requirements in 40 CFR § 125.121(c) for APDES permits discharging to marine waters beyond the baseline of the territorial sea define a mixing zone to be that portion of the water body that extends a cylindrical distance of 100 meters from the discharge point and vertically from the seafloor to the sea surface.

Default cylindrically shaped mixing zones with 100 meter radii are proposed for all discharges requiring a mixing zone due to the inherent variation in discharges from geotechnical facilities. The 100-meter, cylindrical mixing zone is large enough to ensure chronic water quality criteria are met at the boundary of the mixing zone but small enough to limit acutely toxic effects.

5.3.3 Technology

18 AAC 70.240(a)(3) requires the Department to determine if "an effluent or substance will be treated to remove, reduce, and disperse pollutants, using methods found by the department to be the most effective and technologically and economically feasible, consistent with the highest statutory and regulatory treatment requirements" prior to authorizing a mixing zone.

The limits for the discharge of water-based drilling fluids and cuttings (001) include surrogate metals cadmium and mercury. These technology-based effluent limits are based on the best available technology economically achievable (BAT). The technology-based effluent limits developed using best professional judgment (BPJ) for domestic wastewater (003) require the TRC concentration to be a minimum of 1.0 milligram per liter (mg/L) and to be maintained as close to this concentration as possible. These technology-based effluent limits are based on best conventional pollutant control technology (BCT) and the best practicable control technology currently available (BPT). The permit establishes a maximum daily limit for TRC of 1.0 mg/L established previously through BPJ, citing dechlorination as an effective

technologically and economically feasible treatment to attain this limit. In addition, the minimum treatment requirements of 18 AAC 72.050 must be met unless a waiver is approved by the Department under 18 AAC 72.060. These regulatory requirements apply to domestic wastewater (003) and graywater (004) discharges.

The Department finds that available evidence reasonably demonstrates that the wastewater will be treated to remove, reduce, and disperse pollutants, using methods found by the Department to be the most effective and technologically and economically feasible, consistent with the highest statutory and regulatory treatment requirements (See Section 9.0 for more information).

5.3.4 Existing Use

Per 18 AAC 70.245, the mixing zone has been appropriately sized to fully protect the existing uses of receiving waters in the areas approved for coverage under the permit. DEC has determined that the existing uses and biological integrity of the water body will be maintained and fully protected under the terms of the permit, as required in 18 AAC 70.245(a)(1) and (a)(2). Furthermore, upon review of the 2013 ODCE, the Department determined that the discharges will not result in unreasonable degradation in waters of the territorial sea as long as the limits, terms, and conditions of the permit are adhered to (See Section 9.0).

5.3.5 Human Health

Per 18 AAC 70.250(a)(1), 18 AAC 70.255(b) and (c), and 18 AAC 70.255(e)(3)(B) the mixing zones will not result in pollutants discharged at levels that will bioaccumulate, bioconcentrate, or persist above natural levels in soils, water, or biota, or at levels that otherwise will create a public health hazard through encroachment on a water supply or contact recreation uses. The 2013 ODCE also thoroughly evaluated the potential for pollutants to bioaccumulate, bioconcentrate, or persist above natural levels in soils, water, or biota, and found then unlikely to do so. Under the conditions of the permit, in particularly restricting discharges in shallow water or near aquatic resources, the pollutants discharged are regulated to not produce objectionable color, taste, or odor in aquatic resources harvested for human consumption nor will the pollutants discharged preclude or limit established processing activities of commercial, sport, personal-use, or subsistence fish and shellfish harvesting in accordance with 18 AAC 70.250(b)(2) and (b)(3).

5.3.6 Spawning Areas

Per 18 AAC 70.255(h), a mixing zone is not authorized in an area of anadromous fish spawning or resident fish spawning redds for Arctic grayling, northern pike, rainbow trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, king, and sockeye salmon. The permit does not allow the discharge of effluent to open waters of a freshwater lake or river. Therefore, there are no associated discharges to anadromous fish spawning areas or the resident freshwater fish listed in the regulation.

5.3.7 Aquatic Life

Per 18 AAC 70.255(b)(1) and (2), 18 AAC 70.250(b)(1), or 18 AAC 70.250(a)(2)(A-C) pollutants for which the mixing zone will be authorized will not result in concentrations outside of the mixing zone that are undesirable, present a nuisance to aquatic life, result in permanent or irreparable displacement of indigenous organisms, or a reduction in fish or shellfish population levels. Mixing zone authorizations result in water quality criteria being met at the boundary of the mixing zone for all pollutants with an authorized mixing zone. Coupled with the requirement for permittees to inventory chemical additives and biocides used to treat seawater, the Department determined that effluent toxicity characterization will

ensure protection of aquatic life and indigenous organisms outside the mixing zone. The Department concludes that the discharges will meet all water quality criteria outside authorized mixing zone boundaries and aquatic life will be protected.

5.3.8 Endangered Species

Per 18 AAC 70.250(a)(2)(D), the mixing zone will not cause an adverse effect on threatened or endangered species. Based on the information regarding endangered species in the areas that are available as described in the 2013 ODCE, authorized mixing zones should not adversely affect threatened or endangered species. Permittees must also address mitigation measures associated with geotechnical activities for endangered species when filing their Plan of Operations with the DNR for boreholes deeper than 300 feet below the seafloor surface.

5.4 Zone of Deposit

Per 18 AAC 70.210, the Department is authorizing a 100 meter radius zone of deposit for the discharge of water based drilling fluids and drill cuttings at the seafloor. The Department evaluated the potential impacts from these deposits using technical information contained in the ODCE as applied to 18 AAC 70.210(b)(1) - (6). Based on this evaluation, the Department concludes that the requirements for authorizing a zone of deposit are met.

For a given geotechnical site, all drilling fluids and cuttings must be deposited on the seafloor within the 100 meter radius zone of deposit. The permittee may conduct multiple geotechnical borings in this area so long as the boreholes are spaced 16 feet minimum. However, the permittee may conduct a boring less than 16 feet from an existing borehole in subsequent years of operation.

6.0 EFFLUENT LIMIT DEVELOPMENT

6.1 Basis for Permit Effluent Limits

18 AAC 83.015 prohibits the discharge of pollutants to waters of the United States unless first obtaining a permit implemented by the APDES point source discharge program that meets the purposes of Alaska Statutes 46.03 and in accordance with CWA Section 402 and the requirements adopted by reference at 18 AAC 83.010. Per these statutory and regulatory provisions, the permit includes effluent limits that require the discharger to (1) meet standards reflecting levels of technological capability, (2) comply with WQS, (3) comply with other state requirements that may be more stringent, and (4) cause no unreasonable degradation to the territorial seas.

In establishing permit limits, DEC first determines which technology-based effluent limits (TBELs) from national ELG's must be incorporated into the permit. Where national ELGs have not been developed, or did not consider specific pollutant parameters in discharges, the same performance-based approach applied to develop national ELGs is applied to a specific industrial facility using BPJ to develop TBELs for the permit. DEC then evaluates the effluent quality expected to result from these technological controls to determine if the discharge could result in exceedences of the water quality criteria in the receiving water. If exceedences could occur, water quality-based effluent limits (WQBELs) must be included in the permit. The limits in the permit reflect whichever requirements (technology-based or water quality-based) are more stringent. The permit contains TBELs developed using BPJ and one WQBEL for pH. By adopting or adapting the ELGs as TBELs based on BPJ and comparing these to WQS as described above, DEC has developed permit conditions that are protective of water quality and existing or designated uses of the receiving water body.

6.2 Technology-Based Effluent Limits

National ELGs are developed based on the demonstrated performance of a reasonable level of treatment that is within the economic means of specific categories of industrial facilities. For conventional pollutants (see 40 CFR § 401.16), CWA Section 301(b)(1)(E) requires the imposition of effluent limits based on BCT. For nonconventional and toxic pollutants, CWA Section 301(b)(2)(A), (C), and (D) require the imposition of effluent limits based BAT. CWA Section 301(b) requires compliance with BCT and BAT no later than March 31, 1989. The compliance deadline for BPT was July 1, 1977.

EPA has promulgated national ELGs for the Oil and Gas Extraction Point Source Category at 40 CFR § 435 Subparts A (Offshore Subcategory). These subparts specify BCT, BAT, and BPT for the Offshore Subcategory of the Oil and Gas Point Source Category. While EPA has developed ELGs for oil and gas extraction point sources it has not developed ELGs for geotechnical facility discharges. However, many of the discharges from geotechnical facilities are similar to those in 40 CFR § 435 except the depth of drilling is significantly less (less than 500 feet) requiring limited drilling fluid use and no concerns of interception of hydrocarbon-bearing zones. Furthermore, because drilling depth is less for geotechnical facilities, the duration of drilling is less (up to 3 days as opposed to 30 to 90 days (MMS, 2008; NMFS 2011) resulting in lower total discharge volumes per individual site for all discharges. However, geotechnical facilities can range of a greater geographic area in a typical investigation season.

Considering similarities and differences, DEC has developed TBELs and other requirements on a case-by-case basis using BPJ citing relevant sections in 40 CFR § 435 Subpart A as they apply to geotechnical investigations. The requirements of Subpart A are applicable in state waters in the territorial sea, which matches the coverage area of the permit.

6.2.1 Developing TBELs Using Case-by-Case Best Professional Judgment

Per Section 402 of the CWA, developing BPJ permit conditions requires the permitting authority to consider the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, the cost of achieving such effluent reduction, non-water quality environmental impact (including energy requirements), the cost of implementing these conditions relative to the environmental benefits achievable, and such other factors as deemed appropriate. The Department has evaluated these BPJ limits to ensure compliance with Section 402 of the CWA. The following sections discuss the TBELs derived from these ELGs used in the permit

6.2.2 Water-Based Drilling Fluids and Drill Cuttings (Discharge 001)

Drilling Fluids: For facilities conducting geotechnical drilling, DEC has adopted certain TBELs and adapted other TBELS for drilling fluid and drill cutting discharges in the permit using BPJ. The TBELs are based on the ELGs establishing BAT for water based drilling fluids in per 40 CFR § 435.13. The permit includes the following limits and prohibitions:

- no discharge of non-aqueous drilling fluids,
- no discharge of drilling fluids and drill cuttings that fails the static sheen test,
- no discharge of free oil,
- no discharge of diesel oil,
- no use of mineral oil pills,
- toxicity limit of 3% by volume,
- mercury limit of 1 mg/kg dry weight, and
- cadmium limit of 3 mg/kg dry weight.

The permit limits the discharge of organic contaminants by prohibiting the discharge of free oil, diesel oil, and non-aqueous drilling fluids. The Static Sheen Test method is used to determine if free oil is in drilling fluid discharges. Permittees must also measure toxicity using a 96-hour LC50 on the suspended particulate phase (SPP) using the Leptachoirus plumniosus species once per drilling fluids system mixture. Applicants may conduct this testing off-site using maximum expected chemical additive concentrations and submit the results with the Drilling Fluid Plan (DFP). If the DFP remains unchanged, no additional testing is required. Unchanged means no new sources of stock barite or new chemical additives have been added to a drilling fluids plan. If a new fluid system has been implemented that has not adequately been covered in the DFP), permittees are required to measure toxicity using the SPP test. Stock barite, which is commonly added to drilling fluids, is the main source of heavy metals in drilling fluid discharges. The TBELs for cadmium and mercury, 3 mg/kg and 1 mg/kg respectively, serve as surrogate parameters for other metals contained in the barite. Permittees are required to report cadmium and mercury concentrations measured in the stock barite before it is added to the drilling fluids, using EPA Method 245.5 or 7471 for mercury and EPA Method 200.7 for cadmium. Testing must be conducted for any new source of stock barite not adequately addressed in the Drilling Fluids Plan (See Section 7.2.5). The permittee must also conduct a metals analysis of fluids systems (See Section 7.2.4). Unused drilling fluids remaining in deck tanks at the end of drilling may only be discharged to the seafloor or disposed at appropriate onshore facilities.

The permit prohibits the discharges of oil-based drilling fluids, inverse emulsion drilling fluids, oil-contaminated drilling fluids, and drilling fluids to which mineral oil has been added. These prohibitions are consistent with the prohibition of free oil and ensure compliance with the toxicity limit. The permit prohibits the use of drilling fluids to which a mineral oil pill has been added. A pill is defined as a discrete amount of mineral oil circulated through a well to free stuck pipe. The prohibition is based on the fact that mineral could not be effectively captured for typical geotechnical drilling equipment and that boreholes are shallow enough that the drill can be unstuck using other fluids such as seawater.

Drill Cuttings: The main source of pollutants in drill cutting discharges comes from drilling fluids that adhere to the drill cuttings. Therefore, based on the ELGs for BAT, BCT, and BPT the permit requires drill cutting discharges to meet the same limits that apply to drilling fluid discharges. Because drill cuttings from geotechnical facilities that use seawater as the "only" fluid are not expected to contain pollutants, Discharge 001 does not apply.

6.2.3 Deck Drainage (Discharge 002)

The ELGs from 40 CFR § 435.13 are adopted based on BPJ based on BAT and BCT. The limitation of no discharge of free oil is determined by the presence of film, sheen, or a discoloration of the surface of the receiving water for deck drainage discharges. Deck drainage contaminated with oil and/or grease must be treated using an oil-water separator, or other equivalent treatment, prior to discharge.

6.2.4 Domestic Wastewater (Discharge 003)

For domestic wastewater, DEC establishes BPJ TBELs based on minimum treatment requirements per 18 AAC 72.050. Minimum treatment is defined as secondary treatment per 18 AAC 72.990(59) meeting limits for BOD_5 and TSS of 30 mg/L average monthly, 45 mg/L average weekly, and 60 mg/L maximum daily concentrations. In addition, pH must be no less than 6 and no greater than 9 standard units (SU). Per 18 AAC 72.050, domestic wastewater must receive minimum treatment prior to being discharged to waters of the U.S. in Alaska.

DEC is adopting the minimum TRC limit in 40 CFR §435 Subpart A as a surrogate parameter to control fecal coliform and enterococci bacteria based on BPJ. The TRC must be 1 mg/L minimum and maintain

as close to this concentration as possible. The point of compliance for this limit is just downstream from the point of chlorination. In addition, DEC develops a 1mg/L maximum limit with the understanding that dechlorination is a readily available, effective, and economically achievable treatment for removing chlorine before discharge. The point of compliance is after the last treatment system prior to discharge. Because the 1 mg/L maximum limit is above water quality criteria, the Department has authorized a 100 meter regulatory mixing zone for this discharge parameter.

6.2.5 Graywater (Discharge 004)

The Department establishes TBELs based on BPJ for graywater citing pertinent sections of 18 AAC 72. Because graywater is considered a component of domestic wastewater per 18 AAC 72.990(23), graywater by itself is subject to the same minimum treatment requirements per 18 AAC 72.050 unless a waiver is granted by the Department per 18 AAC 72.060 as discussed in section 6.2.4. Per 18 AAC 72.050(e) a person may not discharge domestic wastewater with less than primary treatment, where primary treatment is defined in 18 AAC 72.990 as removal of 30 % of BOD_5 and TSS as well as disinfection, where appropriate. Additionally, DEC adopts TBEL based on BPJ for floating solids per BCT and foam per BPT from 40 CFR § 435.14 and 40 CFR § 435.13, respectively. Because graywater could contain TRC, the Department is authorizing a regulatory mixing zone for this discharge.

6.2.6 Miscellaneous Discharges (Discharges 005, and 007 – 012)

The following miscellaneous discharges are controlled via BPJ limitations and monitoring requirements in Section 6.2.8.

Desalination unit waste	(005)
Boiler blowdown	(007)
Fire control system test water	(008)
Non-contact cooling water	(009)
Uncontaminated ballast water	(010)
Bilge water	(011)
Excess cement slurry	(012)

6.2.7 Free Oil BPJ Limitations

Discharges 005, 007 - 012 were not included in the ELGs and have been developed using case-by-case BPJ during the development of other oil and gas permits. The discharge of oil is prohibited for bilge water; uncontaminated ballast water; and excess cement slurry. Similar to the discharge of leftover drilling fluids, cement may be discharged to the seafloor or transported to onshore disposal facilities. Compliance with the limitation of no free oil will be determined by the visual sheen test. The permit also requires bilge and contaminated ballast water to be processed through an oil-water separator prior to discharge. If bilge or ballast water is discharged during broken or unstable ice conditions or during stable ice conditions, the Static Sheen Test will be used to determine compliance with the no free oil limitation.

The permit also limits free oil/sheen for desalination unit wastes; boiler blowdown, fire control system test water, and non-contact cooling water although these waste streams are not expected to contain oil. These waste streams do not typically contact hydrocarbon products or machinery surfaces where oily wastes are likely to contaminate them. This limit is included in consideration with the BMPs and effluent toxicity characterization (ETC) required for any miscellaneous discharge that has been chemically treated and is discharged at a rate of greater than 10,000 gallons per day (gpd).

6.3 Water Quality-Based Effluent Limits

CWA Section 301(b)(1) requires the establishment of limits in permits necessary to meet WQS by July 1, 1977. All discharges to state waters must comply with WQS, including the antidegradation policy. The

APDES regulations at 18 AAC 83.435(a)(1) require that permits develop WQBELs that "achieve water quality standards established under CWA Section 303, including State narrative criteria for water quality."

6.3.1 Domestic Wastewater (003)

pH: 18 AAC 70.020(18)(A) requires pH to be no less than 6.5 SU and no greater than 8.5 SU based on the use classification for water supply used for aquaculture. Compared to the pH requirements for minimum treatment in 18 AAC 72, pH from 6 to 9 SU, marine water quality criteria is the more stringent. This will be applied to Discharge 003 – Domestic Wastewater.

7.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

7.1 Monitoring Requirements

APDES regulations at 18 AAC 83.455 require that permits include monitoring to determine compliance with effluent limits. Monitoring may also be required to gather data for future effluent limits or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting monitoring and reporting the results to DEC.

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. A permittee has the option of taking more frequent samples than are required under the permit. These samples must be used for averaging if they are conducted using approved test methods as found in 40 CFR § 136, adopted by reference at 18 AAC 83.010(f).

The basis for effluent limit derivation is discussed in Section 6.1. The following sections summarize the effluent limits and describe monitoring requirements for each discharge in the permit.

7.2 Water-based Drilling Fluids and Drill Cuttings (Discharge 001)

Table 7: Effluent Limitations and Monitoring Requirements for Water-based Drilling Fluids and Drill Cuttings (Discharge 001)

Discharge	Pollutant Parameter	Effluent Limitations	Monitoring Requirements	
		Average Monthly and Maximum Daily Limits	Measurement Frequency	Sample Type
Water-based fluids and cuttings	SPP toxicity [1, 2]	Minimum 96-hour LC_{50} of 30,000 parts per million (ppm)	Drilling fluids plan	Grab
	Free oil	No discharge [2, 4]	Daily	Grab
	Mercury	1 mg/ kilogram (kg) [2, 3]	Monthly (See 7.2.5)	Grab
	Cadmium	3 mg/kg [2, 3]	Monthly (See 7.2.5)	Grab
	Volume (million gallons (MG))	Report average and maximum daily and monthly total	Daily	Estimate

Footnotes:
1. As determined by the 96-hour SPP toxicity test. See 40 CFR § 435, Subpart A, Appendix 2.
2. All Samples to be collected at the mudpit, or other location, prior to downhole use.

Table 7: Effluent Limitations and Monitoring Requirements for Water-based Drilling Fluids and Drill Cuttings (Discharge 001)

Discharge	Pollutant Parameter	Effluent Limitations	Monitoring Requirements	
		Average Monthly and Maximum Daily Limits	Measurement Frequency	Sample Type
3. Dry weight in the stock barite. Analysis shall be conducted using EPA Methods 245.5 or 7471b for mercury and 200.7 for cadmium. The permittee report stock barite once per month and submit the information on the appropriate monthly DMR. See Section 7.2.5). 4. As determined by the Static Sheen Test. See 40 CFR § 435, Subpart A, Appendix 1.				

7.2.1 Chemical Inventory:

For each fluid system discharged, the permittee must maintain a precise chemical inventory of all constituents added downhole, including all drilling fluid additives used to meet specific drilling requirements. The permittee must maintain these records for each fluid system for a period of five years, and must make these records available to DEC upon request

7.2.2 Annual Report:

The permittee is required to submit an annual report within 90 days of the end of the calendar year. The permittee shall report the following for each drilling fluid system in the report on a per borehole basis:

- well name, well number, latitude and longitude collected with a GPS unit with Wide Area Augmentation System (WAAS) capabilities, beginning drill date, well completion date and borehole diameter;
- a precise chemical inventory of all constituents added downhole, including all drilling fluid additives used to meet specific drilling requirements
- the base drilling fluid type;
- the name and total amount of each constituent in the discharged drilling fluid;
- the total volumes of drilling fluid created and added downhole;
- the maximum concentration of each constituent in the drilling fluid;
- the total volumes of drilling fluid discharged to surface waters; and
- the estimated amount of each constituent in the drilling fluid discharged
- results of all effluent toxicity characterization tests
- total discharge volume per

7.2.3 Static Sheen Test:

When required, the permittee must perform the Static Sheen Test on separate samples of drilling fluids as required in 40 CFR § 435, Subpart A, Appendix 1. Samples must be collected at the mud pit prior to mud pit discharges and must be tested in accordance with "Approved Methodology: Laboratory Sheen Tests for the Offshore Subcategory, Oil and Gas Extraction Industry."

Whenever fluids fail the Static Sheen Test, and a discharge has occurred in the past 24 hours, the permittee is required to analyze an undiluted sample of the material which failed the test to determine the presence or absence of diesel oil. The determination and reporting results must be performed as described in Section 7.2.5.

7.2.4 Metals Analysis:

The permittee must analyze each discharged drilling fluids system (Discharge 001) for the following metals: barium, cadmium, chromium, copper, mercury, zinc, and lead. Subsequent metals analysis is not required until the drilling fluid system is modified outside of any previous drilling fluids system previously analyzed. If the permittee uses a drilling fluids system not specified in the Drilling Fluids Plan, a sample must be collected prior to using the new drilling fluids system. Analyses for concentrations shall be conducted and reported for each metal utilizing the methods specified in 40 CFR § 136. The results shall be reported in "mg/kg of whole fluid (dry weight)" and the moisture content (% by weight) of the original drilling fluid sample with the DMR for the month in which the borehole was completed.

7.2.5 Mercury and Cadmium Content in Barite:

The permittee must analyze a representative sample of stock barite once prior to drilling the first borehole of the drilling season described in an NOI subject to a Department authorization. Thereafter, the permittee must analyze a representative sample of stock barite each when a new supply of stock barite is used. If different supplies of barite are received during the drilling season, the permittee must analyze a representative sample of stock barite once prior to drilling the first borehole with the new supply. The results for total mercury and total cadmium must be reported in the applicable DMR for the month that borehole installation commenced. Analyses must be conducted by absorption spectrophotometry and results expressed as mg/kg (dry weight) of barite.

7.2.6 Environmental Monitoring Program Requirements:

The prohibition of discharges within 1,000 meter of Tier 1 biologically sensitive or unique areas was based on conservative estimates of fate and transport of drilling fluids from geotechnical facilities. Although the ODCE appropriately evaluated impacts, monitoring is an important component of the permit to inform future permitting decisions. DEC believes that the EMP performed under this section will assist in better prediction of conditions in the near shore environment, understanding of potential impacts of discharges authorized under the permit, and that the collection of this information will inform future Department decisions during permit reissuance. The EMP includes the following three phases:

Phase I – Pre-Drilling Baseline Seafloor Survey and Sediment Sampling

Phase II – During-Drilling Plume Observations and Field Measurements

Phase III – Post-Drilling Seafloor Survey and Targeted Sediment Sampling

The goals of the EMP are to:

- evaluate potential impacts from Discharge 001;
- protect the marine environment;
- collect data to inform future permitting decisions; and
- develop correlations and predictive tools for near shore environments.

The objectives of the EMP include:

- conduct a baseline survey and sediment sampling of all borehole locations to ensure biologically sensitive or unique sites are protected and form a basis of comparison for post drilling conditions;
- develop a robust baseline dataset and predictive tools for near sediment chemistry and biological resources and habitats to lessen future Phase I monitoring effort;
- evaluate plume behavior in the near shore environment for Discharges 001 and 009;
- evaluate the nature and extent of Discharge 001 at representative sites;

- collect post-drilling data to verify assumptions and inform future permit decisions; and
- revise and improve EMP Study Plan requirements for subsequent years of operation.

The objectives of the EMP is to collect data that may be used to verify assumptions and provide better predictive tools for determining baseline conditions, transport and dispersion, and demonstrate impacts from geotechnical drilling are minimal and adequately mitigated by permit conditions. At a minimum, permittees will be required to document pre-drilling and post-drilling conditions via seafloor survey. Pre-drilling surveys will be used to verify the geotechnical surveys are not be conducted in biologically sensitive or unique locations and provide a baseline to evaluate aerial distribution resulting from the discharge of drilling fluids and drill cuttings when compared to post-drilling surveys. Seafloor sediment samples will be collected at each proposed borehole location during Phase I and at selected sites in Phase III for analysis of metals and other parameters as determined in the Study Plan. The increase in metals concentrations in the sediment is assumed to be minimal and below effect range concentrations. The data collected will be used to verify this assumption and inform future permit decisions, including reduction of EMP requirements in subsequent years of operation. Similarly, observations of plume behavior and field measurements of turbidity and temperature and other oceanographic parameters if interest will be required at selected sites to verify existing and inform future dispersion estimates. A Study Plan and annual EMP report will be required.

EMP Study Plan: Applicants that propose to discharge drilling fluids and drill cuttings (Discharge 001), must submit an Environmental Monitoring Study Plan to DEC for review with, or prior to, submission of an NOI. Based on the NOI schedule, the EMP Study Plans must be submitted at least 90 days prior to discharge for the first season of operation and 45 days prior in subsequent years. The permittee may propose in the EMP Study Plan in subsequent years of operation the use and consideration of data from a completed EMP from the previous season of operation. The permittee may propose modifying the monitoring requirements if the results from the previous season demonstrate the data from the previous year(s) satisfies the goals and objectives of the EMP. This demonstration must be included in the annual report for DEC consideration prior to proposing modifications in the subsequent EMP Study Plan.

The EMP Study Plan will describe the scope of the program and how the goals and objectives will be met. The Study Plan will be reviewed by the Department and must be approved prior to implementing. The permittee must make necessary modifications to the Study Plan based on DEC review comments. The EMP Study Plan should include:

1. Goals and Objectives for each Phase of the Study, and
2. How each element of the EMP will be implemented in each Phase of the Study.

EMP Reports: The permittee must analyze the data collected during borehole completion and submit an EMP report with the annual report for that season. The report must address the environmental monitoring objectives by using appropriate descriptive and analytical methods to test for and to describe any impacts of the discharges on sediment pollutant concentrations, sediment quality, water quality and/or the benthic community. The report must contain all relevant quality assurance/quality control requirements described in the Quality Assurance Project Plan including, but not limited to, instrumentation, laboratory procedures, detection limits/precision requirements of the applied analyses, and sample collection methodology.

DEC will review the draft report in accordance with the environmental monitoring objectives and evaluate it for compliance with the requirements of the permit. If revisions to the report are requested, the permittee must complete them and submit the final report to DEC within two months of the request. The permittee will be required to correct, repeat and/or expand EMP until the Department determines the

requirements of the permit are fulfilled. Modifications to the EMP may be approved if DEC determines that the modification is appropriate. The modified EMP may include changes in sampling stations, sampling frequency, parameters, and Phase components. The Department may grant a written exemption to this requirement if the permittee can satisfactorily demonstrate that information on the fate and effects of the discharge are available and/or the discharge will not have significant impacts in the discharge area. An exemption to post-drilling monitoring may be granted if there is adequate demonstration of no impact geotechnical drilling. An exemption request must be submitted to DEC for review with, or prior to, submission of an NOI.

7.2.7 Drilling Fluid Plan Requirements:

The permit requires applicants for geotechnical facilities proposing to conduct geotechnical drilling to develop and implement a Drilling Fluids Plan. The basis for the Drilling Fluids Plan requirement is Sections 308 and 403(c) of the CWA. The Drilling Fluids Plan requirement is also based upon the Pollution Prevention Act (PPA) and its policy of prevention, reduction, recycling, and treatment or wastes (PPA Section 102(b)) through measures that include process modification, materials substitution, and improvement of management (PPA Section 107(b)(3)).

A goal of the Drilling Fluids Plan is to ensure that personnel on-site are knowledgeable about the information needed and the methods required to formulate the drilling fluids/chemical additive systems to minimize addition of toxic substances and meet the toxicity requirements of the permit. The plan must be implemented during drilling operations and a copy of the plan must be available on-site at the geotechnical facility at all times.

The permittee must develop and implement a written procedural plan for the formulation and control of drilling fluid/chemical additive systems for geotechnical drilling program. The drilling fluid plan must specify the drilling fluid/chemical additive systems to be used. The Drilling Fluids Plan also requires clearly stated procedures for situations where additives not originally planned for or included in the toxicity estimations are proposed for use later, and whether any new additive may be used and discharged. The criteria for making changes to the additive make up of a drilling fluid system must be specified in the Drilling Fluids Plan.

7.3 Deck Drainage (Discharge 002)

Table 8: Effluent Limitations and Monitoring Requirements for Deck Drainage (Discharge 002)

Parameter	Units	Effluent Limitations	Monitoring Requirements	
			Sample Frequency	Sample Type
Free Oil [1]	---	No Discharge	Daily[2]	Visual[2]
Flow	gpd	Report	Daily[2]	Estimated
Effluent Toxicity Characterization (ETC) [3]	See Section 7.6.3	Monitor	Once per Season Minimum	Grab

Footnotes:

1. Contaminated deck drainage must be processed through an oil-water separator, or other equivalent treatment, to remove free oil prior to discharge.
2. When discharging to the receiving water in conditions that do not allow for observation of a sheen, the Static Sheet Test must be used (see 40 CRF § 435 Subpart A, Appendix

1) and a grab sample is required. The monitoring frequency is reduced to monthly if the permittee has complied with this requirement for three consecutive months.
3. Samples for that portion of the deck drainage collected from the OWS effluent must be sampled for effluent toxicity characterization (See Section 7.6.3).

7.4 Domestic Wastewater (Discharge 003)

Table 9: Effluent Limitations and Monitoring Requirements for Domestic Wastewater (Discharge 003)

Effluent Parameter	Effluent Limitations			Monitoring Requirements	
	Minimum Limit	Avg. Monthly Limit	Max. Daily Limit	Sample Frequency	Sample Type
Flow Rate (gpd)	-	Report	-	1Daily	Continuous
TRC	1.0 mg/L[1]	-	1.0 mg/L [2]-	1/Month	Grab
BOD	-	30 mg/L	60 mg/L	1/Month	Grab
TSS	-	30 mg/L	60 mg/L	1/Month	Grab
pH	6.5	-	8.5	1/Month	Grab
Floating Solids	No Discharge			1/Day	Observation [3]

Footnotes:
1. Total residual chlorine is a surrogate parameter for fecal coliform and enterococci. Maintain as close to the minimum limit concentration of 1.0 mg/L as possible and measure immediately after chlorination.
2. The maximum daily limit of 1.0 mg/L is measured after the last treatment unit (e.g., dechlorination) and prior to discharge.
3. The permittee must monitor by observing the surface of the receiving water in the vicinity of the outfall(s) during daylight at the time of maximum estimated discharge and during conditions when observation on the surface of the receiving water is possible in the vicinity of the discharge. For domestic wastewater, observations must follow either the morning or midday meal. Observations must be recorded in daily operating logs and made available upon request by DEC.

7.5 Graywater (Discharge 004)

Table 10: Monitoring Requirements for Graywater (Discharge 004)

Effluent Characteristic [2]	Units	Sample Location	Sampling Frequency [1]	Sample Type
Total Flow	gpd	Effluent	Daily	Estimate or Measured
Floating Solids	Visual	Effluent	Daily	Observation
Foam	Visual	Effluent	Daily	Observation
Garbage	Visual	Effluent	Daily	Observation
Oily Sheen	Visual	Effluent	Daily	Observation

Table 10: Monitoring Requirements for Graywater (Discharge 004)

Effluent Characteristic [2]	Units	Sample Location	Sampling Frequency [1]	Sample Type
Footnotes: 1. Samples are required during periods of operation. 2. Graywater Discharge 004 requires a plan review and waiver to minimum treatment (Section 6.2.5). Influent and effluent samples for BOD_5 and TSS may be a condition of the plan and waiver approval by the Department.				

7.5.1 Flow: The permit includes flow monitoring requirements to measure or estimate the effluent discharge flow for each discharge. DEC will use the flow data to determine the amount of contaminants entering the environment and inform future Department decisions during the permit reissuance.

7.5.2 Floating Solids, Foam, Garbage, and Oily Sheen: The permit prohibits floating solids, foam, garbage, and oily sheen and requires a visual observation of the receiving water surface at a minimum frequency of once per day. Monitoring of the effluent for floating solids, foam, garbage, and oily sheen is to determine compliance with narrative effluent limits. Observations must be recorded in daily operating logs and made available upon request by DEC.

7.6 Miscellaneous Discharges (Discharges 005 and 007 to 012)

Miscellaneous discharges include desalination unit wastes (005), boiler blowdown (007), fire control system test water (008), non-contact cooling water (009), uncontaminated ballast water (010), bilge water (011), and excess cement slurry (012). These discharges must comply with the following effluent limitations and monitoring requirements.

Table 11: Effluent Limitations and Monitoring Requirements for Miscellaneous Discharges (005 and 007 - 012)

Parameter	Effluent Limitations		Monitoring Requirements	
	Average Monthly Limit	Maximum Daily Limit	Sample Frequency	Sample Type
Flow (gpd)	Report		Daily	Estimate
Free Oil	No discharge [1]	No discharge [1]	Once/Week [1]	Visual
Temperature [2]	Report		Daily	Grab
Chemical Inventory	See Section 7.6.2		Monthly – Report Annually	Calculation
ETC [3]	See Section 7.6.3		Once per Season Minimum See 7.6.3	Grab
Footnotes: 1. Miscellaneous discharge is limited to those times that a visible sheen observation is possible unless the permittee uses the static sheen method which would require a grab sample. Monitoring shall be performed using the visual sheen method on the surface of the receiving water once per week during periods of slack tide when discharging, or by use of the static sheen method at the Permittee's option. The number of days a sheen is observed must be recorded. For discharges during stable ice, below ice, to unstable ice or broken ice conditions, a water temperature that approximates surface water temperatures after breakup shall be used. Observations must be recorded in daily operating logs and made available upon request by DEC. 2. Discharge 009 only.				

Table 11: Effluent Limitations and Monitoring Requirements for Miscellaneous Discharges (005 and 007 - 012)

Parameter	Effluent Limitations		Monitoring Requirements	
	Average Monthly Limit	Maximum Daily Limit	Sample Frequency	Sample Type
3. Applicable to all discharges to which chemical additives have been added except Excess Cement Slurry (012). The permittee must conduct ETC for all discharges 10,000 gpd or greater that have chemical additives. At a minimum, one ETC per season must be performed for all miscellaneous discharges, except 012, regardless of volume or chemical additions.				

7.6.1 **No free oil:** Although the Department has determined that no free oil shall be discharged in any waste streams, additional attention is warranted for those discharges that are most likely to be oil-contaminated. That is, a no free oil limitation is critical for bilge water, uncontaminated ballast water and fluids, cuttings and excess cement at the seafloor. The proposed permit also requires deck drainage, bilge, and contaminated ballast water to be processed through an OWS prior to discharge. If treated bilge or ballast waters are discharged during broken or unstable ice conditions, the Static Sheen Test will be used to determine compliance with the no free oil limitation.

As with the other miscellaneous discharges described above, the permit contains BCT limits prohibiting the discharge of free oil for chemically-treated seawater and freshwater discharges. Free oil is a direct measurement of oil contamination and, based on BPJ, the permit uses it as a surrogate parameter for conventional pollutants in these discharges.

7.6.2 **Miscellaneous Discharges With Chemical Additives**: Many of the chemicals used to treat seawater or freshwater, especially biocides, have manufacturer's recommended maximum concentrations or EPA product registration labeling. In addition, information obtained from offshore permittees demonstrates that it is unnecessary to use any of the chemical additives or biocides in concentrations greater than 500 mg/L. Therefore, the permit establishes BMPs to control chemicals in seawater or freshwater to the most stringent of the following:

- the maximum concentrations and any other conditions specified in the EPA product registration labeling if the chemical additive is an EPA registered product;
- the maximum manufacturer's recommended concentration ; or
- 500 mg/L.

Compliance with this requirement is calculated based on the amount of treatment chemicals added to the volume of water discharged. The permittee is required to maintain a chemical inventory of chemical additives used and their amounts and submit this information in the annual report. Chemical inventories must be maintained at the facility for a period of five years and be made available upon request.

7.6.3 **Effluent Toxicity Characterization Monitoring:** The permittee must conduct effluent toxicity characterization (ETC) monitoring on the following miscellaneous discharges:

Deck Drainage	(002)
Desalination unit waste	(005)
Boiler blowdown	(007)
Fire control system test water	(008)
Non-contact cooling Water	(009)
Uncontaminated ballast water	(010)
Bilge water	(011)

The effluent toxicity characterization (ETC) test is designed to identify effluent discharge samples with positive toxicity results from effluent discharge without positive toxicity results. Due to the short duration the facility will spend on-site (less than one day to a maximum of three days) and limited discharge volumes, permittees will use a screening tool for this effluent testing that can be accomplished rapidly (less than one hr). The Geotech GP will require the use of the echinoderm fertilization test.

Additional ETC testing is required if the discharge rate is greater than 10,000 gpd and chemicals were added to the effluent. At a minimum, one ETC sample is required per season regardless of the discharge rate or chemical additions assuming the discharge occurs.

Grab samples of 100% effluent will be tested using a rapid screening toxicity testing process. Samples will be collected after the last treatment and prior to discharge to the receiving water. Three echinoderm species will be included in the testing in order to meet windows of reproductively appropriate time frames. The species include the sand dollar (Dendraster excentricus) and two sea urchins (Strongylocentrotus purpuratus and Lytechinus anamesus). The echinoderm fertilization test is an EPA-approved method (EPA/600/R-95/136).

The threshold limits established for this requirement are based on the initial toxicity screening test using echinoderm fertilization success. For this testing program, the initial toxicity screening thresholds include two criteria (2 and 3), which must both be met to indicate a positive toxicity result:

1) Percent fertilization of the control has to be >70% for the test to be validated.

2) A statistically significant difference between the control fertilization test and the 100% effluent and:

3) At least a 20% decline in fertilization compared to the corrected- control response.

For example, if the control percent fertilization was 80%, then the effluent response must be statistically significantly different from the control and have exhibited a greater than 25 % difference in percent fertilization.

The screening level toxicity testing results will be reported within the discharge monitoring report (DMR) for the month following the sample collection and analysis. If testing results show positive toxicity, the permittee should discuss possible causes and steps taken to minimize or eliminate the likelihood of a repeat occurrence on the DMR. Permittees with positive toxicity results are required to verbally notify the DEC Oil and Gas Section Manager (907-269-4874) within 24 hours of lab results.

7.6.3.1 **ETC Monitoring Reporting:** Results of ETC testing must be reported on the DMR:

- the toxicity test results,
- the dates of sample collection and initiation of each toxicity test,
- the flow rate at the time of sample collection and total volume of discharge, if applicable, and
- the chemical requiring the characterization.

8.0 ANTIBACKSLIDING

18 AAC 83.480 requires that "effluent limits, standards, or conditions must be at least as stringent as the final effluent limits, standards, or conditions in the previous permit." 18 AAC 83.480(c) also states that a permit may not be reissued "to contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time the permit is renewed or reissued." The effluent limits in the permit issuance are consistent with 18 AAC 83.430. The permit effluent limits, standards, and conditions are at least as stringent as in the EPA-issued 2012 permit AKG282100.

9.0 ANTIDEGRADATION

The antidegradation policy of the WQS (18 AAC 70.015) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. This section analyzes and provides rationale for Department decisions in the permit issuance with respect to the antidegradation policy.

The approach used by the Department to implement the antidegradation policy is based on the requirements in 18 AAC 70 and the Interim Antidegradation Implementation Methods, dated July 14, 2010 (Interim Methods). Using these requirements and policies, the Department determines whether a water body or portion of a water body is classified as Tier 1, Tier 2, or Tier 3. A higher numbered tier indicates a greater level of water quality protection. At this time, no Tier 3 waters have been designated in Alaska. Accordingly, this antidegradation analysis conservatively assumes that all discharges under the permit will be to Tier 2 waters, which is the next highest level of protection and is more rigorous than a Tier 1 analysis. As a result, any discharges to Tier 1 water bodies are not eligible for coverage under the permit and would require individual permit coverage.

Wastewater discharged under the permit is subject to a Tier 2 antidegradation analysis, as detailed in the Interim Methods and outlined in 18 AAC 70.015(a)(2). 18 AAC 70.015(a)(2) states that if the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality must be maintained and protected unless the Department finds that the five specific requirements of the antidegradation policy at 18 AAC 70.015(a)(2)(A)-(E) are satisfied. The Department's findings are as follows:

1. **18 AAC 70.015(a)(2)(A). Allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located.**

Based on the evaluation required per 18 AAC 70.015(a)(2)(D), the Department has determined that the most reasonable and effective pollution prevention, control, and treatment methods are being used and the lowering of water quality is necessary.

The 2010 Alaska Economic Performance Report written by the Department of Commerce, Community and Economic Development (DCCED) indicates that the Alaskan oil and gas industry continues to be the largest source of state revenue while creating some of the highest paying jobs in the State (DCCED, 2011). The total contribution from the oil and gas industry was $6.2 billion during fiscal year 2010. The oil and gas extraction industry also supports local economies by purchasing significant amounts of equipment, parts, fuel, food, freight, and other services.

In addition, DNR tracks oil and gas activity in the state when it develops findings for lease sales (DNR, 2011). The July 15, 2008 Best Interest Finding for the North Slope Areawide Oil and Gas lease sale and the November 9, 2009 Final Finding for the Beaufort Sea Areawide Oil and Gas Lease Sale included the following socio-economic information on the oil and gas industry:

- Alaska's economy depends heavily on revenues related to oil and gas production and government spending resulting from those revenues. Oil and gas lease sales generate income to state government through royalties (including bonuses, rents, and interest), production taxes, petroleum corporate income taxes, and petroleum property taxes. Total oil revenue totaled $11.2 billion in fiscal year (FY) 2008.
- Unrestricted oil revenue comprised approximately 93 % of the state's general fund unrestricted revenue in FY 2009.

- The Alaska state-wide economy depends heavily on revenues related to petroleum development, which totaled $5.2 billion in fiscal year 2007. The petroleum industry is Alaska's largest industry, annually spending $2.1 billion, including $422 million on payroll and $1.7 billion on goods and services.
- Overall, this spending generates 33,600 jobs, $1.4 billion in payroll, and value added to the Alaska economy of $1.8 billion for total output of $3.1 billion. Oil and gas accounts for 12 % of private sector jobs and 20 % of private sector payroll. The oil and gas industry has the highest monthly wage in Alaska, averaging $7,754, which is 2.8 times higher than the statewide average of $2,798.
- A primary goal of the North Slope Borough (NSB) has been to create employment opportunities for Alaska Native residents. The NSB has been successful in hiring large numbers of Alaska Natives for NSB construction projects and operations. The NSB employs many permanent residents directly and finances construction projects under its Capital Improvement Program. The NSB pay scales have been equal to, or better than, those in the oil and gas industry, while working conditions and the flexibility offered by the NSB are considered by Alaska Native employees to be superior to those in the oil and gas industry. In addition, NSB employment policies permit employees to take time off, particularly for subsistence hunting.
- Oil and gas is an important component of revenues to support government services to Alaskans. At the end of the state's 2012 fiscal year, oil and gas revenues represented 83 % of the total revenue to the state.

Geotechnical activities that support exploration and development of oil and gas from the North Slope support important economic and social aspects in the area where the water body is located. The Department finds that the requirements of this part of the antidegradation analysis have been met.

2. 18 AAC 70.015 (a)(2)(B) except as allowed under this subsection, reducing water quality will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235 or the whole effluent toxicity limit in 18 AAC 70.030.

A 100-meter cylindrically shaped mixing zone is authorized for Discharge 001 – water-based drilling fluids and drill cuttings for metals. Upon request, DEC may authorize a standard-sized 100-meter, cylindrical mixing zone for Discharge 003 – domestic wastewater and Discharge 004 – graywater for TRC. Where DEC has authorized a mixing zone (in accordance with 18 AAC 70.240 – 18 AAC 70.270), all applicable criteria found in 18 AAC 70.020 must be met at the boundary of that authorized mixing zone to ensure that the quality of the water body as a whole is protected and maintained. Site-specific criteria as allowed by 18 AAC 70.235 has not been established for either the Beaufort or Chukchi Seas and is therefore not applicable. An effluent toxicity characterization program is being implemented in the permit to evaluate toxicity in miscellaneous discharges. Effluent toxicity characterization is required for miscellaneous discharges that are chemically treated and discharge more than 10,000 gpd. In addition, the BMP Plan, Drilling Fluids Plan, and Environmental Monitoring Program direct the permittee to implement practices to control toxicity and report on environmental impacts from drilling activities, respectively. Accordingly, if the terms of the permit are followed, violations of marine water quality criteria in 18 AAC 70.020 will not occur.

The Department finds that the requirements of this part of the antidegradation analysis have been met.

3. 18 AAC 70.015 (a)(2)(C) the resulting water quality will be adequate to fully protect existing uses of the water.

Waters covered under the permit are protected for all marine use categories per 18 AAC 70.020(a)(2)(A-D). Effluent limits and monitoring in the permit have been developed to ensure that water quality criteria are not exceeded at the point of discharge, or if applicable, at or beyond the boundary of an authorized mixing zone. Accordingly, water quality criteria will be met in the water body at the boundary of the mixing zone, and the water body's existing uses will be protected.

Under Section 403 of the CWA, an ODCE was conducted in 2013 for the discharges in the permit. The Department concluded that if certain discharge restrictions and conditions in the 2013 ODCE are included in the permit, unreasonable degradation is not expected to occur in the marine environment as a result of the discharges. The discharge prohibitions adopted in the permit include no discharge to waters shallower than five-meters or within 1,000 meters from certain sensitive areas.

Given that geotechnical facilities are expected to discharge much lower concentrations and volumes of pollutants than exploration or production platforms, discharges associated with the permit are not expected to affect existing uses so long as limitations and discharge prohibitions in the permit are followed.

The Department finds that requirements of this part of the antidegradation analysis have been met.

4. 18 AAC 70.015(a)(2)(D) the methods of pollution prevention, control, and treatment found by the Department to be most effective and reasonable will be applied to all wastes and other substances to be discharged.

For the purpose of discussing pollution prevention, control, and treatment the discharges covered by the permit will be grouped according to the following five categories:

1. Water-based Drilling Fluids and Drill Cuttings
2. Domestic Wastewater
   - Black Water
   - Graywater
3. Discharges potentially contaminated with oil
   - Deck Drainage
   - Bilge Water
   - Uncontaminated Ballast Water
4. Seawater or Freshwater Typically Treated with Chemicals
   - Desalination Unit Wastes
   - Non-contact Cooling Water
5. Miscellaneous Intermittent Discharges
   - Boiler Blowdown
   - Fire Control Test Water

Water-based Drilling Fluids and Drill Cuttings: The limitations imposed on water-based drilling fluids and cuttings in the permit rely on effective and reasonable pollution prevention strategies that promote reducing volumes of potentially toxic discharges and replacing toxic fluids with less toxic substitutions.

The ELGs establish pollution control by prohibiting the use of oil-based fluids, non-aqueous drilling fluids (synthetic fluids), diesel oil, inverse emulsion fluids, and oil contaminated fluids. The prohibition of discharge of free oil for all discharges protects aquatic life as well as public health and welfare. 40 CFR

110.3 defines the quantity of oil that may be harmful to public health or welfare as a discharge that causes a sheen or discoloration on the receiving water. Prohibition of free oil in discharges is a reasonable and effective pollution control strategy.

The limitations in the permit promote using the least toxic water-based drilling fluids and minimizing the discharge of chemical additives. When discharged, water-based fluids must meet limits for surrogate metals cadmium and mercury, as well as SPP toxicity limits.

Domestic Wastewater: As discussed in Section 6.3.1, geotechnical facilities may use various treatment systems including, but not limited to, Marines Sanitation Devices (MSDs), biological treatment units (BTUs), or MSD/BTU combinations to treat domestic wastewater (black water or commingled black and graywater). The limits in the permit are based on BPJ citing minimum treatment per 18 AAC 72.050. As a result of the perceived difficulties for some domestic wastewater systems to meet the state regulatory minimum treatment requirements, the permit clarifies and emphasizes adherence to existing requirements in 18 AAC 72 in order to evaluate treatment systems before obtaining authorization under the permit. In situations where graywater is segregated from blackwater, 18 AAC 72.060 allows for waivers on a case-by-case basis to minimum treatment standards if the permittee can demonstrate through submittal of an engineering report that that human health and the environment would be protected.

Discharges potentially contaminated with oil: The permit prohibits the discharge of free oil as determined by the visual sheen test, or the Static Sheen Test, and requires treatment of deck drainage, bilge water and contaminated ballast water using an OWS. When discharging these waste streams during broken, or unstable ice conditions, the effluent must pass the Static Sheen Test prior to discharge. As stated previously, the Department considers prohibiting the discharge of free oil to be the most effective and reasonable treatment and pollution control techniques for these discharges.

Seawater or Freshwater Typically Treated with Chemicals: Non-contact cooling water and desalination unit wastes commonly include chemical additives necessary to prevent biofouling, scaling, or corrosion. Because of the multitude of products available, as well as those that may become available during the permit cycle, the Department determined that developing limits is infeasible. The Department also considered that inhibiting the use of more effective or less toxic chemicals would be inappropriate. Therefore, the permit requires a strict inventory of chemical use along with implementing BMPs and effluent toxicity characterization monitoring. These requirements promote effective pollution control while allowing for flexibility to use the most effective, low toxicity chemicals including new and potentially more beneficial treatment chemicals.

Miscellaneous Intermittent Discharges: Boiler blow down is a low volume discharge of freshwater from a closed boiler system. The discharge of blow down is replenished with makeup fresh water to help maintain water quality characteristics in the closed system. Fire control system test water is typically sea water discharged during training events and the testing and maintenance of the fire protection equipment. These intermittent discharges represent point source discharges but pose little environmental concern. These discharges are control by water quality narrative limits of no floating solids, foam, and oily waste and implementation of BMPs. In the event these discharges are chemically treated, the effluent toxicity characterization monitoring and triggers discussed previously also apply.

Each waste stream is either treated using the most effective and reasonable methods or controlled by implementing practicable and effective pollution prevention and control strategies. The Department finds that requirements of this part of the antidegradation analysis have been met.

5. 18 AAC 70.015(a)(2)(E). All wastes and other substances discharged will be treated and controlled to achieve (i) for new and existing point sources, the highest statutory and regulatory requirements and (ii) for nonpoint sources, all cost-effective and reasonable best management practices.

The "highest statutory and regulatory requirements" as defined in 18 AAC 70.990(30) includes the following three parts:

1) *any federal TBEL identified in 40 CFR § 125.3 and 40 CFR § 122.29, as amended through August 15, 1997, adopted by reference at 18 AAC 83.010;*
2) *minimum treatment standards in 18 AAC 72.040; and*
3) *any treatment requirement imposed under another state law that is more stringent than a requirement of this chapter.*

The first part of the definition refers to ELG's. There are no ELGs for geotechnical surveys. In the absence of specific ELGs for waste streams, limitations and related requirements are established using BPJ. Therefore, the first part of the definition predominantly includes all relevant TBELs adopted by BPJ using 40 CFR § 435 as a basis. The permit implements the more stringent TBELs among the BPT, the BAT, and the BCT as they apply to geotechnical survey discharges, specifically water based drilling fluids and cuttings. The limits for Drilling Fluid and Drill Cuttings (Discharge 001) are based on BAT at 40 CFR § 435.13. As required by the ELGs for BCT at 40 CFR §435.14, BAT at 40 CFR § 435.13 and BPT at § 435.12, the permit limits TRC for Domestic Wastewater (003) are adopted based on the assumption that the geotechnical facilities will be continuously manned by over 10 people. As a surrogate for bacteria, TRC must be 1 mg/L minimum and maintained as close to this concentration as possible immediately following chlorination. Deck Drainage (002) has a no discharge of free oil prohibition based on BAT, BCT, and BPT requirements. Similar to Deck Drainage, the miscellaneous discharges that have the potential to contain oil such as Uncontaminated Ballast Water (010), Bilge Water (011), and Excess Cement at the Seafloor (012) are prohibited to discharge free oil.

When developing numeric BPJ limits is infeasible, narrative and BMP limitations are established based on BPJ to limit the discharge of pollutants. Miscellaneous discharges that are chemically treated must adhere to BMPs, inventory and report annually on chemicals used, and be subjected to toxicity characterization monitoring.

The second part of the definition appears to be in error, as 18 AAC 72.040 considers discharge of sewage to sewers and not minimum treatment. The correct reference appears to be 18 AAC 72.050, minimum treatment, which deals with domestic wastewater. The permit requires domestic wastewater discharges to surface water to meet minimum treatment requirements (i.e., secondary treatment), unless a waiver request is approved by the Department under 18 AAC 72.060. This requirement applies to both domestic wastewater discharges (003) and graywater discharges (004) (See Section 4.3). The waiver request must satisfactorily address the waiver requirements in 18 AAC 72.050(d)(1) – (5) and 18 AAC 72.060(b); facilities must achieve, at a minimum, primary treatment. The permit only authorizes discharges of domestic wastewater and graywater from exploration facilities after the applicant submits plans and a report with the completed NOI, and the Department determines that the plans, report, and NOI satisfactorily address the requirements of 18 AAC 72.050(d) and 18 AAC 72.060(b) and that the minimum treatment standards will be met. By virtue of requiring a case-by-case evaluation as necessary for first time dischargers and existing facilities conducting major renovations, the permit will protect public health, public and private water systems, and the environment.

The third part of the regulation includes any more stringent treatment required by State law that is more stringent than 18 AAC 70. Other regulations beyond 18 AAC 70 that directly apply to the permitting action include 18 AAC 72 and 18 AAC 15. The paragraph above speaks directly to the more stringent treatment requirements contained in 18 AAC 72 for domestic wastewater discharges. Besides those in 18 AAC 72, neither the regulations in 18 AAC 15 or another State law that the Department is aware of impose more stringent treatment requirements than 18 AAC 70.

The Department finds that requirements of this part of the antidegradation analysis have been met.

10.0 OTHER PERMIT CONDITIONS

10.1 Monitoring Requirements

APDES regulations require that permits include monitoring to determine compliance with permit requirements (18 AAC 83.455). Monitoring may also be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality.

10.2 Standard Permit Provisions

Appendix A of the permit contains standard regulatory language that must be included in all APDES permits. These requirements are based on the regulations and cannot be challenged in the context of an individual APDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, signatory authority, and other general requirements.

10.3 Best Management Practices

BMPs are measures that are intended to prevent or minimize the generation and potential for the release of pollutants from industrial facilities to the waters of the United States through normal operations and ancillary activities. Pursuant to CWA Section 402(a)(1), development and implementation of BMP Plans may be included as a condition in APDES permits. CWA Section 402(a)(1) authorizes DEC to include miscellaneous requirements that are deemed necessary to carry out the provision of the CWA in permits on a case-by-case basis. BMPs are required to control or abate the discharge of pollutants in accordance with 18 AAC 83.475.

The permittee must develop a BMP Plan which achieves the objectives and the specific requirements to prevent or minimize the generation and release of pollutants during exploration activities. The permittee must amend the BMP Plan whenever there is a change in the facility or in the operation of the facility that materially increases the generation of pollutants or their release or potential release to the receiving waters. The permittee must also amend the BMP Plan, as appropriate, when facility operations covered by the BMP Plan change. All changes to the BMP Plan must be reviewed by the facility engineering staff and manager. Changes to the BMP Plan shall be consistent with the objectives and specific requirement as described in Section 2.10 of the permit.

10.4 Quality Assurance Project Plan

The permittee is required to develop procedures to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to develop a Quality Assurance Project Plan (QAPP) for all discharges for which authorization has been requested and submit the QAPP to DEC within 45 days prior to discharge during each year of operation. If Discharge 001 – Drilling

Fluids and Drill Cuttings is one of the requested discharges, the QAPP must be submitted with the EMP Study Plan per Permit Section 3.3.2. The QAPP shall be retained on the geotechnical facility and consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples; laboratory analysis; and data reporting.

10.5 Recording and Reporting Requirements

10.5.1 The reporting provisions in 18 AAC 83.455(b) allow flexibility in determining the frequency of reporting. The permittee shall submit monthly DMRs summarizing the monitoring required in Permit Section 2.

11.0 OTHER LEGAL REQUIREMENTS

11.1Endangered Species Act (ESA)

The ESA requires federal agencies to consult with NMFS and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. As a state agency, DEC is not required to consult with these federal agencies regarding permitting actions. However, the Department has examined the U.S Fish and Wildlife webpage of listed and candidate species (see http://www.fws.gov/alaska/fisheries/endangered/species.htm) and will be verifying listings of threatened and endangered species in the subject coverage area with USFWS staff.

The following threatened and endangered species occur in the Geotech GP Area of Coverage[1] and are potentially affected by discharges covered under the permit: Three species have critical habitat in Area of Coverage.

Listed species

- Steller's eider (Polysticta stelleri) (threatened)
- Spectacled eider (Somateria fischeri) (threatened)
- Polar bear (Ursus maritimus) (threatened)
- Bowhead whale (Balaena mysticus) (endangered)
- Fin whale (Balaenoptera physalus) (endangered)
- Humpback whale (Megaptera novaeangliae) (endangered)
- Bearded seal (Erignathus barbatus nauticus) (threatened)
- Ringed seal (Phoca hispida hispida) (threatened)

Steller's eider: The Alaskan breeding populations of Steller's eider were listed as threatened under the ESA on June 11, 1997 in the Federal Register (62 FR 31748). Designated critical habitat for the Steller's eider includes five units located along the Bering Sea and north side of the Alaskan Peninsula but none in the permit Area of Coverage.

Spectacled eider: The Alaskan breeding populations of Spectacled eider were listed as threatened under the ESA on June may 10, 1993 (58 FR 27474)). On February 6, 2001, the USFWS designated critical habitat for spectacled eider (66 FR 9146) in Ledyard Bay in the Chukchi Sea but none in the Beaufort Sea.

[1] Species were listed as threatened or endangered on the USFWS's Alaska Region Web site (Alaska's http://alaska.fws.gov/fisheries/endangered/pdf/consultation_guide/4_Species_List.pdf) accessed on May 29, 2013.

Polar bear: On May 15, 2008, the USFWS published a Final Rule in the Federal Register listing the polar bear as a threatened species under the federal Endangered Species Act (73 FR 28212-28303). The USFWS based its listing on the loss of sea ice, which it says threatens and will likely continue to threaten polar bear habitat. However, currently there is no critical habitat listing for the polar bear

Bowhead whale: Bowhead whales are listed as endangered under the Endangered Species Act and are considered depleted under the Marine Mammal Protection Act. NMFS, in 2002, issued a determination within the Federal Register deciding against designating critical habitat for bowheads. NMFS determined that (1) the population decline was due to overexploitation by commercial whaling, and habitat issues were not a factor in the decline; (2) the population is abundant and increasing; (3) there is no indication that habitat degradation is having any negative impact on the increasing population; and (4) existing laws and practices adequately protect the species and its habitat (67 FR 55767, August 30, 2002.).

Fin whale: The fin whale population was decimated by commercial whaling in the 1800s and early 1900s. It was listed as endangered under the Endangered Species Conservation Act, the predecessor to the Endangered Species Act (ESA), in 1970. When the ESA was passed in 1973, the fin whale was listed as endangered throughout its range. It is also designated as depleted under the Marine Mammal Protection Act.

Humpback whale: Commercial whaling in the 1800s and early 1900s significantly reduced the global humpback whale population. In 1946, commercial whaling of humpbacks was regulation by the International Convention for the Regulation of Whaling. Then, the International Whaling Commission ended commercial whaling of humpbacks in 1966. In 1970, the humpback whale was listed as endangered under the Endangered Species Conservation Act, the predecessor the Endangered Species Act (ESA). When the ESA was passed in 1973, the humpback whale was listed as endangered throughout its range. In the same year it was designated as depleted under the Marine Mammal Protection Act. The Chukchi Sea is the northernmost area for humpbacks during their summer feeding, although, in 2007, humpbacks were seen in the Beaufort Sea east of Barrow, which would suggest a northward expansion of their feeding grounds.

Bearded seal: With the loss of sea ice due to climate change, concern has arisen over the survival of ice seals. The National Marine Fisheries Service (NMFS) was petitioned to list ribbon seals under the Endangered Species Act (ESA). In 2008, upon finding that the petition for ribbon seals had merit, NMFS decided to initiate status reviews for the ribbon seal and the other three species of ice seal, the spotted seal, the ringed seal, and the bearded seal. In December 2010 NMFS proposed to list the bearded seal as a threatened species under the ESA, but that decision has not been finalized

Ringed seal: With the loss of sea ice due to climate change, concern has arisen over the survival of ice seals. The National Marine Fisheries Service (NMFS) was petitioned to list ribbon seals under the Endangered Species Act (ESA). In 2008, upon finding that the petition for ribbon seals had merit, NMFS decided to initiate status reviews for the ribbon seal and the other three species of ice seal, the spotted seal, the ringed seal, and the bearded seal. In December 2010 NMFS proposed to list the ringed seal as a threatened species under the ESA, but that decision has not been finalized.

11.2 Essential Fish Habitat (EFH)

Essential fish habitat (EFH) includes the waters and substrate (sediments, etc.) necessary for fish from commercially-fished species to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires federal agencies to consult with National Oceanic and Atmospheric Administration (NOAA) when a proposed discharge has the potential to

adversely affect (reduce quality and/or quantity of) EFH. As a state agency, DEC is not required to consult with NOAA regarding permitting actions. However, the Department has examined *the Fishery Management Plan for Fish Resources of the Arctic Management Area* (Fishery Management Plan) (NOAA 2009) and is in the process of verifying EFH in the subject coverage area. EFH includes the waters and substrate (sediments, etc.) necessary for fish from commercially-fished species to spawn, breed, feed, or grow to maturity. The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act set forth a number of new mandates for NMFS, regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat.

Most marine waters surrounding the State of Alaska have been designated as essential fish habitat. Figure 13 provides a summary of the EFH species within the permit coverage area. Figures 13 – 15 were taken from the Fishery Management Plan and show more detailed information on the extent of EFH in the permit Area of Coverage.

Figure 7: Essential Fish habitat in the Arctic

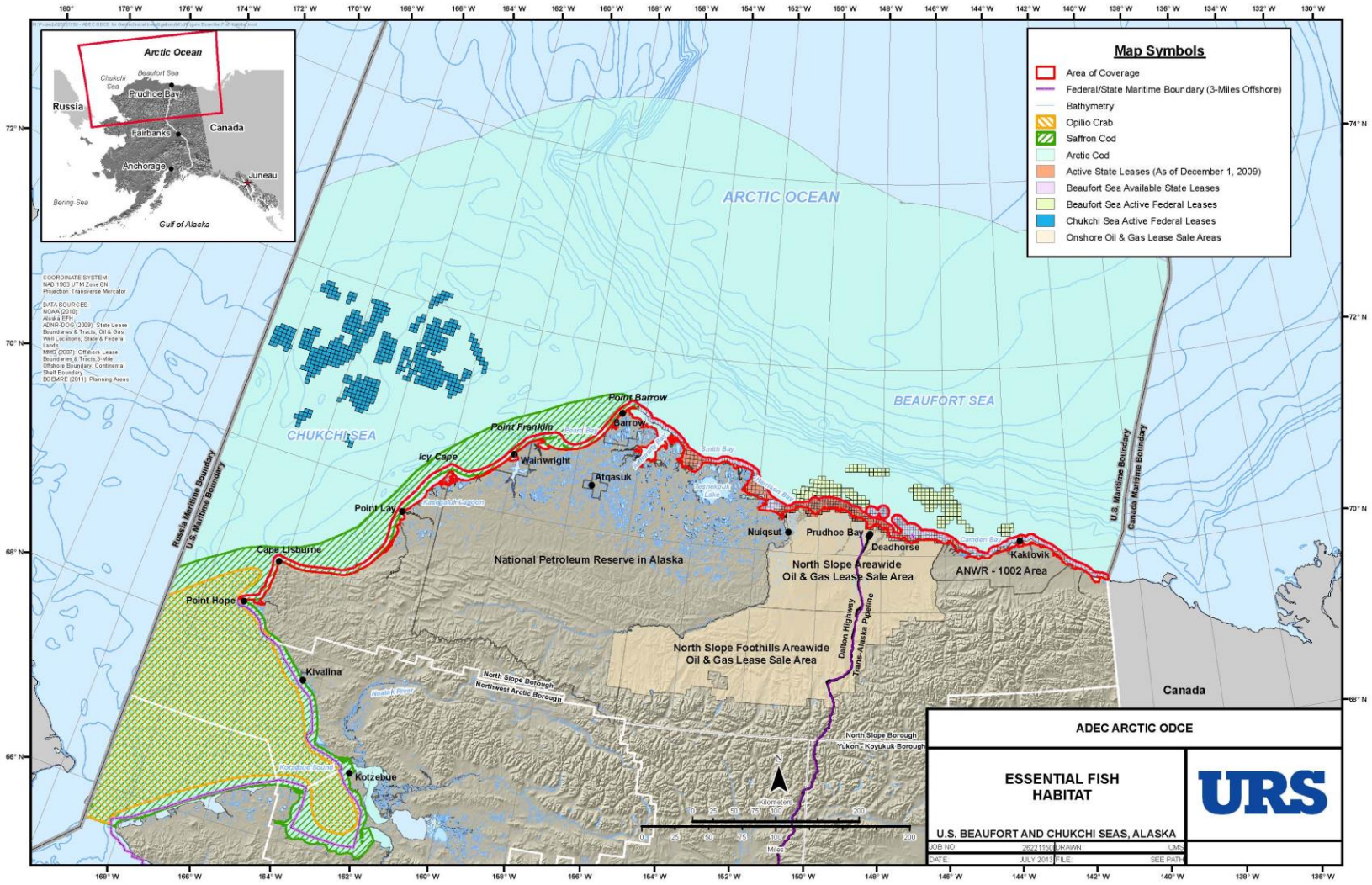


Figure 8: EFH Map Description for the Arctic Cod Late Juveniles and Adults in the Arctic Management Area

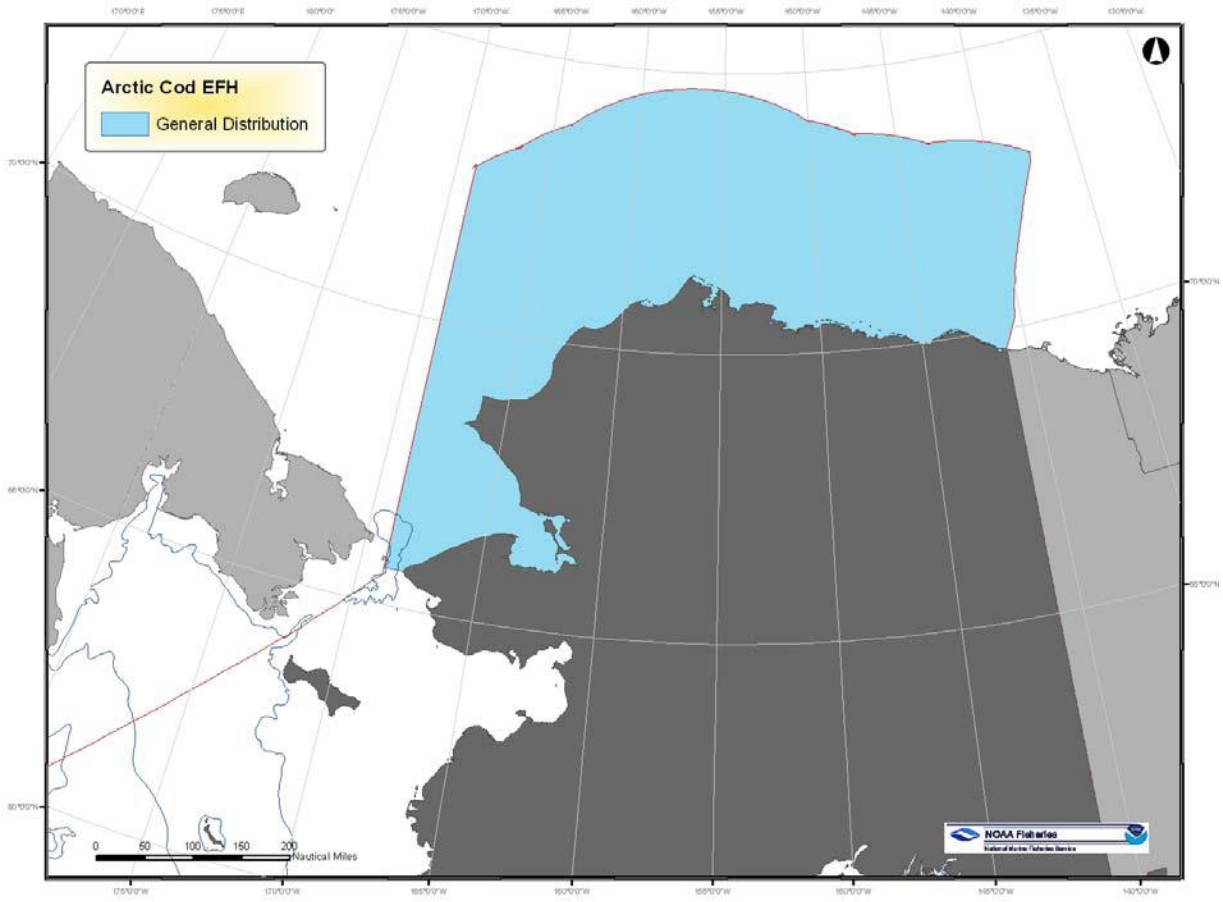


Figure 9: EFH Map Description for Saffron Cod Late Juveniles and Adults in the Arctic Management Area

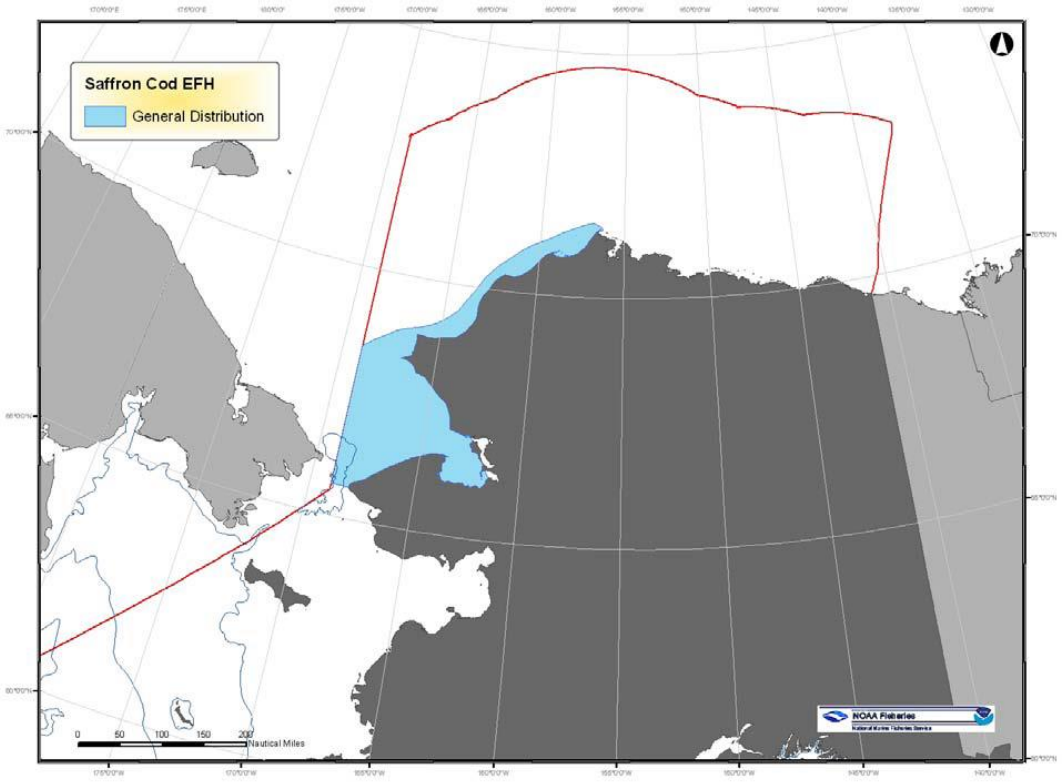
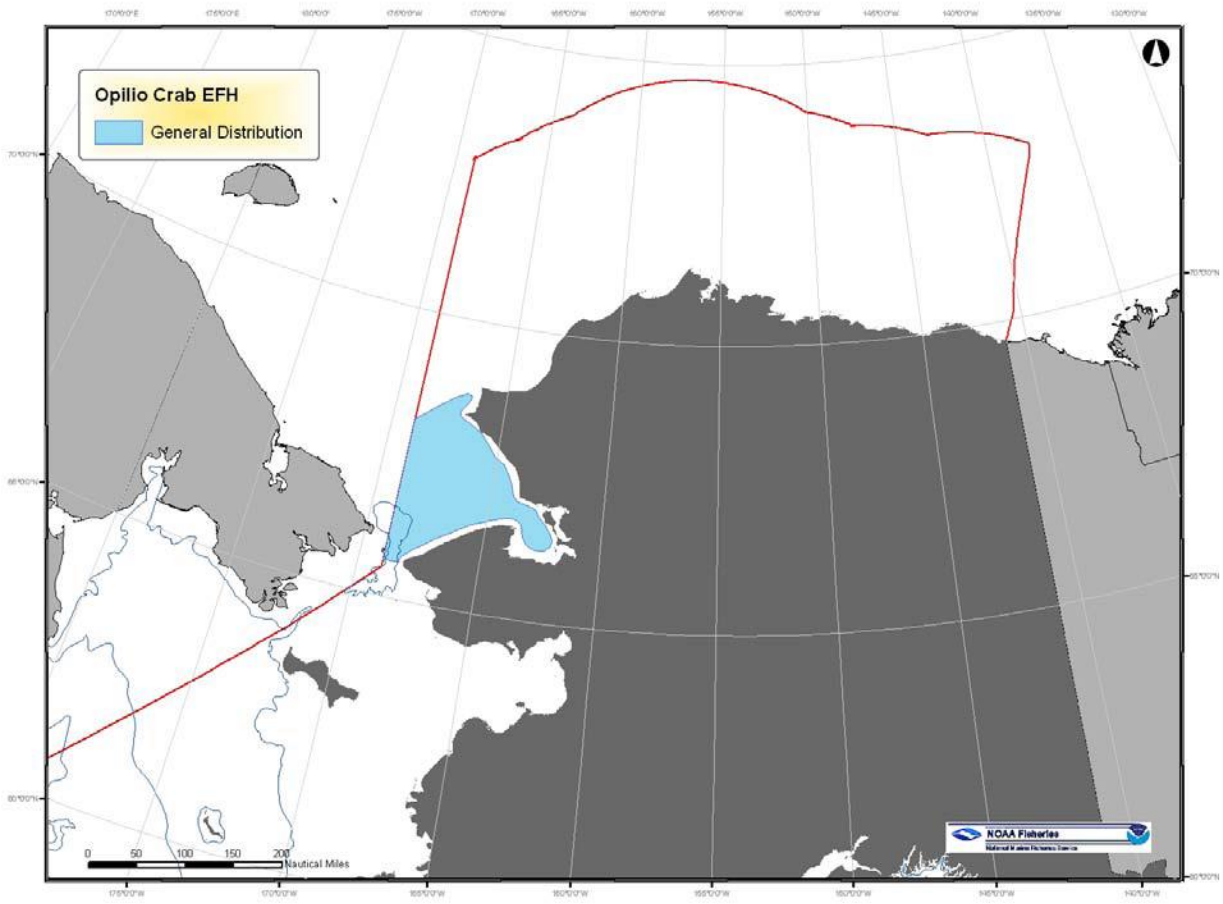


Figure 10: EFH Map Description for Snow Crab (C. opilio) Eggs, Late Juveniles, and Adults in the Arctic Management Area



As can be surmised from Figure 12 - 15, EFH is prevalent in the Arctic much like most of Alaskan marine waters. The habitats of potential concern are typically the estuarine and near shore habitat of the Pacific salmon and herring spawning grounds. It is difficult to determine where facilities might locate during the life of a general permit. However, the prohibition of discharge within 1,000 meters of certain sensitive areas and in waters shallower than 5 meter serves to protect these near shore habitats. Because the discharges disperse rapidly within the deeper waters, activities associated with the permit will not adversely affect EFH.

11.3Permit Expiration

The permit will expire five years from the effective date.

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APPENDIX A. MIXING ZONE ANALYSIS CHECKLIST

Mixing Zone Authorization Checklist
based on Alaska Water Quality Standards (2003)

The purpose of the Mixing Zone Checklist is to guide the permit writer through the mixing zone regulatory requirements to determine if all the mixing zone criteria at 18 AAC 70.240 through 18 AAC 70.270 are satisfied, as well as provide justification to authorize a mixing zone in an APDES permit. In order to authorize a mixing zone, all criteria must be met. The permit writer must document all conclusions in the permit Fact Sheet, however, if the permit writer determines that one criterion cannot be met, then a mixing zone is prohibited, and the permit writer need not include in the Fact Sheet the conclusions for when other criteria were met.

Criteria	Description	Answer & Resources	Regulation
Size	Is the mixing zone as small as practicable? - Permit writer conducts analysis and documents analysis in Fact Sheet at: ►Section 4.2 Mixing Zone Analysis -.	Yes, mixing zone as small as practicable. Technical Support Document for Water Quality Based Toxics Control •Fact Sheet, Section 5.3 • Fact Sheet, Section 5.3.1 • DEC's RPA Guidance • EPA Permit Writers' Manual	18 AAC 70.240 (a)(2) 18 AAC 70.245 (b)(1) - (b)(7) 18 AAC 70.255(e) (3) 18 AAC 70.255 (d)

Criteria	Description	Answer & Resources	Regulation
Technology	Were the most effective technological and economical methods used to disperse, treat, remove, and reduce pollutants? **If yes**, describe methods used in Fact Sheet at Section 4.2 Mixing Zone Analysis.	Answer: Yes Fact Sheet, Section 5.3.3	18 AAC 70.240 (a)(3)
Low Flow Design	**For river, streams, and other flowing fresh waters.** - Determine low flow calculations or documentation for the applicable parameters. Justify in Fact Sheet	N/A	18 AAC 70.255(f)
Existing use	Does the mixing zone…		
	(1) partially or completely eliminate an existing use of the water body outside the mixing zone? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.4	18 AAC 70.245(a)(1)
	(2) impair overall biological integrity of the water body? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.4	18 AAC 70.245(a)(2)
	(3) provide for adequate flushing of the water body to ensure full protection of uses of the water body outside the proposed mixing zone? **If no, then mixing zone prohibited.**	Answer: Yes Fact Sheet Section 5.3.2	18 AAC 70.250(a)(3)
	(4) cause an environmental effect or damage to the ecosystem that the department considers to be so adverse that a mixing zone is not appropriate? **If yes, then mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3	18 AAC 70.250(a)(4)

Criteria	Description	Answer & Resources	Regulation
Human consumption	Does the mixing zone…		
	(1) produce objectionable color, taste, or odor in aquatic resources harvested for human consumption? **If yes, mixing zone may be reduced in size or prohibited.**	Answer: No Fact Sheet Section 5.3.7	18 AAC 70.250(b)(2)
	(2) preclude or limit established processing activities of commercial, sport, personal use, or subsistence shellfish harvesting? **If yes, mixing zone may be reduced in size or prohibited.**	Answer: No Fact Sheet Section 5.3.4	18 AAC 70.250(b)(3)
Spawning Areas	Does the mixing zone…		
	(1) discharge in a spawning area for anadromous fish or Arctic grayling, northern pike, rainbow trout, lake trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, king, and sockeye salmon? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.6	18 AAC 70.255 (h)
Human Health	Does the mixing zone…		
	(1) contain bioaccumulating, bioconcentrating, or persistent chemical above natural or significantly adverse levels? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.5	18 AAC 70.250 (a)(1)
	(2) contain chemicals expected to cause carcinogenic, mutagenic, tetragenic, or otherwise harmful effects to human health? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.5	

Criteria	Description	Answer & Resources	Regulation
	(3) Create a public health hazard through encroachment on water supply or through contact recreation? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.5	18 AAC 70.250(a)(1)(C)
	(4) meet human health and aquatic life quality criteria at the boundary of the mixing zone? **If no, mixing zone prohibited.**	Answer: Yes Fact Sheet Section 5.3.5	18 AAC 70.255 (b),(c)
	(5) occur in a location where the department determines that a public health hazard reasonably could be expected? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.5	18 AAC 70.255(e)(3)(B)
Aquatic Life	Does the mixing zone…		
	(1) create a significant adverse effect to anadromous, resident, or shellfish spawning or rearing? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.6	18 AAC 70.250(a)(2)(A-C)
	(2) form a barrier to migratory species? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.6	
	(3) fail to provide a zone of passage? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.6	
	(4) result in undesirable or nuisance aquatic life? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.7	18 AAC 70.250(b)(1)
	(5) result in permanent or irreparable displacement of indigenous organisms? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.7	18 AAC 70.255(g)(1)
	(6) result in a reduction in fish or shellfish population levels? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.7	18 AAC 70.255(g)(2)

Criteria	Description	Answer & Resources	Regulation
	(7) prevent lethality to passing organisms by reducing the size of the acute zone? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.2and Fact Sheet Section 5.3.7	18 AAC 70.255(b)(1)
	(8) cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 5.3.7	18 AAC 70.255(b)(2)
Endangered Species	Are there threatened or endangered species (T/E spp) at the location of the mixing zone? If yes, are there likely to be adverse effects to T/E spp based on comments received from USFWS or NOAA. If yes, will conservation measures be included in the permit to avoid adverse effects? **If yes, explain conservation measures in Fact Sheet. If no, mixing zone prohibited.**	Answer: Yes Fact Sheet Section 5.3.8 and Fact Sheet Section 10.1	Program Description, 6.4.1 #5 18 AAC 70.250(a)(2)(D)