ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT FACT SHEET – PRELIMINARY DRAFT

Individual Permit: AK0062278 – EXXONMOBIL ALASKA LNG LLC, Cook Inlet Geotechnical Survey

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Wastewater Discharge Authorization Program

555 Cordova Street

Anchorage, AK 99501

Public Comment Period Start Date: Pending
Public Comment Period Expiration Date: Pending
Alaska Online Public Notice System

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Proposed issuance of an Alaska Pollutant Discharge Elimination System (APDES) permit to:

EXXONMOBIL ALASKA LNG LLC

For wastewater discharges from:

Geotechnical Survey Activities in Coastal Areas of the Cook Inlet
3201 C Street, Suite 506
Anchorage, AK 99501

The Alaska Department of Environmental Conservation (Department or DEC) proposes to issue APDES individual permit AK0062278 – Exxon Mobile Alaska LNG LLC, Cook Inlet Geotechnical Survey (permit). The permit authorizes and sets conditions on the discharge of pollutants from geotechnical survey operations to waters of the United States. 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 operated by EMALL in state waters of the Cook Inlet and the development of the permit including:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations, monitoring requirements, and other conditions
- technical material supporting the conditions in the permit
- a description of the proposed activities

Public Comment

Persons wishing to comment on, or request a public hearing for the draft permit for this facility, may do so in writing by the expiration date of the public comment period.

Commenters are requested to submit a concise statement on the permit condition(s) and the relevant facts upon which the comments are based. Commenters are encouraged to cite specific permit requirements or conditions in their submittals.

A request for a public hearing must state the nature of the issues to be raised, as well as the requester's name, address, and telephone number. The Department will hold a public hearing whenever the Department finds, on the basis of requests, a significant degree of public interest in a draft permit. The Department may also hold a public hearing if a hearing might clarify one or more issues involved in a permit decision or for other good reason, in the Department's discretion. A public hearing will be held at the closest practicable location to the site of the operation. If the Department holds a public hearing, the Director will appoint a designee to preside at the hearing. The public may also submit written testimony in lieu of or in addition to providing oral testimony at the hearing. A hearing will be tape recorded. If there is sufficient public interest in a hearing, the comment period will be extended to allow time to public notice the hearing. Details about the time and location of the hearing will be provided in a separate notice.

All comments and requests for public hearings must be in writing and should be submitted to the Department at the technical contact address, fax, or email identified above (see also the public comments section of the attached public notice). Mailed comments and requests must be postmarked on or before the expiration date of the public comment period.

After the close of the public comment period and after a public hearing, if applicable, the Department will review the comments received on the draft permit. The Department will respond to the comments received in a Response to Comments document that will be made available to the public. If no substantive comments are received, the tentative conditions in the draft permit will become the proposed final permit.

The proposed final permit will be made publicly available for a five-day applicant review. The applicant may waive this review period. After the close of the proposed final permit review period, the Department will make a final decision regarding permit issuance. A final permit will become effective 30 days after the Department's decision, in accordance with the state's appeals process at 18 AAC 15.185.

Appeals Process

The Department will transmit the final permit, fact sheet (amended as appropriate), and the Response to Comments to anyone who provided comments during the public comment period or who requested to be notified of the Department's final decision.

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 the Division of Water at the following address:

Director, Division 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 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 43335 Kalifornsky Beach Rd. - Suite 11 Soldotna, AK 99669 (907) 262-5210

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1.0 INTRODUCTION – INDIVIDUAL PERMIT

On March 31, 2015, the Alaska Department of Environmental Conservation (DEC or Department) received an Alaska Pollutant Discharge Elimination System (APDES) individual permit application from ExxonMobil Alaska LNG LLC (EMALL or Applicant). Information contained in this fact sheet is based on the application and follow-up information requested by DEC. The application includes a request for the Department to develop an APDES individual permit to authorize discharges from geotechnical survey facilities operating in coastal waters of Cook Inlet. The geotechnical survey program will collect data to inform engineering and construction decisions for siting pipeline crossings and terminal facilities for the AK Liquefied Natural Gas (LNG) Project (Project).

1.1 Applicant

This fact sheet provides information on the APDES permit for the following entity:

Name of Project:	EMALL, Cook Inlet Geotechnical Survey Program
APDES Permit No.:	AK0062278
Project Location:	Cook Inlet (Area of Coverage Map: Appendix A, Figure 1)
Mailing Address:	3201 C Street, Suite 506 Anchorage, AK 99501
Facility Contact:	Mr. Charlie Kominas

The applicant requests the following discharges be included in the permit:

Discharge Outfall	Discharge Type	Receiving water
Outfall 001	Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor	Cook Inlet
Outfall 002	Deck Drainage	Cook Inlet

For more information about individual discharge and borehole locations, refer to Figure 1 through Figure 4 in Appendix A and Table 2.

1.2 Authority

On October 31, 2008, the Environmental Protection Agency (EPA) approved the State's application to administer the National Pollutant Discharge Elimination System (NPDES) Program, which regulates the discharges of pollutant point sources to waters of the United States (U.S.) located in the State of Alaska. The state program is the APDES Program and is administered by DEC. Transfer of the Program occurred in four phases with oil and gas facilities transferring as part of Phase IV, which occurred on October 31, 2012. Accordingly, DEC is the APDES permitting authority for regulating the discharges associated with AK0062278 – ExxonMobil Alaska LNG LLC, Cook Inlet Geotechnical Survey (Permit). This is the first issuance of the Permit and the permit will only be needed until the geotechnical program is completed.

Section 301(a) of the Clean Water Act (CWA) and Alaska Administrative Code (AAC) 18 AAC 83.015 provide that the discharge of pollutants to waters of the U.S. is unlawful except in accordance with an APDES permit. The proposed individual permit issuance is being developed in accordance with regulations 18 AAC 83.115 and 18 AAC 83.120. A violation of a condition contained in the 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).

1.3 Geotechnical Survey Regulatory and Permitting Overview

Specific marine geotechnical programs are developed based on localized geology, purpose of the investigation, investigation methods, localized environmental factors, uses of the waterbody, current regulatory framework, and permitting aspects. The nature of the discharges from geotechnical facilities coupled with environmental factors and current regulations determine the degree of pollution prevention control required in the permit. The following sections provide an overview of the current regulatory framework, related Alaska permits, and the key aspects that the Department considers in developing effluent limitations, best management practices (BMPs), and other permit conditions to control pollutant discharges from specific geotechnical programs.

Geotechnical surveys are developed in consideration of the anticipated geology, the purpose, and appropriate drilling and sample collection methods. For example, marine geotechnical programs in uncomplicated geologic formations may use auger stem drilling that incorporates the surrounding seawater to lubricate and cool the bit as well as sweep the borehole cuttings. These discharges do not require a CWA Section 402 permit under the APDES program because only surrounding seawater and drill cuttings are expelled from the borehole, accordingly these discharges are not covered in the APDES Permit. Instead, this discharge can be authorized under Section 404 of the CWA through the U.S. Army Corps of Engineers (USACE) Nationwide Permit 6 (NWP6). However, other incidental pollutant point source discharges from the geotechnical facility while actively performing a geotechnical survey requires an APDES permit.

The Department uses the term geotechnical facility rather than vessel purposefully in the permit and herein. The permit defines a geotechnical facility as any floating moored, or stationary jack-up rick or lift barge actively conducting geotechnical surveying in open water. When a geotechnical facility is no longer conducting geotechnical survey activities and is in a mode of transportation, coverage of incidental discharges (e.g., deck drainage) are covered under the Small or Large Vessel General Permit (VGP) issued by EPA. However, vessels that are not operating in the capacity of a means of transportation, are not covered by the VGP (i.e., facilities that are secured to the bed of the ocean for the purpose of conducting geotechnical surveys for oil and gas development). Therefore, an APDES permit is required for incidental discharges from geotechnical facilities to account for the gap in coverage with the VGP.

For more complicated geologic formations, marine geotechnical programs may need to use rotary drilling techniques and some form of a drilling fluid to sweep cutting out of the borehole. Some fluids are ubiquitous and consist of manufactured clays or polymers that have low toxicity and metals concentrations. Other fluids could include weighting agents (e.g., barite) and chemical additives (e.g., lignosulfates) that have higher toxicity and metals concentrations. Regardless of toxicity or metals, a discharge of manufactured drilling fluids requires an APDES permit along with any incidental discharges (e.g. deck drainage) from the geotechnical facility. In part, the toxicity level and the volume of fluids proposed to be discharged determine the level of pollution control required by the permit. For example, if the proposed drilling fluid system is similar to drilling fluids used while conducting oil and gas exploration drilling, then the permit requirements would be similar to oil and gas exploration permits in the vicinity of the discharge, such as AKG315100 – Mobile Oil and Gas Exploration Facilities in State Waters in the Cook Inlet General Permit (Exploration GP). The Exploration GP establishes limits for drilling fluids and drill cuttings based on 40 CFR 435, which requires a drilling fluids plan (DFP), an environmental monitoring program (EMP), and prohibits discharges in sensitive areas of the Cook Inlet including waters less than 10 meters deep. If the proposed drilling fluids to be used in the geotechnical program have low toxicity and are of low volumes, implementing pollutant control strategies similar to the Exploration GP is not commensurate with this level of activity. The Department has developed permit limitations, conditions, and other requirements that are effective and appropriate for the specific EMALL Geotechnical Survey Program (EMALL Program).

2.0 BACKGROUND INFORMATION

The EMALL Program is a component of the Alaska LNG Project (Project) intending to establish the infrastructure needed to enable the commercialization of natural gas resources on the North Slope of Alaska. The Project, as currently proposed, will span roughly 800-miles from the North Slope to a new LNG plant in Nikiski, Alaska. As currently proposed gas will be distributed to communities along the pipeline route and to foreign export markets shipped by tankers from a marine terminal in Cook Inlet (Alaska LNG Project – Preliminary Resource Report 1, 2014).

2.1 Purpose of Geotechnical Investigations

The proposed EMALL Program will collect marine sediment and geotechnical engineering data to inform placement of a pipeline route crossing from the west side of Cook Inlet to a LNG marine terminal located at Nikiski on the east side of Cook Inlet. Specifically, marine sediment samples will be 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 marine terminals, pipelines, or other infrastructure.

2.2 EMALL Program in the Cook Inlet

The geotechnical surveys will be conducted in the coastal waters of Cook Inlet (defined as north of the baseline at the southern-most point of Kalgin Island) along potential pipeline corridors. The survey corridor extends from Shorty Creek about halfway between the village of Tyonek and the Beluga River (Appendix A, Figure 2) to Boulder Point on the Kenai Peninsula (Appendix A, Figure 3). This survey area is approximately 45 kilometers (km) or 28 miles (mi) in length along the corridor centerline and averages about 13 kilometers (km) or 8 mi wide. The total survey area is 541 km^2 (209 mi^2). The marine terminal survey area (Appendix A, Figure 4), encompassing 371 km^2 (143 mi^2), is in Nikiski where potential sites and vessel routes for the marine terminal are being investigated. The marine terminal geotechnical survey subarea encompasses 12 km^2 (4.6 mi^2). Portions of the survey area have been identified as potential critical habitat area or within set net lease areas (Figures 2-4, Appendix A).

The EMALL Program has been designed to obtain core sediment samples from 42 locations by drilling 9-inch diameter boreholes ranging from 50-200 feet (ft) in depth. Eight boreholes are located along the east and west sides of the Cook Inlet where a pipeline is expected to transition from onshore to offshore and thirty-four boreholes are located within the LNG marine terminal investigation area. Table 1 provides a summary of the proposed geotechnical program.

Table 1: EMALL Geotechnical Program – Summary

Survey Area	Location/Facility	Number of Borings (9-inch Diameter)	Target Depth (ft)
Pipeline Survey Area	Potential Shoreline Crossings	8	150
Marine Terminal Area (Boring Area)	Dolphins/Berths	24	50-200
	Dock/Channel	10	50-200

Table 2 provides the locations and water depth of each borehole.

Table 2: EMALL Geotechnical Program – Borehole Locations

Borehole	Water Depth ft (m)	Coordinates Latitude	Coordinates Longitude	Distance to Nearest Shore Fishery Lease - ft (m)
MB-1	25 (7.6)	60.6707	-151.3860	Within Lease
MB-2	34 (10.4)	60.6697	-151.3896	160 (48)
MB-3	23 (6.8)	60.6684	-151.3831	Within Lease
MB-4	37 (11.1)	60.6673	-151.3867	Within Lease
MB-5	20 (6.0)	60.6660	-151.3803	Within Lease
MB-6	35 (10.6)	60.6650	-151.3839	Within Lease
MB-7	37 (11.2)	60.6609	-151.3815	65 (19)
MB-8	17 (5.1)	60.6637	-151.3774	Within Lease
MB-9	30 (9.0)	60.6626	-151.3810	Within Lease
MB-10	40 (11.9)	60.6619	-151.3834	Within Lease
MB-11	40 (11.9)	60.6633	-151.3842	110 (34)
MB-12	17 (5.1)	60.6613	-151.3746	Within Lease
MB-13	25 (7.6)	60.6603	-151.3782	Within Lease
MB-14	39 (11.8)	60.6594	-151.3816	535 (163)
MB-15	14 (4.0)	60.6590	-151.3717	Within Lease
MB-16	22 (6.7)	60.6579	-151.3753	Within Lease
MB-17	37 (11.2)	60.6569	-151.3790	685 (208)
MB-18	38 (11.8)	60.6553	-151.3795	1,035 (316)
MB-19	33 (9.8)	60.6586	-151.3788	325 (98)
MB-20	11 (3.3)	60.6566	-151.3689	Within Lease
MB-21	19 (5.5)	60.6556	-151.3725	115 (35)
MB-22	41 (12.3)	60.6535	-151.3793	1,245 (379)
MB-23	29 (8.6)	60.6545	-151.3761	605 (184)
MB-24	12 (3.5)	60.6539	-151.3672	Within Lease
MB-25	18 (5.2)	60.6532	-151.3696	Within Lease
MB-26	26 (7.7)	60.6522	-151.3733	400 (122)
MB-27	40 (12.1)	60.6511	-151.3765	940 (287)
MB-28	30 (8.9)	60.6644	-151.3808	Within Lease
MB-29	11 (3.2)	60.6527	-151.3656	Within Lease
MB-30	16 (4.7)	60.6509	-151.3668	Within Lease
MB-31	25 (7.5)	60.6498	-151.3704	80 (25)
MB-32	24 (7.2)	60.6475	-151.3675	160 (50)
MB-33	13 (3.8)	60.6485	-151.3640	Within Lease
MB-34	34 (10.3)	60.6464	-151.3713	480 (146)
BP-1	12 (3.5)	60.7757	-151.2565	9,490 (2,892)
BP-2	37 (11.0)	60.7814	-151.2577	11,380 (3,468)
SV-1	10 (3)	60.7825	-151.1929	18,560 (5,657)
SV-2	30 (9)	60.7852	-151.1929	19,185 (5,848)
VP-1	6 (2.0)	61.1198	-151.0870	Within Lease
VP-2	19 (6.0)	61.1179	-151.0805	340 (104)
SC-1	12 (3.4)	61.1272	-151.0726	330 (101)
SC-2	23 (6.8)	61.1228	-151.0653	2,040 (621)

3.0 FACILITY INFORMATION

EMALL plans to conduct geotechnical surveys using a Comacchio MC-S skid-mounted rotary drilling unit on the deck of a Skate 3–Seacore mobile offshore drilling unit (MODU). The Skate 3 is equipped with a 64ft x 40ft deck area, four externally mounted legs (30-inch diameter) to provide maximum stability, and a rapid deck elevating system. All components and equipment are designed around the container freight concept where pontoons double as containers in which the legs, power units, and all other ancillary equipment are housed. The pontoons are positioned over each worksite by a tug (as they are not self-powered) and can be constructed and commissioned in the field within two shifts. The resulting MODU is capable of operating in water depths between 1-30 meters (m) and is appropriate for use in confined intertidal areas or open seas. Unlike more permanent platforms and jack-up facilities, the Skate 3 is a modular facility not configured or equipped with standard wastewater collection, holding, or treatment systems for deck drainage. Collecting samples from the discharge prior to mixing with the receiving water is infeasible.

3.1 Effluent Characterization of Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor (Outfall 001)

The Comacchio MC-S rotary drill will use casing pressed into the seabed in order to facilitate circulation of drilling fluids and drill cuttings topside. The cuttings will be separated from the drilling fluids and containerized for disposal at an onshore facility. The drilling fluids will be recycled for reuse downhole. The only discharge anticipated will be the remaining fluid and ground-up fragments of the seafloor (cuttings) contained in the riser. The discharge will occur after the borehole is complete and when the riser is removed from the seafloor. Based on the water depth and minor fluid loss during the drilling process, the discharge volume is expected to be between 204-323 gallons (gal). The discharge will likely result in a zone of deposit of larger sized sediment for a short-term duration, while remaining smaller sediment and drilling fluids will be suspended in the water column and rapidly disperse in ocean currents. The total suspended sediment (TSS) from the discharge will result in a temporary localized increase in turbidity that is anticipated to exceed water quality criteria and requires a mixing zone.

To minimize potential impacts from the geotechnical drilling fluids on the near-shore environment, EMALL proposes to conduct their program using two non-toxic fluid systems. The first fluid system consists of mixture of seawater and guar gum additive (Secovis). Guar gum is a food grade polysaccharide that can be used as a lubricant by modifying the viscosity of the base fluid (seawater). Guar gum is made from ground guar beans and is found to be non-toxic to humans and animals in numerous toxicity tests (FDA 2013). The second system uses Pure Bore which is also derived from natural material, a polysaccharide, that is non-toxic to humans and animals and naturally biodegrades. Because the applicant has indicated these drilling fluids could have an elevated five-day biochemical oxygen demand (BOD_5), the Department requested additional data from EMALL to verify that the fluid additives are also non-toxic to aquatic life.

EMALL conducted a suspended phase particulate (SPP) toxicity test to determine the 50 percent (%) lethal concentration (LC_{50}) to confirm that the fluids and additives are non-toxic to aquatic life. In a 96-hour LC_{50} SPP toxicity test, a lab evaluates the occurrence and magnitude of toxicity to aquatic life from a mixture over a period of 96 hours. A solution with a concentration of 30,000 parts per million (ppm) by weight (3 % solution) or less is considered to be toxic if there is a 50% lethality rate or greater (EPA Method 1619). The SPP toxicity results for both the fluids selected show that a LC_{50} endpoint was not observed at 1,000,000 ppm (100 % solution) for either fluid or additive. The Department has reviewed these SPP toxicity results and finds the results to be satisfactory. The SPP toxicity test results indicate this fluid will not have significant acute affects for the anticipated discharge volumes. Table 3 provides a summary of discharge characteristics submitted during the permit application process.

Table 3: Effluent Characteristics for Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor (Outfall 001)

Estimated Maximum Discharge (per borehole)	323 gal.
Drilling Fluid Mixture (Guar gum to Seawater)	5 kilograms : 1 cubic meter or 5000 milligrams/liter (mg/L)
Discharge Ratio of Drilling Fluids to Drill Cuttings	4 : 1
% Fines (TSS) from Sediment Discharged (Nikiski/Boulder Point Location)	8-10% (~48,000 mg/L)
% Fines (TSS) from Sediment Discharged (Upper Cook Inlet Location)	18-20% (~96,000 mg/L)
96-hour LC_{50} SPP Toxicity (Secovis/Guar Gum)	>1,000,000 ppm (>100% by Weight)
96-hour LC_{50} SPP Toxicity (Pure Bore)	>1,000,000 ppm (>100% by Weight)

3.2 Effluent Characterization of Deck Drainage (Outfall 002)

Deck Drainage is expected as a result of rain or deck wash-down with seawater withdrawn at the borehole location. While some geotechnical facilities are equipped with scuppers that collected runoff from the deck and route to a holding tank or oil-water separators for treatment, the modular Skate 3 is not designed to include these systems. The deck area does not have a deck drainage collection system and the seams where the deck is bolted together in the field allows rain or wash-down water to be discharged through the deck. This particular characteristic of the Skate 3 MODU provides a unique challenge to use engineered pollution control and requires alternative methods for controlling pollutants. For example, the geotechnical facility will be equipped with secondary containment systems where possible and the operator will implement stringent pollution prevention procedures to control the source of pollutants. The resulting pollutants of concern in the deck drainage includes oil from drilling equipment and residuals from the use of drilling fluids that remain after physical cleaning techniques before wash-down. The discharge is intermittent in nature and volumes are dependent on the frequency, intensity, and duration of rain and wash-down.

Based on an average monthly precipitation recorded in Anchorage for August (peak month for year) of 3.25 inches, the average deck drainage due to precipitation would be 170 gallons per day (gpd) assuming deck dimensions similar to the Skate 3. The predicted maximum daily precipitation is 1.56 in/day, based on a 5-year return period for the Municipality of Anchorage (MOA; 2007). Given the maximum daily precipitation rate, the estimated daily maximum discharge rate for a facility similar in size is approximately 2,500 gpd. Deck wash-down is also expected to contribute to the volume of deck drainage. The discharge from deck wash-down is estimated at approximately 2,400 gpd, assuming that the deck is washed twice per day for an average duration of 20 minutes at a rate of 60 gallons per minute (gpm). Therefore, it is assumed that the maximum deck drainage (combined precipitation and wash-down water) is approximately 4,900 gpd. Table 4 provides estimated effluent characteristics of deck drainage covered in the permit.

Table 4: Effluent Characteristics for Deck Drainage (Outfall 002)

Average Winter Temperature	4º Celsius (C)
Average Summer Temperature	13º C
TSS	Maximum Daily: 25,00 mg/L; Average Daily: 500 mg/L
Daily Flow (including precipitation and deck wash-down)	Maximum Daily: 4,900 gpd; Average Daily: 2,570 gpd
BOD_5	Same as Seawater Intake Concentration
Chemical Oxygen Demand	
Total Organic Carbon	
Ammonia as nitrogen	
pH	

4.0 EFFLUENT LIMIT DEVELOPEMENT

4.1 Basis for Permit Effluent Limits

Per 18 AAC 83.015, the Department prohibits the discharge of pollutants to waters of the U.S. unless the permittee has first obtained a permit issued by the APDES program that meets the purposes of Alaska Statute 46.03 and is in accordance with the CWA Section 402. 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 18 AAC 70 – Water Quality Standards (WQS), and (3) comply with other state requirements that may be more stringent.

The CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBEL) or water quality-based effluent limits (WQBEL). TBELs are set via EPA rule-makings in the form of Effluent Limitation Guidelines (ELG) and correspond to the level of treatment that is achievable using available technology. There are currently no ELGs applicable to discharges from geotechnical facilities. In situations where ELGs have not been developed, or have not considered specific discharges or pollutants, a regulatory agency can develop TBELs using best professional judgment (BPJ) on a case-by-case basis. A WQBEL is designed to ensure that WQS are maintained and the waterbody as a whole is protected and may be more stringent than TBELs. In cases where both TBELs and WQBELs have been generated, the more stringent of the two limits will be selected as the final permit limit. The Permit includes only WQBELs for residues, and petroleum hydrocarbons, oil, and grease.

4.2 Technology Based Effluent Limits

There are no applicable ELGs for discharges from geotechnical facilities. Furthermore, the Department has determined that the nature of drilling fluids, including the low-toxicity fluids discussed in Section 3.2 for the EMALL Program, are not comparable to the drilling fluids in oil and gas exploration and do not warrant adopting the TBELs in 40 CFR 435 using case-by-case BPJ. As collecting and treating deck drainage is not possible on the Skate 3, the permit controls pollutant discharges using pollution prevention strategies and narrative WQBELs.

4.3 Water Quality-Based Effluent Limits

Narrative water quality criteria are appropriate for developing WQBELs for hydrocarbons, oil, and grease, and residues. For hydrocarbons, oil, and grease, 18 AAC 70.020(b)(17) stipulates that a discharge, "may not cause a film, sheen, or discoloration on the surface or the floor of the waterbody or adjoining shoreline." For residues 18 AAC 70.020(b)(20) stipulates that discharges, "may not, alone or in combination with other substances, cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines." The following sections describe how these narrative WQBELs are applied to each discharge considering the pollutant characteristics, the nature of the facility, and the EMALL Program.

4.3.1 Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor (Outfall 001)

Consistent with the Departments determination that TBELs do not apply to the drilling fluids proposed by EMALL, the use of barite, bentonite, or other fluids and additives that are commonly used in exploration drilling are prohibited for the geotechnical survey activities described in this permit. Requirements per 18 AAC 70.020(b)(17) and 18 AAC 70.020(b)(20) are applied as narrative WQBELs for Discharge 001 – Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor. Given the discharge is dependent on the removal of the riser from the seafloor, the permittee must conduct and pass a Static Sheen Test (EPA Method 1617) on a fluid sample from the mud pit prior to discharge. In addition, the permittee must make observations of the receiving water in the vicinity of the discharge point.

4.3.2 Deck Drainage (Outfall 002)

As discussed in Section 3.0, the design of the modularized Skate 3 does not allow for collection, treatment, or sampling of deck drainage. For these reasons, the Department has determined that numeric limits are infeasible because a sample cannot be collected. In cases such as these, 18 AAC 83.515 and 18 AAC 83.475 (3) state that a permit must include BMPs to control or abate the discharge of pollutants when numeric limits are infeasible. The Department finds that minimization of pollutants in this discharges can be achieved using BMPs and without using highly engineered complex treatment systems (See Section 9.2 – BMP Plans). In addition to specific BMP requirements, the permit requires observing the water surface in the vicinity of the discharge per 18 AAC 70.020 (b)(17) and 18 AAC 70.020 (b)(20).

5.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

5.1 Monitoring Requirements

APDES permits must include monitoring to determine compliance with effluent limits per 18 AAC 83.455. 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 the DEC in the End of Survey Report (Section 5.4). If the Program spans multiple seasons, the permittee must submit the previous seasons discharge monitoring reports (DMR) by January 31 and in the End of Survey Report.

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

The basis for effluent limit derivation is discussed in Section 4. The following sections summarize the effluent limits and describe monitoring requirements for each discharge in the permit.

5.2 Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor (Outfall 001)

The permit prohibits the use of drilling fluids or chemical additives that have not been identified in the application process. While discharging, the permit requires the limitation and monitoring requirements for Discharge 001 – Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor per Table 5.

Table 5: Effluent Limits and Monitoring Requirements for Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor Discharge (Outfall 001)

	Effluent Limits	Monitoring Requirements		
Parameter	**Limits**	**Sample Location**	**Sample Frequency**	**Sample Type**
Total Discharge Flow [a, b]	Report	Effluent	Each Borehole location	Estimated
Oily Sheen [c]	No Discharge	Water Surface	While Drilling	Visual
Oily Sheen [d]	No Discharge	Mud Pit	Prior to Discharge	Grab
Residues [e]	No Discharge	Water Surface	Daily	Visual

Notes:

a. The permittee must maintain a daily log while conducting geotechnical survey activities to record estimated flows and volumes, monitoring results, and visual observations. The information must be made available to DEC immediately upon request and summarized in the End of Survey Report (See Section 5.4).

b. Consistent with 18 AAC 70.250(b)(3), the permittee is prohibited from discharging at a time or location that could preclude or limit established processing activities or commercial, sport, personal use, or subsistence fish or shellfish harvesting (See Section 6.3 and 9.3).

c. The permittee must monitor for sheen by observing the surface of the receiving water in the vicinity of the discharge during daylight hours during low and high slack tides. Observations must be made while drilling and after discharge and recorded in a daily operating log. Visual sheen tests must be recorded and submitted in the End of Survey Report (See Section 5.4).

d. The permittee shall collect an effluent sample and conduct a Static Sheen Test (EPA Method 1617) prior to discharging the contents of the riser. Report the Static Sheen Test results, date and time of the sample, the geographic coordinates of the borehole and identifying name or number, and total estimated discharge volume in the End of Survey Report (See Section 5.4).

e. No discharge of floating solids, debris, sludge, deposits, foam, scum, or other residues.

5.3 Deck Drainage (Outfall 002)

Due to the infeasibility of developint numeric limits, pollutants in the discharge of deck drainage will be controlled through implementing specific BMPs per Section 9.2 and the narrative limits and monitoring requirements in Table 6.

Table 6: Effluent Limits and Monitoring Requirements for Deck Drainage Discharge (Outfall 002)

	Effluent Limits	Monitoring Requirements		
Parameter	**Limits**	**Sample Location**	**Sample Frequency**	**Sample Type**
Total Discharge Flow [a]	Report	Effluent	Monthly	Estimated
Oily Sheen [b]	No Discharge	Water Surface	Daily	Visual
Residues [c]	No Discharge	Water Surface	Daily	Visual

Notes:

a. Report estimated discharge volume of each borehole.

b. The permittee must monitor for sheen by observing the surface of the receiving water in the vicinity of the discharge during daylight hours during low and high slack tides. Observations must be made at least daily and be recorded in a daily operating log. Visual sheen tests must be recorded on monthly DMRs and submitted in the End of Survey Report (See Section 5.4)

c. No discharge of floating solids, debris, sludge, deposits, foam, scum, or other residues

5.4 End of Survey Report

The permittee is required to submit an End of Survey Report within 30 days after completing geotechnical survey activities as determined by the last day of reporting any discharge covered under the permit. The report must include discharges for Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor (Outfall 001) and for Deck Drainage (Outfall 002).

For Outfall 001 – Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor, the permittee shall report the following for each borehole and discharge:

- Beginning drill date, completion date, actual coordinate location of each borehole, and borehole diameter,
- Monthly DMRs for referenced outfall,
- The total volumes of drilling fluid created and added downhole at each site location,
- The total volumes of drilling fluid discharged to surface waters at each site location,
- The estimated fluid loss at each site (if any),
- Any unusual observations reported to DEC, and
- Any supplemental information requested by DEC.

For Outfall 002 – Deck Drainage, the permittee shall report the following:

- Monthly DMRs for referenced outfalls,
- Total estimated volumes discharge during the project season.

6.0 RECEIVING WATERBODY

Generally speaking, Cook Inlet is 120 feet deep north of the forelands and increases to 480 feet to the south, with depths of 450 feet at the forelands constriction. Cook Inlet is approximately 215 miles long and is constricted to 10 miles wide between the East and West Forelands. As depicted on Figure 1 in Appendix A, the proposed survey area will span the east and west near-shore areas from as far south as Nikiski and as far north as Beluga. The tidal

range at Nikiski was taken as a diurnal range [difference between mean higher high water level (MHHW) and the mean lower low water (MLLW) level] as determined by National Oceanic and Atmospheric Administration (NOAA) to be 20.6 ft (6.2 m). For the Upper Cook Inlet boring locations, the diurnal range of 21.0 ft (6.4 m) has been measured at North Forelands. Water depths at the boring locations range from 10 to 41 ft (3-12.5 m).

Cook Inlet is unique and noted for large tides, strong currents, extensive mudflats, high turbidity, and fluctuations in salinity due to large glacial and freshwater inputs from surrounding drainages. Near the forelands, there are three main rivers that flow into the Cook Inlet and the input of glacial silts and freshwater causes large fluctuations in salinity. Salinity has been observed to fluctuate between 21.0 to 25.6 practical saline units. The mean diurnal tidal range in Cook Inlet varies from 13.7 feet at the mouth and 29 feet at the headwaters. The resulting tidal currents create maximum observed surface currents that are generally 3.5 knots in most of Cook Inlet. However, tidal currents can be as great as 6.5 knots at the foreland constriction. All of the boring sites are dominated by strong tidal currents that tend to be bimodal in direction. A summary of bottom current information collected for the receiving waterbody near boring locations are listed in Table 7 below.

Table 7: Summary of NOAA Bottom Current Meter Data

Mooring Name	10th Percentile (m/s)	50th Percentile (m/s)	90th Percentile (m/s)
Unocal Pier	0.229[a]	0.81	1.33[a]
Nikiski Offshore	0.296[b]	1.40	2.10
East Forelands	0.404	1.57	2.20[b]
North Forelands	0.339	1.10	1.66
Beluga Shoal	0.297	0.96	1.31
Fire Island	0.375	1.23	1.67

a. Critical bottom current conditions for the Upper Cook Inlet portion of the survey.
b. Critical bottom current conditions for the Nikiski and Boulder Point portions of the survey.

6.1 Water Quality Standards

Section 301(b)(1)(C) of the CWA requires the development of limits in permits necessary to meet WQS by July 1, 1977. Regulations in 18 AAC 83.435 require that conditions in permits ensure compliance with WQS. The WQS are composed of waterbody use classifications, an antidegradation policy, numeric water quality criteria, and narrative water quality criteria. The use classification system designates the beneficial uses that each waterbody is expected to achieve. The numeric and narrative water quality criteria are deemed necessary by the state to support the beneficial use classification of each waterbody. The antidegradation policy ensures that the beneficial uses and existing water quality are maintained. The Department has determined that all marine use classes must be protected in the state waters in Cook Inlet.

Waterbodies in Alaska are designated for all uses unless the water has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some waterbodies in Alaska can also have site–specific water quality criterion per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b). The Department has determined that there has been no reclassification nor has site-specific water quality criteria been established for the Cook Inlet Geotechnical Survey area requested by the applicant. The Department has determined that all of the marine use classes must be protected in state waters in Cook Inlet.

An Ocean Discharge Criteria Evaluation (ODCE) is not required for the permit. 40 CFR 125, Subpart M requires an ODCE for a point source that occurs seaward of the baseline of the territorial sea. Because the survey area is landward of the baseline, further analysis under the ODCE regulations is not warranted.

6.2 Water Quality Status of Receiving Water

Any part of a waterbody for which the water quality does not, or is not expected to, intrinsically meet applicable WQS is defined as a "water quality limited segment" and placed on the state's impaired waterbody list. For an impaired waterbody, Section 303(d) of the CWA requires states to develop a Total Maximum Daily Load (TMDL) management plan for the waterbody. The TMDL documents the amount of a pollutant a waterbody can assimilate without violating WQS and allocates that load to known point sources and nonpoint sources.

Cook Inlet is not included on the *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report*, July 15, 2010 as an impaired waterbody nor is the subject waterbody listed as a CWA 303(d) waterbody as requiring or having a TMDL.

6.3 Mixing Zone Analysis

Per 18 AAC 70.240 – 70.270 as amended through June 23, 2003, the Department may authorize a mixing zone. The applicant submitted a mixing zone application to DEC on March 31, 2015 and indicated the potential for elevated turbidity levels while discharging from Outfall 001 - Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor. The mixing zone application provides information required by 18 AAC 70.260, including the information and available evidence necessary to demonstrate consistency with mixing zone regulations.

The applicant used the Cornell Mixing Zone Expert System (CORMIX) 9.0GTS version 9.0.0.0 mixing zone model with input data representing critical ambient conditions in Cook Inlet, estimated maximum discharge rates, and estimated effluent characteristics of the subject waste streams. The resulting study, "*AKLNG Cook Inlet G&G Boring Program*," was submitted with the application to support the request and provide information to evaluate if the requested mixing zones are appropriately sized and could be authorized by the Department.

This mixing zone study provided a breakdown of particle sizes in the discharges, including which particles are expected to settle and require a zone of deposit (cuttings) and which particles are expected to remain in suspension and require a mixing zone for turbidity (fluids). The study also provided correlations of turbidity with TSS as an easily modeled surrogate parameter for estimating the size of the turbidity plume associated with the discharge using CORMIX.

Based on evaluation of the modeling results, the Department authorizes two different sizes of chronic mixing zones for turbidity that are dependent on the regional location of the discharge. Water quality criteria will be met at the boundary of the authorized mixing zones. The rectangular shaped chronic mixing zones extend from the surface of the water to the seafloor and are centered on the point of discharge and longitudinally oriented in the prevailing current directions as described below.

Mixing Zone Location	Dilution Factor	Mixing Zone Length	Mixing Zone Width
• East side of the Cook Inlet (Nikiski area)	1500	1378 m 689 m (each direction)	88 m
• West side of the Cook Inlet (Between Beluga and Tyonek)	3000	1856m 928 m (each direction)	105 m

Appendix B, Mixing Zone Analysis Checklist, outlines criteria per mixing zone regulations that must be considered when the Department reviews an application for mixing zones. These criteria include consideration of the size of the mixing zone, treatment technology, and existing uses of the waterbody, human consumption,

spawning areas, human health, aquatic life, and endangered species. All criteria must be met in order to authorize a mixing zone. The following sections summarize the Department's regulatory mixing zone analysis.

6.3.1 Size

Per 18 AAC 70.255, the Department has determined the mixing zone sizes for the discharge of Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor (as described above) are appropriate and as small as practicable based on modeling of critical ambient and effluent conditions and meeting mixing zone regulatory requirements.

Critical ambient conditions considered in the CORMIX model are identified in the permit application and evaluate the 10th percentile low current conditions and the 90th percentile high current conditions at each of the investigation areas. On the east side of the Cook Inlet, the critical conditions were 0.229 meters per second (m/s) and 1.33 m/s respectively. On the west side, the critical current conditions used in the CORMIX model were 0.294 m/s and 2.20 m/s. Based on maximum regional water depths (Table 2) and pipe volume, the resulting discharge will range from 27.3 to 43.2 cubic feet (ft^3) or 204-323 gallons. For the purposes of modeling the most conservative scenario, the maximum discharge volume was used. The flow rate for modeling was based on the assumption that the total discharge would occur over a 30-second period resulting in a flow rate of 1.44 cubic feet per second (cfs or ft^3/s) or 646 gpm.

The volume of sediment in the discharge used for modeling is based on a four to one (4:1) mixture of geotechnical drilling fluids to drill cuttings, where the drilling fluid is a combination of guar gum and ambient seawater. The specific gravity of seawater (1.016) and the average specific gravity of sediment in Cook Inlet (2.680) are used in the CORMIX model to determine the concentration of TSS in the final mixture of sediment slurry. The percent fine fraction of TSS was modeled assuming no settling of the silt or clay components and only lateral dispersion. The total fine sediment discharge was estimated to be 48,000 mg/L, equating to 9-10% fines for the Nikiski area and 96,000 mg/L (or 18-20% fines) for Upper Cook Inlet (ICIEMAP). Based on the 4:1 ratio of seawater to sediment cuttings, and a 5.0 kilograms per cubic meter (kg/m^3) mixing proportion of guar gum to seawater, the final concentration of guar gum in the effluent discharge would be 4.0 kg/m^3.

The CORMIX model was originally designed to model the concentration of plumes as they disperse in a waterbody. The water quality criteria for turbidity is not a measurement of concentration but rather of reflected light (dependent on grain size, structure, and the refractive index). While CORMIX cannot model the turbidity it can model TSS (a measure of sediment weight). Therefore, it is necessary to convert the water quality criteria for turbidity of 25 nephelometric turbidity units (ntu) to a TSS equivalent. Although a universal relationship does not exist, a site-specific correlation between TSS and turbidity was developed specifically for Cook Inlet as part of the Knik Arm Bridge and Toll Authority (KABATA) studies (KLI 2007). This correlation is consistent with a linear relationship between TSS and turbidity determined by the USACE whereby turbidity of 25 ntu was correlated to a TSS concentration of 32.5 mg/L in settling column tests. Similarly, 25 ntu was correlated to a field value of 43.8 mg/L (Thackston and Palermo 2004). Based on the correlation to TSS, CORMIX modeled the size of the mixing zone necessary to dilute the discharged TSS concentrations from 48,000 - 96,000 mg/L to 32 mg/L. The reduction represents dilutions of 1,500 and 3,000 required to achieve water quality criteria for turbidity at the boundary of the mixing zone. The anticipated accuracy of this correlation is expected to be consistent with the accuracy of the CORMIX model and is a valid approach to modeling turbidity.

Using the calculations, critical conditions, and correlations discussed above, the modeling results indicate that the plume is controlled primarily by the geometry of the discharge in relation to the seafloor. The near-field flow was dominated by the negative buoyancy of the effluent and the short distance between the outfall and the seafloor. Due to the negatively buoyant plume and discharge direction, the plume will exit the riser in a downward trajectory and immediately contact the bottom. The models evaluated by the Department indicate that TSS was found to disperse much more rapidly as a result of increased energy available for near-field mixing during the 90th percentile currents (high-current scenarios). The low (10th percentile) current scenarios represent the most conservative case where the flow of discharge remains attached to the bottom due to its negative buoyancy, and disperses both vertically and laterally as it approached the mixing zone boundary.

The Department is authorizing two area-dependent mixing zones. One is specific to the East side of the Cook Inlet (Nikiski area). The second mixing zone is specific to the West side of the Cook Inlet (Between Beluga and Tyonek). As the mixing dimensions described in Section 6.2 were determined using critical effluent, receiving water conditions, and near worse-case discharge scenarios, turbidiy water quality criteria will be met at the boundary of all mixing zones authorized by the Permit. Based on the nature of the pollutants in the discharge of Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor, no lethality to passing organisms is expected (Section 3.1). Lastly, the drilling fluids in the discharge do not contain concentrations of pollutants that pose a risk of bioaccumulation or bioconcentration. Aquatic life and human health are protected and the mixing zone is as small as practicable (see Section 6.3.4 and 6.3.6).

6.3.2 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" before authorizing a mixing zone.

Applicable "highest statutory and regulatory requirements" are defined in 18 AAC 70.990(30) [2003]. Accordingly, there are three parts to the definition, which are:

- 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;
- Minimum treatment standards in 18 AAC 72.040; and
- Any treatment requirement imposed under another state law that is more stringent than the requirement of this chapter.

The first part of the definition includes all applicable federal technology-based ELGs. No applicable ELGs as documented in Section 4.2. In addition, the nature of the discharges from the EMALL Geotechnical Program are not comparable to those used in oil and gas drilling such that development of TBELs using case-by-case BPJ siting 40 CFR 435 is appropriate. The Department has determined that prohibitions, BMPs, and narrative WQBELs are the most effective and technologically and economically feasible methods to control the pollutant discharges from the EMALL Geotechnical Program.

The second part of the definition from the WQS 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 for domestic wastewater. The EMALL Geotechnical Program will not have a domestic wastewater discharge and therefore this part of the definition does not apply.

The third part of the definition includes any treatment required by state law that is more stringent than 18 AAC 70. Other regulations beyond 18 AAC 70 that may apply to this permitting action include 18 AAC 83, 18 AAC 72 and 18 AAC 15. The permit prohibitions and BMP requirements are consistent with 18 AAC 83. In addition, neither the regulations in 18 AAC 15 nor another state legal requirement that the Department is aware of impose more stringent treatment requirements than 18 AAC 70 besides those in 18 AAC 72, which are addressed in the paragraph above.

6.3.3 Existing Use

Per 18 AAC 70.245, time-area prohibitions associated with known fisheries have been established and the mixing zone has been appropriately sized to fully maintain and protect existing receiving water uses. The discharge volumes and ambient receiving water characteristics at the discharge location have been examined to ensure the biological integrity of Cook Inlet is protected. Reportedly, several borehole sites are located within or near the boundaries of set net leases. In order to ensure the discharge neither partially nor completely eliminates existing uses of the waterbody as a fishery, the permit prohibits discharges near set net leases, subsistence, sport fishing, shellfish harvesting, and processing locations during respective fishery openings. In addition, the volume and type of effluent discharged, the large tidal fluctuations and flushing occurring in Cook Inlet, and the short durations the mixing zones will be present, forms the basis of the Determination that the mixing zones are appropriately sized and restricted, such that existing uses and biological integrity of the waterbody will be maintained and fully protected under the terms of the permit as required in 18 AAC 70.245 (a)(1) and (a)(2).

6.3.4 Human Consumption

Per 18 AAC 70.250(b)(2) and (b)(3), the subject pollutants will not produce objectionable color, taste, or odor in aquatic resources harvested for human consumption, nor will the discharge preclude or limit established processing activities or commercial, sport, personal use, or subsistence fish and shellfish harvesting. The drilling fluids proposed by the EMALL Geotechnical Program do not contain pollutants that are expected to produce objectionable color, taste, or odor in aquatic resources. Significant flushing in Cook Inlet is expected to rapidly disperse the low-volume discharges predominately composed of turbidity pollutants. See Section 6.3.3 for time-area prohibitions to protect fishery uses.

6.3.5 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 reds 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.

6.3.6 Human Health

Per 18 AAC 70.250 and 18 AAC 70.255, the mixing zone shall be protective of human health and will not result in pollutants discharged at levels that will bioaccumulate, bioconcentrate, or persist above natural levels in sediments, water, or biota or at levels that otherwise will create a public health hazard through encroachment on a water supply or contact recreation uses. As discussed in Section 6.3.4, pollutants discharged will not produce objectionable color, taste, or odor in aquatic resources harvested for human consumption. Furthermore, due to the time-area restriction around fishery lease areas, the pollutants discharged will not preclude or limit established processing activities of commercial, sport, personal-use, or subsistence fish and shellfish harvesting.

An analysis of the wastewater characteristics of the drilling fluids indicate no direct or indirect human health concerns and the mixing zone application indicates the proposed drilling fluids and drill cuttings discharges as controlled by Permit limitations and requirements, are protective of human health.

6.3.7 Aquatic Life and Wildlife

Per 18 AAC 70.250(a)(2)(A-C), 18 AAC 70.250(b)(1), 18 AAC 70.255(g)(1) and (2), and 18 AAC 70.255(b)(1) and (2), 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, permanent or irreparable displacement of indigenous organisms, or a reduction in fish or shellfish population levels. The temporary exceedance in turbidity will not result in lethality base on the toxicity results discussed in Section 3.1. Therefore, no acute mixing zones are necessary (18 AAC 70.255). The mixing zones were determined using critical effluent and receiving water conditions and are as small as practicable. Based on there being no lethality to drifting organisms (Section 3.1), low discharge volume at the seafloor, tidal fluctuations at the point of discharge, and short discharge durations, the Department concludes aquatic life and wildlife will be maintained and protected.

6.3.8 Endangered Species

Per 18 AAC 70.250(a)(2)(D), the mixing zone is not expected to cause an adverse effect on threatened or endangered species. Impacts to overall water quality, and any threatened or endangered species therein, are not expected based on the discharge characteristics and the extreme tidal fluctuations associated with the receiving water. The National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) indicated that there are two listed endangered species. The following endangered species may occur in Cook Inlet in the vicinity of the discharge: Cook Inlet Beluga Whale (*Delphinapterus leucas*) and Stellar Sea Lion (*Eumetopias jubatus*). See Section 11.3 and 11.4 for more information on endangered species.

6.4 Zone Of Deposit

The Department authorizes a 16-meter radius zone of deposit for each borehole centered over the point of discharge at the seafloor. Per 18 AAC 70.210(b), the Department reviewed information provided by the applicant to make the determination for a zone of deposit. The deposit will be composed of naturally occurring sand and gravel cuttings from the borehole with trace amounts of drilling fluids attached to the surface of the particles. The permit prohibits the use of chemical additives and the discharge of hydrocarbons, oil, and grease. Per Sections 6.3.3 through 6.3.7, the characteristics of the drilling fluids have no potential to have a direct or indirect impact on human health, bioaccumulate, persist in the environment, or have impacts on aquatic life. The deposit is expected have a short duration. Due to the tidal currents in the vicinity, the zone of deposit will be dispersed by the high energy tidal currents over the course of several tidal cycles. In order to ensure the use of the waterbody as fishery is protected, a time-area restriction is imposed that corresponds the location and timing of the fish or shellfish harvesting activity. The Department has determined the nature and duration of the deposit is not expected to adversely impact the receiving water and the uses of the waterbody beyond the boundary of the authorized zone of deposit are not impacted due to the time-area restriction imposed by the permit.

7.0 ANTIBACKSLIDING

State regulation 18 AAC 83.480 requires that “effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, 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.”

Effluent limitations may be relaxed as allowed under 18 AAC 83.480, CWA §402(o) and CWA §303(d)(4). Per 18 AAC 83.480(b), relaxed limitations are allowed in renewed, reissued, or modified permits when there have been material and substantial alterations or additions to the permitted facility that justify the relaxation or if the Department determines that technical mistakes were made.

CWA §303(d)(4)(A) states that, for waterbodies where the water quality does not meet applicable WQS, effluent limitations may be revised under two conditions; the revised effluent limitation must ensure the attainment of the WQS (based on the waterbody TMDL or the waste load allocation) or the designated use which is not being attained is removed in accordance with the WQS regulations. CWA §303(d)(4)(B) states that, for waterbodies where the water quality meets or exceeds the level necessary to support the waterbody's designated uses, WQBELs may be revised as long as the revision is consistent with the State's antidegradation policy. Even if the requirements of CWA §303(d)(4) or 18 AAC 83.480(b) are satisfied, 18 AAC 83.480(c) prohibits relaxed limits that would result in violations of WQS or ELGs.

State regulation 18 AAC 83.480(b) only applies to effluent limitations established on the basis of CWA Section 402(a)(1)(B), and modification of such limitations based on effluent guidelines that were issued under CWA Section 304(b). Accordingly, 18 AAC 83.480(b) applies to the relaxation previously established case-by-case TBELs developed using BPJ. To determine if backsliding is allowable under 18 AAC 83.480(b), the regulation provides five regulatory criteria (18 AAC 83.480[b][1-5]) that must be evaluated and satisfied.

This is the first issuance of this permit, therefore an antibacksliding analysis is not warranted.

8.0 ANTIDEGRADATION

Section 303(d)(4) of the CWA states that, for waterbodies where the water quality meets or exceeds the level necessary to support the waterbody's designated uses, WQBELs may be revised as long as the revision is consistent with the State's antidegradation policy. The antidegradation policy per 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 of the fact sheet 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 Department's *Policy and Procedure Guidance for Interim Antidegradation Implementation Methods, July 14, 2010 (Interim Methods)*. Using these requirements and policies, the Department determines whether a waterbody or portion of a waterbody 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 waterbodies are not eligible for coverage under the permit and would require individual permit coverage. The receiving water for the discharges from the EMALL Geotechnical Program is Cook Inlet, which is a Tier 2 water.

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). Per 18 AAC 70.015(a)(2), 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.

In 2009 and 2010, an Alaska Economic Performance Report written by the Department of Commerce, Community, and Economic Development (DCCED) indicates that Alaska's 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 industry also supports local economies by purchasing significant amounts of equipment, parts, fuel, food, freight, and other services. The Alaska LNG project serves to provide significant benefits to Alaskans statewide.

In addition, Alaska's Department of Natural Resources (DNR) tracks oil and gas activity in the State when it develops findings for lease sales (DNR, 2011). The January 2009 Best Interest Finding for the lease sale in Cook Inlet 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.

- The Alaska state-wide economy depends heavily on revenues related to petroleum development, which totaled $4.57 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.

- Oil and gas is an important component of revenues to support government services to Alaskans. At the end of the state's fiscal years of 2007 and 2012, oil and gas revenues represented 88 and 83 percent of the total revenue to the state, respectively.

- Overall, this spending generated 33,600 jobs, $1.4 billion in payroll, and added value to the Alaska economy of $1.8 billion for total output of $3.1 billion in 2007. Oil and gas accounts for 12 percent of private sector jobs and 20 percent 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 (in 2007).

- In the Matanuska-Susitna Borough, it is estimated that over 350 residents are employed by the oil and gas industry with an average monthly wage of $8,382. The economic impact of the oil and gas industry in the Matanuska-Susitna Borough was an additional 2,105 jobs for Matanuska-Susitna residents, with a payroll of $84 million. The induced impacts were 1,558 jobs and $38 million in payroll. Total economic impact was estimated to be 4,016 jobs and $158 million for the Matanuska- Susitna Borough.

- In Anchorage, it is estimated that about 2,400 workers are employed by the oil and gas industry. Estimated total payroll is over $239 million with an additional $845 million in goods and services in the Anchorage economy. Indirect impact of the oil and gas industry is estimated to be 11,600 jobs and $431 million in payroll, with an induced impact of 2,320 jobs and $69 million in payroll.

- The oil and gas industry has been important to the economy of the Kenai Peninsula for over 40 years, and five of the top 10 employers are connected to the oil and gas industry. Direct impact of the oil and gas industry has been estimated at 674 jobs with a payroll of $63 million. Indirect economic impacts are estimated to be an additional 2,822 jobs and $94 million in payroll. The induced impacts were 777 jobs and $20 million in payroll. Total economic impact on the Kenai Peninsula was 4,273 jobs and $177 million in payroll, which was 26 percent of the area's employment and 36 percent of the area's payroll. Taxable properties for the oil and gas industry were reported at $607 million, and 8 of the top 10 property tax payers in the borough were oil and gas industry companies.

- In anticipation of the AK LNG Project, Agrium Corporation has entered into a cost reimbursement agreement with Alaska Industrial Development and Energy Authority (AIDEA) and is in the process of

obtaining permits needed for the restart of the plant. Prior to closure due to dwindling natural gas supplies in 2007, Agrium's Kenai facility provided an economic multiplier of over 9 dollars for every million cubic feet (mcf) of gas consumed at the plant or an annual 350 million dollar economic benefit (at its lowest operating point). The plant provided over 650 direct and indirect, high-paying, skilled year-around manufacturing jobs (McDowell Group). The AK LNG Project will support the restart of Agrium that will reclaim these socio-economic benefits in the vicinity of the discharge.

- The AK LNG Project will create approximately 15,000 jobs during the construction phase, and an estimated 1,000 full-time jobs during operation. The influx of construction workers during the project will also provide indirect economic benefits (Alaska LNG Project – Preliminary Resource Report 1, 2014). The new pipeline will establish the infrastructure needed to enable the commercialization of the vast natural gas resources discovered on Alaska's North Slope in 1968 and thereafter. The AK LNG Project will span from the North Slope to local markets across Alaska, and finally to a new LNG plant in Nikiski, Alaska for distribution to foreign export markets. In Nikiski, the estimated peak construction workforce for AK LNG Plant could exceed 5,000 workers and 1,500 workers for the marine terminal during the seven-year construction period. Once operating, the AK LNG Plant and marine terminal estimate needing 350 full-time personnel. (Alaska LNG Project – Preliminary Resource Report 1, 2014).

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.*

All applicable criteria found in 18 AAC 70.020 are met at the boundaries of the authorized mixing zones, ensuring that the quality of the waterbody as a whole is protected and maintained.

The two fluids systems selected as options for the EMALL Geotechnical Program to modify viscosity are Pure Bore and Secovis (guar gum seeds) with seawater. The geotechnical survey discharges at the seafloor will result in a temporary zone of deposit and an authorized chronic mixing zone for turbidity that has been sized to ensure the applicable turbidity water quality criterion is met at the boundaries of the mixing zones.

Note that 18 AAC 70.235 pertains to site-specific criteria and site-specific criteria have not been developed for the waterbody in the vicinity of the EMALL Geotechnical Program. In addition, 18 AAC 70.030 pertains to WET limits and there are no WET limits or monitoring requirements contained in the permit. An SPP Toxicity test was conducted and submitted to DEC during the application process that verified that the drilling fluids are not acutely toxic. Water quality criteria for the discharges will be met at the boundary of the chronic mixing zones and applicable criteria will not be violated.

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.*

As previously mentioned, Cook Inlet is protected for all marine use categories per 18 AAC 70.020(a)(2)(A-D). The tidal currents anticipated at the discharge locations for Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor are expected to result in rapid disperal of turbidy. The mixing zones for turbidy have been sized to ensure water quality criteria are met at the boundary of the mixing zone.To ensure the discharge of Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor do not affect existing uses, a time-area restriction is imposed that corresponds the location and timing of the fish or shellfish harvesting activity. The limitations and requirements of the permit ensure that existing uses established in the WQS for Cook Inlet will be protected.

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 two categories:

A. Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor
B. Deck Drainage

A. <u>Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor:</u> As discussed in Section 6.3.2, the Department has determined that prohibitions, BMPs, and narrative WQBELs are the most effective and technologically and economically feasible methods to control the pollutant discharges from the EMALL Geotechnical Program. The limitations imposed on Geotechnical Drilling Fluids and Drill Cuttings at the Seafloor (Outfall 001) in the permit rely on effective and reasonable pollution prevention strategies that minimize the volume of discharge and prohibit the use of toxic chemicals. The permittee is limited to the use of drilling fluids that were identified and tested during the permit application process. Substitution of unapproved base fluids or additives that may increase toxicity or have hydrocarbons, oil, and grease is prohibited. The Permit prohibits the discharge of oil as determined by visual observation on the receiving water and a Static Sheen Test (EPA Method 1617). The prohibition on discharge of hydrocarbons, oil, and grease for all discharges protects aquatic life and human health and welfare. The permitee will limit the discharge volume by containerizing all drill cuttings for onshore disposal and recirculating drilling fluids. Discharges resulting from Outfall 001 will be no greater than the volume of the pipe as it is removed from the seafloor.

B. <u>Deck Drainage:</u> The Department considers prohibiting the discharge of residues, hydrocarbons, oil, and grease to be the most effective and reasonable treatment and pollution control techniques for these discharges. The modular deck design of the platform does not allow for the collection and treatment of rain and wash-down water from the deck area. The Department has determined that this constraint makes development of numeric limits infeasible. Therefore, the Permit includes implementation of specific BMP requirements to ensure that residues, hydrocarbons, oil, and grease, and other pollutants do not come in contact with rain or wash water to prevent the discharges of oil in quantities that pose a risk to the environment or human health. The quantity of oil that may be harmful to human health is defined by 40 CFR 110.3 as a discharge that causes a sheen or discoloration on the receiving water.

Each waste stream is controlled by implementing practicable and effective pollution prevention and control strategies as the most effective and reasonable methods. 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.*

Applicable "highest statutory and regulatory requirements" are defined in 18 AAC 70.990(30), as amended through June 26, 2003, and *Interim Methods*. Accordingly, there are three parts to the definition, which are:

- 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;
- Minimum treatment standards in 18 AAC 72.040; and
- Any treatment requirement imposed under another state law that is more stringent than requirement of this chapter.

The first part of the definition includes all any established TBELs. The permit contains no TBELs because there is no national industrial category for geotechnical survey discharges or other ELGs with similar discharges or pollutants to inform a case-by-case TBEL by BPJ. The Department determined that WQBELs and pollution control strategies adequately control the pollutant discharges. Accordingly, all limits contained in his permit are narrative WQBELs.

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 for domestic wastewater. There will be no domestic wastewater discharged from the geotechnical facility. Therefore, 18 AAC 72.050 does not apply.

The third part of the definition includes any treatment required by state law that is more stringent than 18 AAC 70. Other regulations beyond 18 AAC 70 that may apply to this permitting action include 18 AAC 83, 18 AAC 72 and 18 AAC 15. The permit is consistent with 18 AAC 83. Further, neither the regulations in 18 AAC 15 nor another state law that the Department is aware of, impose more stringent treatment requirements than 18 AAC 70 besides those in 18 AAC 72, which are addressed in the paragraph above. All limits contained within this permit are controlled by 18 AAC 70.

The Department has determined that the treatment of the discharge conforms to the highest statutory and regulatory requirements and the finding is met.

9.0 OTHER PERMIT CONDITIONS

9.1 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 update the Quality Assurance Project Plan (QAPP) within 30 days prior to discharge. The permittee must submit a letter to the Department within 30 days stating that the plan has been implemented within the required time frame. The QAPP shall consist of standard operating procedures the permittee must follow for collecting, handling, laboratory analysis, data reporting, storing, and shipping samples. The plan shall be retained onsite and made available to the Department upon request.

9.2 Best Management Practices Plan

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 U.S. 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 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 that achieves the overall objectives and specific requirements to prevent or minimize the generation and release of pollutants during geotechnical activities. The permit contains specific BMP requirements for controlling pollutant sources that could be discharged with rain and wash-down water from the facility and to minimize to the extent practicable the volume of the drilling fluids and drill cuttings discharge at the seafloor. BMP's will include the use of secondary containment around equipment or fuel, availability of spill kits, and sweeping the deck prior to any wash-down operations to minimize any discharge of sediment, drilling fluids and drill cuttings. BMPs will also identify potential pollutant sources and aid in eliminating any contaminated discharges.

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 requirements described in the permit. The permit requires the permittee to develop or update and implement a BMP Plan within 30 days prior to initiating a discharge. The permittee must submit a letter to the Department within 120 days of the effective date of the permit certifying that the BMP Plan has been implemented. The BMP Plan must be kept onsite and made available to the Department upon request.

9.3 Time-Area Restrictions

Twenty of the forty-two borehole locations are within set net fishery lease areas in the Cook Inlet, and several other borehole locations could potentially have a mixing zone that could encroach on a fishery lease area. Fishery lease maps with borehole locations are depicted for each area in Figures 2-4, Appendix A. The Department establishes a time-area restriction on discharges to ensure existing and designated uses are not adversely impacted. Consistent with 18 AAC 70.250 (b)(3), the permittee is prohibited from discharging at a time or location that could preclude or limit established processing activities or commercial, sport, personal use, or subsistence fish or shellfish harvesting.

9.4 Termination of Permit

The Permit is scheduled to expire five years from the effective. However, upon completion of the EMALL Geotechnical Program described in Table 2, the permittee is expected to request termination of the permit per 18 AAC 83.130 (a) once all reporting requirements have been met. DEC will not terminate the permit if any enforcement actions pertaining to permit violations are pending.

10.0 OTHER LEGAL REQUIREMENTS

10.1 Endangered Species Act

The Endangered Species Act (ESA) requires federal agencies to consult with the NOAA National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (U.S. FWS) 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 voluntarily requested information from these Federal Services on April 6, 2015 and has not received a response. Following previous suggestions from NMFS for other permits in the Cook Inlet area, the Department searched *http://alaskafisheries.noaa.gov/mapping/esa/* and *http://alaskafisheries.noaa.gov/protectedresources/esa/ak_specieslst.pdf* to find there are four listed species and three species have critical habitat in Cook Inlet. The following threatened and endangered species occur in Cook Inlet[1] and are potentially affected by discharges covered under the permit:

10.1.1 Steller sea lion (*Eumetopias jubatus*)-Endangered: The NMFS listed the Steller sea lion as threatened on November 6, 1990 (55 FR 12645). On May 5, 1997, the NMFS issued a final rule that reclassified Steller sea lions into two distinct population segments (62 FR 24355). There is critical habitat for Steller sea lion within Cook Inlet at Cape Douglas, the Barren Islands, Port Chatham, and at the extreme southern end of Cook Inlet. There is additional critical habitat including rookeries, haulouts, and marine foraging areas for the western population stock in areas near Shelikof Strait, and areas along the southern side of the Alaska Peninsula (MMS 2003)

[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 January 14, 2013.

10.1.2 Beluga whale (*Delphinapterus leucas*) Endangered: Beluga whales are divided into five stocks: Cook Inlet, Bristol Bay, eastern Bearing Sea, eastern Chukchi Sea, and Beaufort Sea (NMFS 2003). The Cook Inlet stock is classified as the most vulnerable, which led to listing the population as endangered under the ESA (73 FR 62919) on October 22, 2008 and followed by designating critical habitat in Cook Inlet on April 11, 2011 (76 FR 20180). The Cook Inlet population is the most isolated stock, spending the entire year in Cook Inlet and the majority of the time in the northern portion of Cook Inlet. The critical habitat areas are prioritized according to levels of sensitivity. The permit coverage area excludes the highly sensitive habitat of the beluga whale.

10.1.3 Northern sea otter (*Enhydra lutris kenyoni*) Endangered: The USFWS issued a final rule listing the southwest Alaska distinct population segment of the northern sea otter as threatened under the ESA on August 9, 2005 (70 FR 46366). Designated habitat areas in Cook Inlet range along the west side from Shelikof Strait to Tuxedni Bay. These areas contains all the elements necessary for the conservation of the southwest Alaska northern sea otter population and thus is subject to special management considerations and protections to minimize the risk of oil and other hazardous-material spills from commercial shipping (74 FR 51988). The permit coverage area overlaps with habitat areas from Chinitna Point to Tuxedni Bay

10.1.4 Steller's eider (*Polysticta stelleri*) Threatened: The Alaskan breeding populations of Steller's eider were listed as threatened under the ESA on June 11, 1997 (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. There is no critical habitat in Cook Inlet.

According to NMFS, the Cook Inlet beluga whales (Delphinapterus leucas) and the Steller sea lion (Eumetopias jubatus) are the only Endangered Species Act (ESA) -listed marine mammal species of concern. The endangered western distinct population segment (DPS) of Steller sea lions and endangered Cook Inlet beluga whales occur regularly in Cook Inlet. Endangered humpback and fins also are observed in Cook Inlet, but rarely north of Anchor Point. The area near the planned pipeline route is also within designated critical habitat for the Cook Inlet belugas. Several listed species of chinook and possibly Coho salmon of origin in the Pacific Northwest occur in the Gulf of Alaska and probably in Cook Inlet, but there is no specific information on their occurrence or distribution at the proposed permitted locations. More information can be found on the following website: *http://alaskafisheries.noaa.gov/protectedresources/esa/*

According to FWS, "northern sea otters (*Enhydra lutris kenyoni*) occupy near shore marine habitat along the southwestern portion of Cook Inlet, and near shore marine areas from Redoubt Point south are designated as critical habitat (2012)." The northern sea otter are not expected in the project area.

10.2 Essential Fish Habitat

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 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 5 provides a summary of the EFH species within the permit coverage area.

10.3 Permit Expiration

The permit will expire five years from the effective date of the permit if the permitee does not request early termination (Section 9.4).

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APPENDIX A. FIGURES

Figure 1. Area of Coverage Map

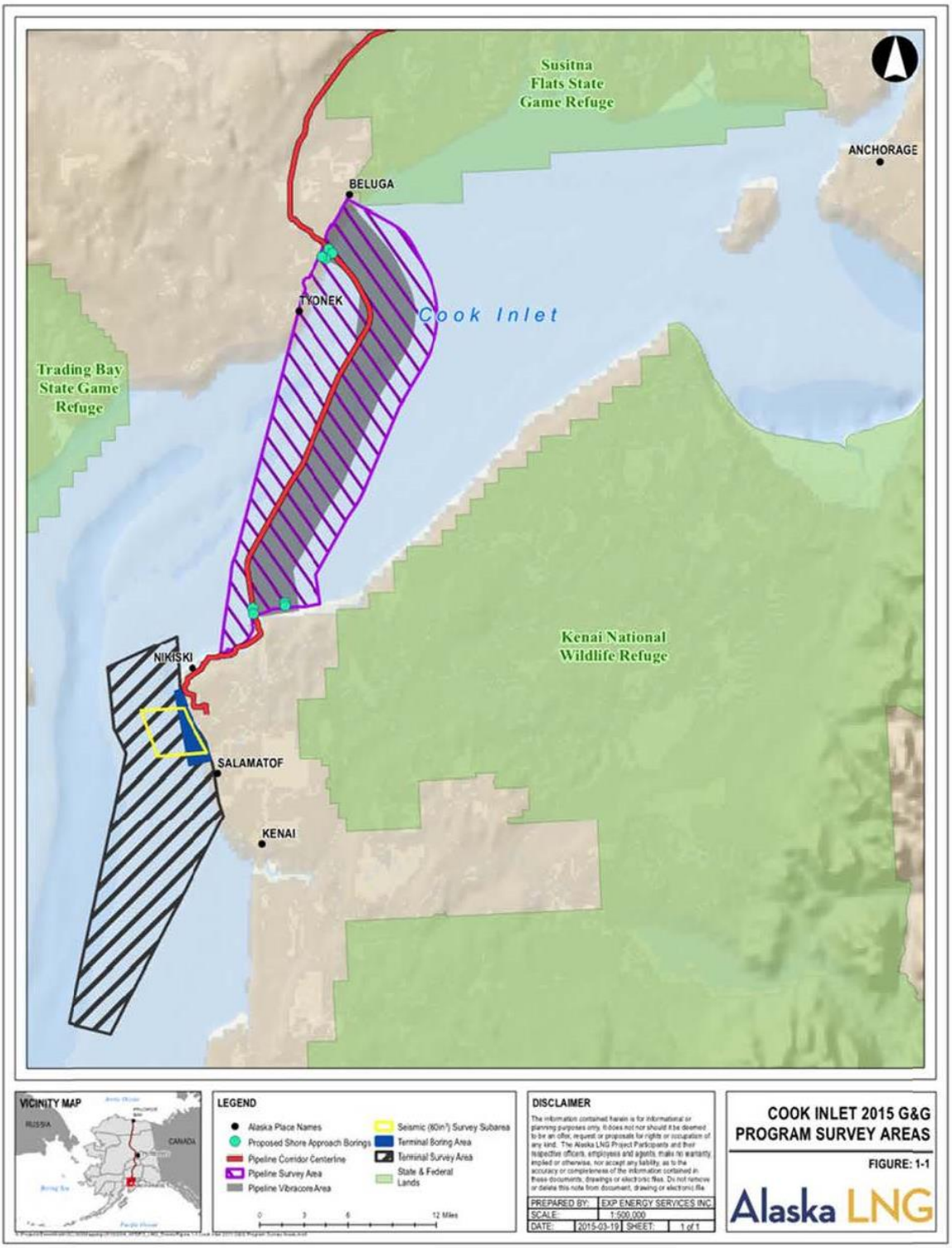


Figure 2. North Cook Inlet Landfall Area

Figure 3. South Cook Inlet Landfall Area

Figure 4. Nikiski LNG Marine Terminal Area

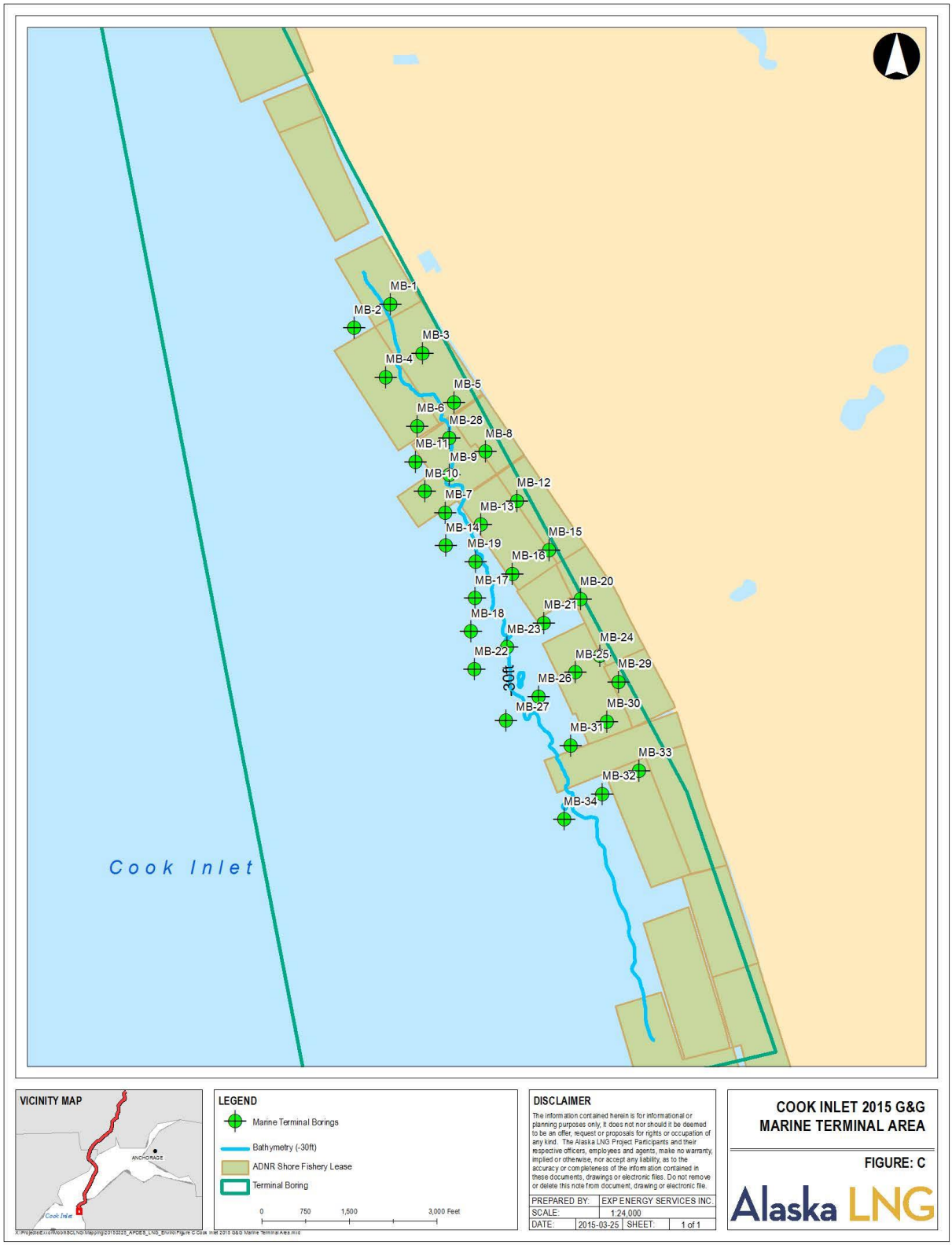
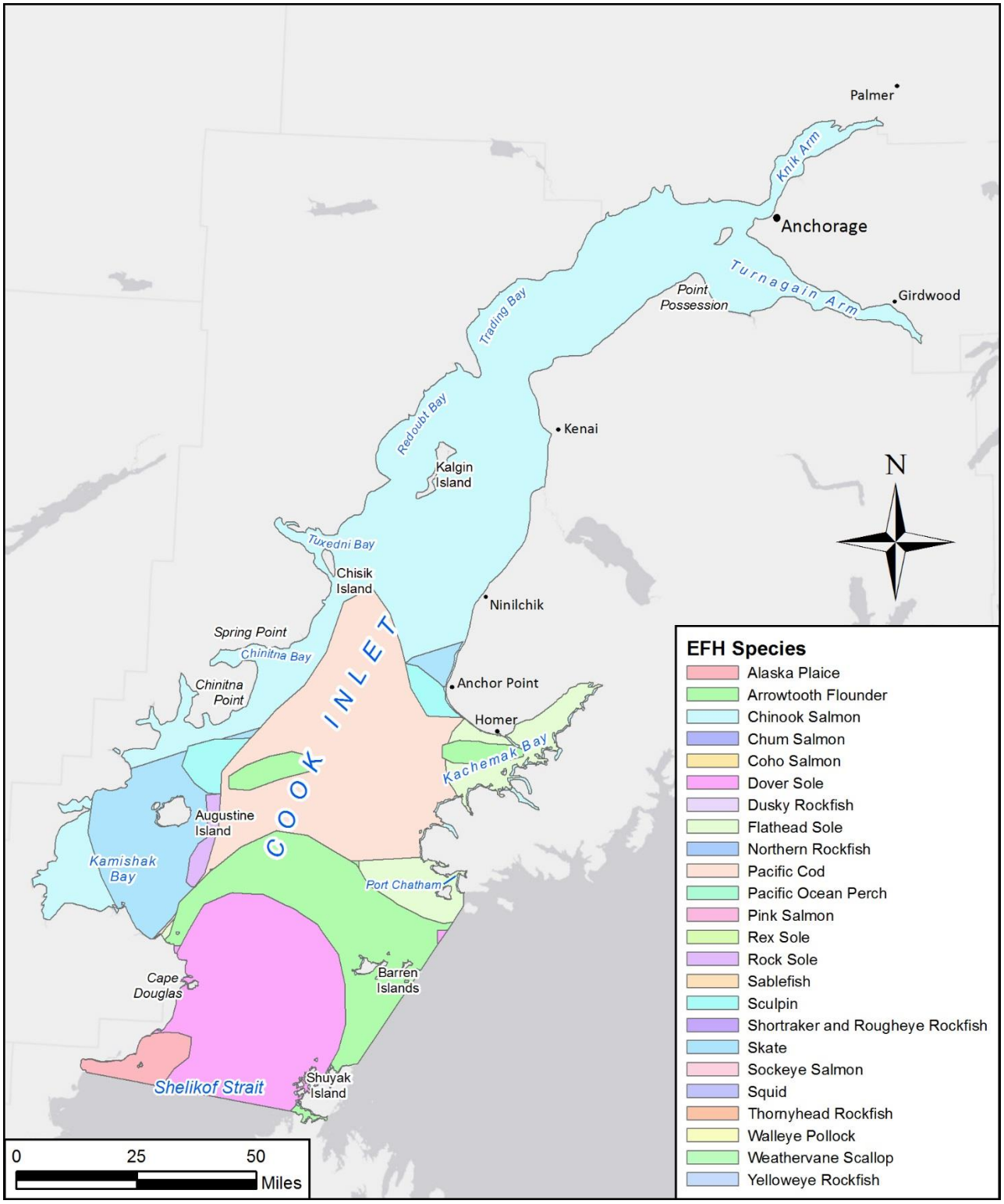


Figure 5. Cook Inlet Fish Habitat



APPENDIX B. MIXING ZONE 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 6.3 Mixing Zone Analysis	Yes, mixing zone as small as practicable. Technical Support Document for Water Quality-Based Toxics Control •Fact Sheet, Section 6.3 • Fact Sheet, Section 6.3.1 • 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)
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 5.3 Mixing Zone Analysis.	Answer: Yes Fact Sheet, Section 6.3.2	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 waterbody outside the mixing zone? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 6.3.3	18 AAC 70.245(a)(1)
	(2) Impair overall biological integrity of the waterbody? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 6.3.4	18 AAC 70.245(a)(2)

	(3) Provide for adequate flushing of the waterbody to ensure full protection of uses of the waterbody outside the proposed mixing zone? **If no, then mixing zone prohibited.**	Answer: Yes Fact Sheet Section 6.3.3	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 6.3	18 AAC 70.250(a)(4)
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 6.3.4	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 6.3.4	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 6.3.5	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 6.3.6	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 6.3.6	
	(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 6.3.6	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 6.3.6	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 6.3.6	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 6.3.7	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 6.3.7	
	(3) Fail to provide a zone of passage? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 6.3.7	
	(4) result in undesirable or nuisance aquatic life? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 6.3.7	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 6.3.7	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 6.3.7	18 AAC 70.255(g)(2)
	(7) Prevent lethality to passing organisms by reducing the size of the acute zone? **If yes, mixing zone prohibited.**	Answer: No Fact Sheet Section 6.3.7	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 6.3.7	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 6.3.8	Program Description, 6.4.1 #5 18 AAC 70.250(a)(2)(D)