ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT FACT SHEET – DRAFT

Permit Number: AK0021555

City of Kodiak Wastewater Treatment Facility

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Wastewater Discharge Authorization Program

555 Cordova Street

Anchorage, AK 99501

Public Comment Period Start Date: February 26, 2024
Public Comment Period Expiration Date: March 26, 2024

Alaska Online Public Notice System

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

CITY OF KODIAK

For wastewater discharges from the

City of Kodiak Wastewater Treatment Facility
2853 Spruce Cape Road
Kodiak, AK 99615

The Alaska Department of Environmental Conservation (the Department or DEC) proposes to reissue an APDES individual permit (permit) to the City of Kodiak. The permit authorizes and sets conditions on the discharge of pollutants from this facility 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 the facility and outlines best management practices to which the facility must adhere.

This fact sheet explains the nature of potential discharges from the City of Kodiak Wastewater Treatment Facility (WWTF) and the development of the permit including:

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

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 Alaska Administrative Code (AAC) 15.185.

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.

Appeals Process

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 20 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
Mail: P.O. Box 111800 Juneau, AK 99811
In Person: 333 Willoughby Avenue
Juneau, AK 99811

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

See https://dec.alaska.gov/commish/review-guidance/informal-reviews 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
Mail: P.O. Box 111800
Juneau, AK 99811
In Person: 555 Cordova Street
Anchorage, AK 99501

Interested persons can review 18 AAC 15.200 for the procedures and substantive requirements regarding a request for an adjudicatory hearing. See http://dec.alaska.gov/commish/review-guidance/adjudicatory-hearing-guidance for information regarding appeals of Department decisions.

Documents are Available

The permit, fact sheet, application, 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, application, and other information are located on the Department's Wastewater Discharge Authorization Program website: https://dec.alaska.gov/water/wastewater/.

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 **Mail**: P.O. Box 111800 **In Person**: 333 Willoughby Avenue Juneau, AK 99811-1800 (907) 465-5180

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1.0 INTRODUCTION

1.1 Applicant

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

Permittee:	City of Kodiak
Facility:	Kodiak Wastewater Treatment Facility
APDES Permit Number:	AK0021555
Facility Location:	2853 Spruce Cape Road, Kodiak, AK 99615
Mailing Address:	2410 Mill Bay Road, Kodiak, AK 99615
Facility Contact:	Mr. Severin Reed

1.2 Authority

Section 301(a) of the Clean Water Act (CWA) and AAC 18 AAC 83.015 provide that the discharge of pollutants to water of the U.S. is unlawful except in accordance with an APDES permit. The individual permit reissuance is being developed per 18 AAC 83. 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 Statutes (AS) 46.03.760 and AS 46.03.761.

1.3 Permit History

The Environmental Protection Agency (EPA) issued the City of Kodiak (Kodiak) their first National Pollutant Discharge Elimination System (NPDES) permit for the Kodiak WWTF in 1974. In 1978, Kodiak applied for CWA Section 301(h) waiver from secondary treatment standards. EPA granted Kodiak the waiver and reissued the permit in 1985 with the waiver from secondary treatment standards. In 1987, Kodiak requested the rescindment of the 301(h) waiver as they had determined to operate as a secondary treatment plant. EPA subsequently modified the Kodiak WWTF permit in 1988 to include secondary treatment standards. EPA reissued the permit in 1999.

DEC reissued the 1999 NPDES permit under the APDES program in 2018 for a five-year permit term. Under the Administrative Procedures Act and state regulations at 18 AAC 83.155(c), an APDES permit may be administratively extended (i.e., continues in force and effect) provided that the permittee submits a timely and complete application prior to the expiration of the current permit. A timely and complete application for a new permit was submitted by the City in December 2022; therefore, the 2018 permit is administratively extended until such time a new permit is reissued.

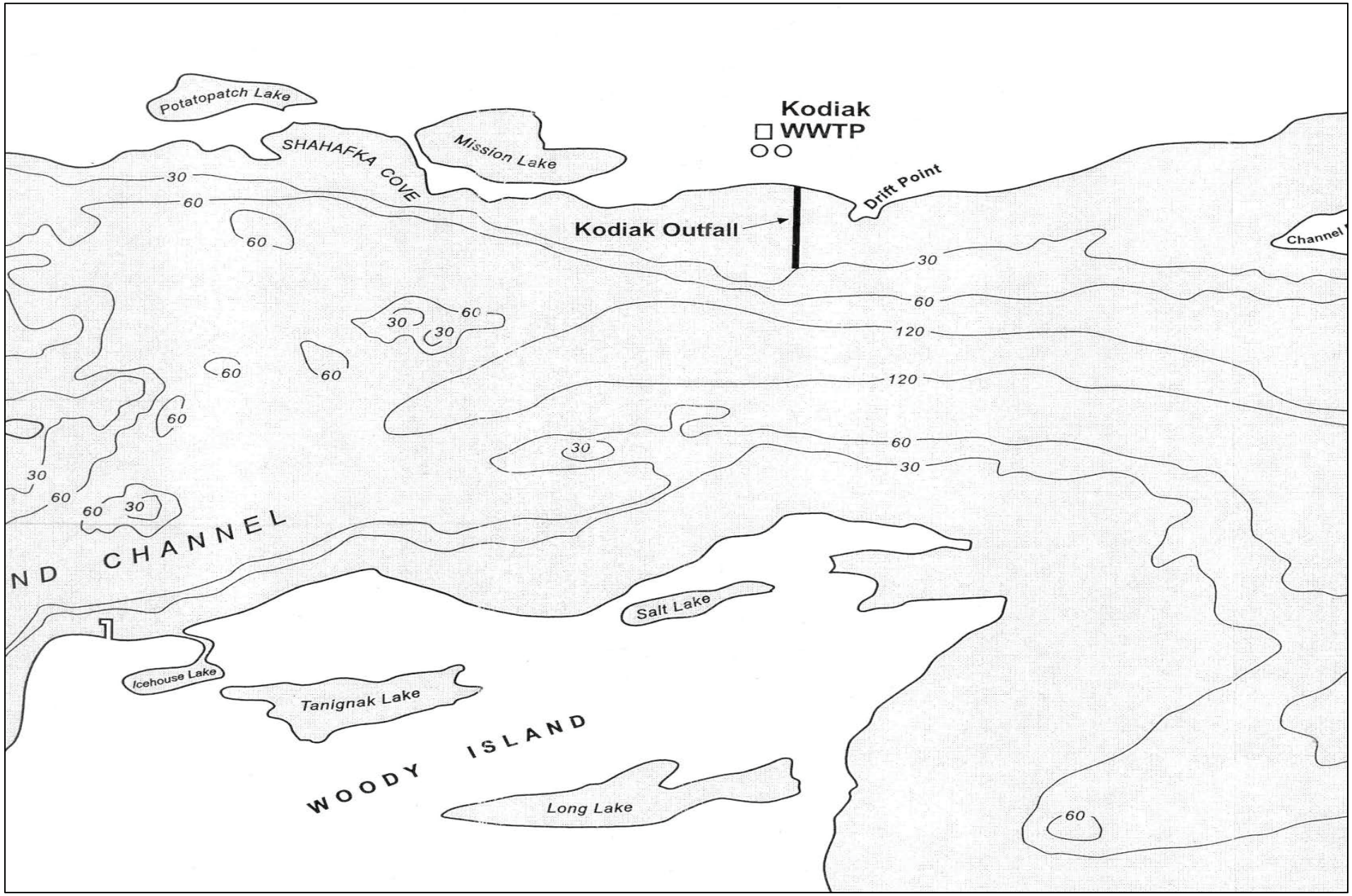
2.0 BACKGROUND

2.1 Facility Information

The City of Kodiak's WWTF, originally put into service in 1978, with upgrades in 1999 and 2000, provides secondary treatment of domestic wastewater from residential and commercial sources. There are no significant industrial wastewater contributions. The WWTF is designed to treat 6.2 million gallons per day (mgd). Figures 1 and 2 show the location of the Kodiak WWTF and outfall.

Figure 1- City of Kodiak WWTF Location

Figure 2- City of Kodiak WWTF Outfall



2.2 Wastewater Treatment

Two rotary drum fine screens provide preliminary treatment of raw sewage entering the headworks of the WWTF. Screened material is compacted and disposed of at the Kodiak Island Borough Landfill. The screened wastewater then flows via gravity to a circular primary clarifier.

The primary clarifier, a 70-foot wide, 10-foot-deep basin, provides primary treatment by separating settleable and floatable solids from the wastewater. Scum, which includes grease, oils, plastics, and soaps is removed from the surface of the clarifier with a rotating surface skimmer that directs the scum to a drainage pipe connected to a scum storage tank. The scum is pumped back to the headworks and removed in the screening process. A rotating rake arm with scraper blades scrapes the bottom of the clarifier and pushes sludge to a center hopper from which solids can be removed. The solids primarily thicken in the clarifier and are stored in a primary sludge tank prior to processing in a gravity thickener. An activated carbon scrubber treats foul odors generated in the primary sludge tank prior to the air discharging into the atmosphere. Primary clarifier effluent flows over a weir, mixes with return activated sludge (RAS), and flows to two parallel aeration basins. Scum baffles prevent floatable solids and scum from going over the weir and into the downstream processes.

Two 150,000-gallon aeration basins, along with two secondary clarifiers, return sludge pumps, waste sludge pumps, and blowers provide secondary treatment via the activated sludge process. Blowers provide aeration via fine bubble membrane diffusers and microorganisms provide biological treatment of soluble and some particulate organic matter.

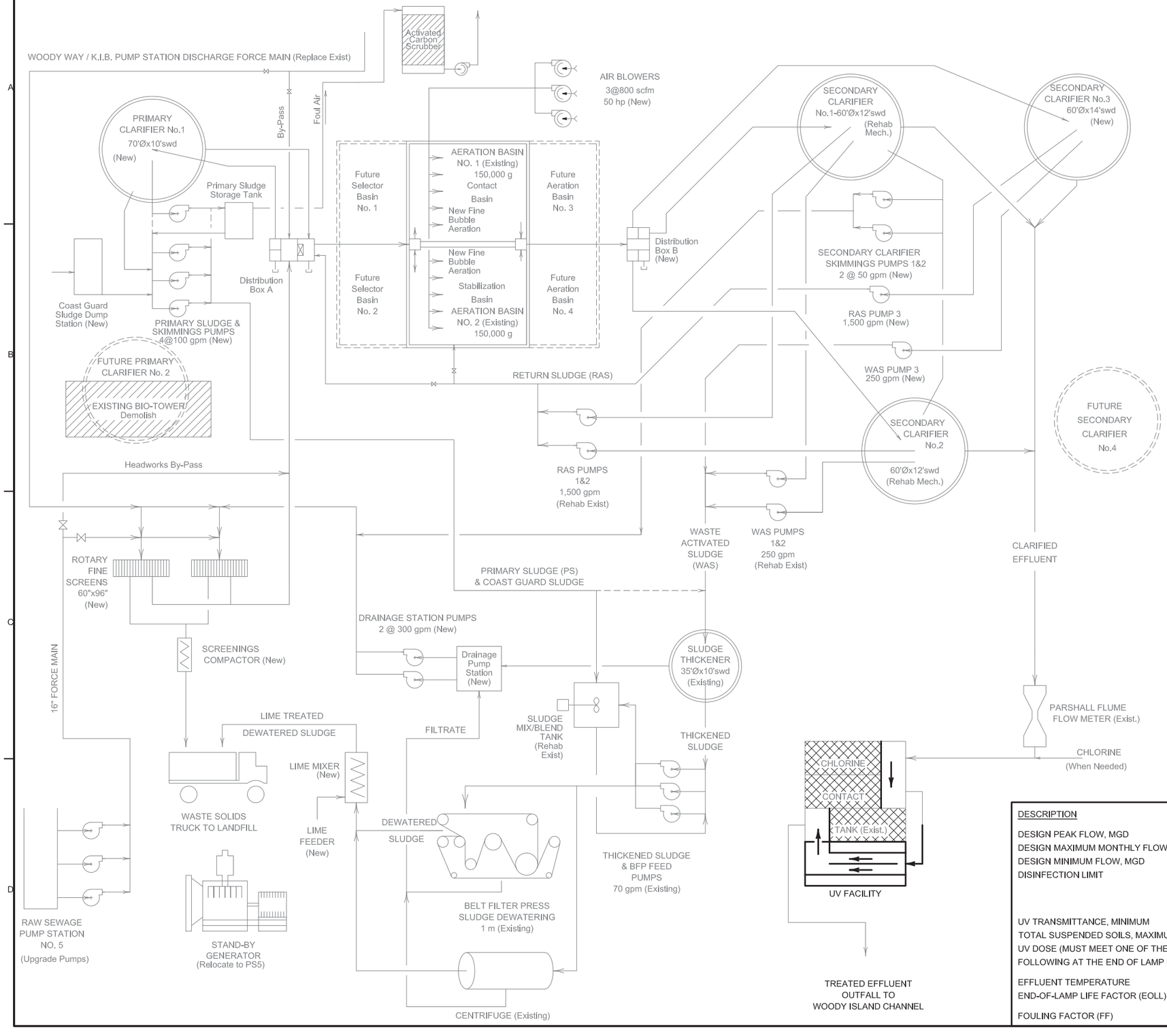
From the aeration basins, the effluent flows to two circular 60-foot wide, 12-foot-deep secondary clarifiers for further settling of microorganisms prior to disinfection. A third secondary clarifier is available as a backup. A portion of the settled sludge is pumped to a gravity thickener as waste activated sludge (WAS) for disposal. Another portion of the settled sludge is pumped back to the aeration basins as RAS to assist secondary treatment. Scum is removed from the secondary clarifiers and pumped back to the headworks for screening. Treated effluent flows over a weir into a trough and to the effluent building for ultraviolet (UV) disinfection. A flow meter measures flow prior to final discharge of the treated effluent into Woody Island Channel.

The Kodiak WWTF accepts WAS from the United States Coast Guard (USCG) Base Kodiak WWTF. Sludge from the USCG Base, along with sludge from the City of Kodiak's primary clarifier and WAS from their secondary clarifiers, is processed using a gravity thickener. All three sludge sources are blended in order to produce a uniform product for dewatering with a belt filter press. Polymer is added to enhance the dewatering process by causing the solids to stick together, facilitating water removal. Solids settle to the bottom of the gravity thickener, where a rotating rake arm with scraper blades pushes the settled, thickened sludge to a center hopper for removal. Supernatant and scum that flows over a weir is pumped back to the WWTF headworks.

Dewatered sludge cakes are transported to the City of Kodiak's solid waste composting facility where sludge cakes are mixed with a wood amendment and processed using the negative aerated static pile method.

Figure 2 illustrates the Kodiak WWTF wastewater treatment process.

Figure 3- City of Kodiak WWTF Process Flow



NOTES:

1. BASE DRAWING FROM RECORD PLANS PROVIDED BY THE CITY OF KODIAK, SHEET 0P2 (8 OR 310), WASTEWATER TREATMENT PLANT UPGRADE, PREPARED BY VEI CONSULTANTS, 4/7/2000, MODIFIED TO INCLUDE UV FACILITY
2. ALL OTHER EXISTING FACILITIES HAVE NOT BEEN CONFIRMED TO PRESENT CURRENT CONDITIONS.

DESCRIPTION	DESIGN CRITERIA
DESIGN PEAK FLOW, MGD	8.0
DESIGN MAXIMUM MONTHLY FLOW, MGD	4.7
DESIGN MINIMUM FLOW, MGD	0.5
DISINFECTION LIMIT	200 MONTHLY AVERAGE FC COLONIES PER 100 ML 460 WEEKLY AVERAGE FC COLONIES PER 100 ML 800 DAILY MAXIMUM FC COLONIES PER 100 ML
UV TRANSMITTANCE, MINIMUM	60% AT 254 nm; FOULED SLEEVES AND AT END OF LAMP LIFE
TOTAL SUSPENDED SOILS, MAXIMUM	30 mg/L
UV DOSE (MUST MEET ONE OF THE	35 mJ/cm^2, AVERAGE FLOW
FOLLOWING AT THE END OF LAMP LIFE)	26 mJ/cm^2, PEAL HOUR FLOW
EFFLUENT TEMPERATURE	MINIMUM 15° C; MAXIMUM 25°C
END-OF-LAMP LIFE FACTOR (EOLL)	0.5 (OR THIRD PARTY CERTIFIED TECHNOLOGY-SPECIFIC EOLL); MAXIMUM 0.9
FOULING FACTOR (FF)	0.8 (OR THIRD PARTY CERTIFIED TECHNOLOGY-SPECIFIC FF); MAXIMUM 0.95

STATE OF ALASKA 49TH
JAN VAN BLANKENSTEIN
CE 10632
02/12/20
REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	REVISION	CHK	APVD
-	-	-	F. DAMRON	F. DAMRON

DSGN I. Vanblankenstein DR R. BENFIELD

KODIAK WWTP UV DISINFECTION
CITY OF KODIAK
KODIAK, ALASKA

JACOBS

PROCESS FLOW DIAGRAM AND DESIGN CRITERIA

100% SUBMITTAL

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	FEBRUARY 2020
PROJ	D3202100
DWG	P-002
SHEET	32

KodiakUV_P-002.dwg February 11, 2020 - 2:40pm

2.3 Pollutants of Concern

Pollutants of concern contained in domestic wastewater include the conventional pollutants: 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), enterococci bacteria, fecal coliform (FC) bacteria, pH, and oil and grease. Between July 2018 and September 2023, total ammonia as nitrogen (N), copper, temperature, and whole effluent toxicity (WET) were detected in the effluent above maximum water quality criteria; therefore, DEC also identified these pollutants as pollutants of concern.

The expanded effluent monitoring that was required as a part of the permit reissuance application also identified copper as a pollutant of concern. No other tested parameters in the expanded effluent monitoring were either detected or present in levels above Alaska Water Quality Standards at 18 AAC 70. Table 1 contains pollutants that were detected in the effluent above marine water quality criteria.

Table 1- Pollutants Observed in Effluent above Water Quality Criteria

Parameter	Units	Maximum Observed Concentration	Water Quality Criteria or Permit Limit
Enterococci Bacteria	Colony forming units/100 milliliters (CFU/100 mL)	2,420	30-day period may not exceed geometric mean of 35, not more than 10% may exceed statistical threshold value 130
FC Bacteria	FC/100 milliliters (FC/100mL)	483,000	Geometric mean may not exceed 14, not more than 10% exceed 43
Total Ammonia as N	Milligrams per liter (mg/L)	12	Water Quality Criteria 7.96 acute, 1.2 chronic Permit Limits 19.09 acute, 9.39 chronic
Copper, Total Recoverable	Micrograms per liter (µg/L)	34	5.8 acute, 3.7 chronic
Temperature as ΔT	degrees Celsius (ºC)	17.5	1
WET	chronic toxic units (TUc)	9.3 *Mytilus galloprovincialis* 48-hour normal development	1.0

2.4 Compliance History

DEC reviewed Discharge Monitoring Reports (DMRs) submitted after the last permit became effective in July 2018 through September 2023 to determine the facility's compliance with effluent limits. There were two reported violations, one in January 2019 in which the BOD_5 minimum percent removal was reported as 83% (85% minimum required) and one in July 2022 in which the total ammonia as N average monthly was reported as 11.8 mg/L (9.39 average monthly permit limit). Table 2 summarizes DEC Compliance and Enforcement actions at the Kodiak WWTF. Additional compliance information may be found at Enforcement and Compliance History Online | US EPA.

Table 2- Compliance and Enforcement Actions

Date	Activity	Summary
November 12, 2019	Notice of Violation	Violations issued for two unapproved bypasses. The first bypass occurred on May 9, 2019; the failure of a sewer pipe resulted in sanitary sewer overflows (SSO) at lift station #5 of an estimated 300,000 gallons per day (gpd) of untreated wastewater into Mission Lake until the repairs could be completed on May 15, 2019. An additional 500,000 gallons of untreated wastewater overflowed at lift station #4 because of the need to shut it down to fix lift station #5. On November 8, 2019, the collection system had a failure at lift station 1B that resulted in an estimated overflow of 86,000 gallons to Mills Bay before repairs could be completed the same day.
August 27, 2020	Routine Inspection	The facility was issued violations for a failure to submit the annual progress report for its disinfection compliance schedule for 2020, failure to conduct WET testing for 2018, failure to receive DEC approval for receiving water monitoring locations, and failure to post a sign on the shoreline adjacent to the discharge outfall.
February 05, 2021	Close-Out Letter	Acknowledged that the deliverables violations stemming from the August 2020 facility inspection were accepted as complete.
February 10, 2022	Notice of Violation	Violation issued for a January 17, 2022 SSO of an estimated 370,000 gallons from lift station #4 as a result of power loss and operator error in responding to a communications fault at the lift station as a result of the power loss.
June 7, 2022 and Jun 8, 2022	Routine Inspection	Violation issued for failure to update the facility's Operation and Maintenance Plan (O&M Plan) and to review it annually.
February 2, 2023	Compliance Order by Consent	Noncompliance corrective actions and fines stemming from SSO events.

3.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

3.1 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 meet the purposes of AS 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 (TBELs) or water quality-based effluent limits (WQBELs). TBELs are set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the WQS of a water body are met. WQBELs may be more stringent than TBELs.

The permit contains a combination of both TBELs and WQBELs. The Department first determines if TBELs are required to be incorporated into the permit. TBELs for publicly owned treatment works (POTWs), which apply to the City of Kodiak WWTF, are derived from the secondary treatment standards found in Title 40 Code

of Federal Regulations (CFR) §133.102 and 40 CFR §133.105, adopted by reference at 18 AAC 83.010(e). The following section summarizes the proposed effluent limits. A more expansive technical and legal basis for the proposed effluent limits is provided in Appendix A Basis for Effluent Limitations.

3.2 Basis for Effluent and Receiving Water Monitoring

In accordance with AS 46.03.110(d), the Department may specify in a permit the terms and conditions under which waste material may be disposed. Monitoring in a permit is required to determine compliance with effluent limits. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limits are required and/or to monitor effluent impact on the receiving waterbody quality. The permittee is responsible for conducting the monitoring and for reporting results on NetDMR or with the application for reissuance, as appropriate, to the Department. Fact Sheet Section 3.3 -3.5 summarizes monitoring requirements DEC has determined necessary to implement in the permit.

3.3 Effluent Limits and Monitoring Requirements

Monitoring is required to determine compliance with effluent limitations and/or for use in future reasonable potential analyses (RPA). The permit requires monitoring of secondary treated domestic wastewater effluent that is discharged through Outfall 001A. Flow, BOD_5, TSS, pH, dissolved oxygen, (DO), FC bacteria, ammonia, as N, and copper, all have associated effluent limits. See Appendix A for details regarding the basis of effluent limits for these parameters.

Monitoring frequencies are based on the nature and effect of a pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used in calculations and used for averaging if they are conducted using Department-approved test methods (generally found in 18 AAC 70 and 40 CFR Part 136 [adopted by reference in 18 AAC 83.010]) and if the method detection limits are less than the effluent limits. Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. The monitoring in this permit is required to determine compliance with the effluent limits and to gather information for permit reissuance.

The City of Kodiak has demonstrated their ability to consistently reduce BOD_5 and TSS to levels below permit requirements. Since the permit became effective in July 2018, there have not been any violations of TSS permit limits and only one BOD_5 minimum percent removal (83% reported, 85% minimum required). Therefore, in order to reduce monitoring while maintaining a high level of environmental protection, DEC used EPA's 1996 Interim Guidance for Performance-Based Reductions of NPDES Permit Monitoring Frequencies to reduce BOD_5 and TSS monitoring frequencies in the reissued permit from 1/week to 2/month. The City of Kodiak is expected to maintain the performance levels that were used as the basis for granting these monitoring reductions. If performance is not maintained DEC may require increased monitoring.

The permit requires effluent sampling for WET to determine what if any chronic toxicity the discharge has at various concentrations of effluent. See Fact Sheet Section 3.4 for further discussion of WET requirements.

Table 3 contains Outfall 001A effluent limits and monitoring requirements and Table 4 contains effluent limits and monitoring requirement changes from the last permit issuance.

Table 3- Effluent Limits and Monitoring Requirements

Parameter	Effluent Limits					Monitoring Requirements		
	Units [a]	Daily Minimum	Monthly Average	Weekly Average	Daily Maximum	Sample Location	Sample Frequency	Sample Type
Flow	mgd	N/A	4.7	N/A	6.2	Effluent	Continuous	Recorded
Biochemical Oxygen Demand (BOD_5)	mg/L	N/A	30	45	60	Influent and Effluent [c]	2/Month	24-hour Composite [d]
	lbs/day [b]		1,176	1,764	3,102			Calculated
Total Suspended Solids (TSS)	mg/L	N/A	30	45	60	Influent and Effluent	2/Month	24-hour Composite
	lbs/day		1,176	1,764	3,102			Calculated
BOD_5 & TSS Minimum Percent (%) Removal [e]	%	N/A	85	N/A	N/A	Influent and Effluent	1/Month	Calculated
pH	S.U.	6.5	N/A		8.5	Effluent	5/Week	Grab
Temperature	°C	N/A	18	---	27	Effluent	5/Week	Grab
Dissolved Oxygen (DO)	mg/L	6.0	N/A		17	Effluent	1/Week	Grab
Fecal Coliform (FC) Bacteria	FC / 100 mL	N/A	200	400	800	Effluent	1/Week [f]	Grab
Enterococci Bacteria	MPN / 100 mL	N/A	35	N/A	130 [g]	Effluent	1/Month (May-Sept) [f, h]	Grab
Total Ammonia, as N	mg/L	N/A	9.39	14	19.09	Effluent	1/Month	24-hour Composite
	lbs/day		368	549	987			
Copper, total recoverable	µg/L	N/A	23	35	39	Effluent	1/Month	24-hour Composite
	lbs/day		902	1,372	2,017			

Footnotes:

a. Units: mgd = million gallons per day, mg/L = milligrams per liter, lbs/day = pounds per day, MPN/100 mL = most probable number per 100 milliliters, FC/100 mL = fecal coliform per 100 milliliters, S.U.= standard units, °C= degrees Celsius, µg/L = micrograms per liter.

b. lbs/day = concentration (mg/L) x flow (mgd) x 8.34 (conversion factor)

c. Limits apply to effluent. Report average monthly influent concentration. Influent and effluent samples shall be collected during the same 24-hour period.

d. See Appendix C for definition.

e. Minimum percent removal = [(average monthly influent concentration in mg/L – average monthly effluent concentration in mg/L) / (average monthly influent concentration in mg/L)] x 100. The monthly average percent removal must be calculated using the arithmetic mean of the influent value and the arithmetic mean of the effluent value for that month.

f. If more than one FC bacteria sample or enterococci bacteria is collected within the reporting period, the average result must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the product of the quantities. For example, the geometric mean of 100, 200, and 300 is (100 X 200 X 300)1/3 = 181.7.

g. If less than ten samples are collected within a 30-day period, the effluent limit cannot be exceeded. If ten or more samples are collected within a 30-day period, not more than 10% of the samples may exceed the effluent limit.

h. One enterococci bacteria sample shall be collected each month, May through September, on the same day as the FC bacteria sample is collected.

Table 4- Outfall 001A Effluent and Monitoring Changes from Prior Permit

Parameter	Units [a]	Monthly Average		Weekly Average		Daily Maximum	
		2018	2024	2018	2024	2018	2024
Flow	mgd	4.7	Unchanged	---	---	6.2	Unchanged
BOD_5	mg/L	Concentration limits unchanged. Monitoring frequency reduced from 1/week to 2/month.					
	lbs/day	800	1,176	1,200	1,764	1,600	3,102
TSS	mg/L	Concentration limits unchanged. Monitoring frequency reduced from 1/week to 2/month.					
	lbs/day	800	1,176	1,200	1,764	1,600	3,102
Temperature	º C	---	18	---	---	Report	27
Enterococci Bacteria	MPN/ 100 mL	---	35	---	---	Report	130
DO	mg/L	4.0 daily minimum	6.0 daily minimum	---	---	17	Unchanged
Total Ammonia, as N	mg/L	9.39	Unchanged	---	14	19.09	Unchanged
	lbs/day	250.6	368	---	549	509.5	987
Copper	µg/L	---	23	---	35	Report	39
	lbs/day	---	902	---	1,372	---	2,017
Total Residual Chlorine [b]	mg/L	0.0075	---	---	---	0.013	---

Footnotes:

a. Units: mgd = million gallons per day, mg/L = milligrams per liter, lbs/day = pounds per day, MPN/100 mL = most probable number per 100 milliliters, S.U.= standard units, °C= degrees Celsius, µg/L = micrograms per liter.

b. The City of Kodiak completed installation of ultraviolet disinfection in October 2021 and removed their chlorine contact chambers. Therefore; total residual chlorine limits are not included in the reissued permit.

3.4 Whole Effluent Toxicity Monitoring (WET)

Alaska WQS at 18 AAC 70.030 require that an effluent discharged to a water may not impart chronic toxicity to aquatic organisms, expressed as 1.0 TUc at the point of discharge, or if the Department authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone. 18 AAC 83.435 requires that a permit contain limitations on WET when a discharge has reasonable potential to cause or contribute to an exceedance of a WQS. 18 AAC 83.335 recommends chronic testing for facilities with dilution factors less than 100:1 at the boundary of the mixing zone, acute testing for facilities with dilution factors greater than 1000:1 at the boundary of the mixing zone, and either acute or chronic testing for dilution factors between 100:1 and 1000:1 at the boundary of the mixing zone.

WET tests are laboratory tests that measure total toxic effect of an effluent on living organisms. WET tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. WET testing is included in the permit to demonstrate any potential toxicity resulting from the WWTF discharge. The two different durations of toxicity tests are: acute and chronic. Acute toxicity tests measure survival over a 96-hour exposure. Chronic toxicity tests measure reductions in survival, growth, and reproduction over a 7-day exposure.

The previous permit required that the permittees conduct annual chronic toxicity tests with the topsmelt silverside (*Atherinops affinis*) (larval growth and survival) or in the event *Atherinops affinis* was not available, *Menidia beryllina* (inland silverside) and either the Pacific oyster (*Crassostrea gigas*) or mussel (*Mytilus galloprovincialis*) (larval development). Testing was required to be conducted annually and tested at 21.6%, 10.8%, 5.4%, 2.7%, 1.4%, effluent and a control of 0% effluent. The TUc (100/No Observed Effect Concentration (NOEC)) for all tests did not exceed the permit's chronic toxicity trigger value of 18.5 TUc (at 5.4% effluent). NOEC is the highest percentage concentration of an effluent tested that causes no observable adverse effects. All test results with the exception of the April 2023 *Mytilus galloprovincialis* larval development test, (test results 10.8% NOEC, 21.6 % lowest observable test level (LOEL), and 9.3 TUc) had NOECs of 21.6%, LOELs > 21.6 and TUc of 4.6.

The Kodiak WWTF's effluent exceeds water-quality criteria for ammonia and copper at the end of the pipe which is 100% effluent. Ammonia and copper are classified as toxic pollutants. There is reasonable potential to assume that WET at 100% effluent concentration will exceed 1.0 TUc at the end of the pipe. Therefore, WET is included in the mixing zone.

Temperature drives the chronic mixing zone, but it is not a toxic pollutant. Ammonia, a toxic pollutant, requires a dilution factor of 17:1 to meet the chronic ammonia water quality criterion. Therefore, DEC is basing the instream waste concentration (IWC) and WET trigger on ammonia's chronic dilution factor. The dilution series must contain the IWC, which corresponds to approximately 5.9% effluent concentration at the boundary of the mixing zone. Two dilutions above, and two dilutions below the IWC must be included, with no concentration greater than two times that of the next lower concentration. The permit requires accelerated WET testing if toxicity is greater than 17 TUc in any test. If toxicity exceeds the trigger of 17 TUc, six biweekly WET tests (every two weeks over a 12-week period) are required. If the permittee demonstrates through an evaluation of the facility operations that the cause of the exceedance is known and corrective actions have been implemented, only one accelerated test is required. If toxicity is greater than 17 TUc in any of the accelerated tests, the permittee must initiate a Toxicity Reduction Evaluation (TRE). A TRE is a site-specific process designed to identify the cause of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and confirm effluent toxicity reduction. The permittee may initiate a toxicity identification evaluation (TIE) as a part of the TRE. A TIE is a set of procedures that characterize, identify, and confirm the specific chemicals responsible for effluent toxicity. TREs and TIEs must be performed in accordance with EPA guidance manuals (see Permit Section 1.3 for further details).

3.5 Receiving Waterbody Monitoring

The permittee conducted receiving waterbody monitoring in Woody Island Channel between July 2018 and August 2023 to assess ammonia, copper, pH, salinity, and temperature. However, ammonia testing was not conducted with an approved method under 40 CFR Part 136 and results were reported under the method detection limit of the method used. Copper receiving water results were erratic, with multiple missed samples and two abnormally high outlier results in a small dataset. The high values do not reflect findings from other facilities in the area and warrant continued monitoring. DEC's *APDES Permits Reasonable Potential Analysis and Effluent Limits Development Guide* directs permit writers to use 15% of the most stringent water quality numeric criterion in cases where a site-specific ambient concentration is not otherwise available; therefore, instead of using the ammonia and copper receiving water results conducted by the permittee, DEC used 15% of the most stringent ammonia and copper water quality criteria for use in the RPA.

The reissued permit maintains receiving waterbody monitoring requirements for ammonia and copper; but does require further monitoring of Woody Island Channel for pH, salinity, and temperature as DEC has determined that sufficient data had been collected during the term of the prior permit to establish ammonia water quality criteria. Monitoring for ammonia and copper will establish ambient pollutant concentrations for future RPAs and mixing zone modeling. Table 5 contains Woody Island Channel monitoring requirements.

Table 5- Woody Island Channel Monitoring Requirements

Parameter	Units [a]	Frequency	Sample Type
Total Ammonia, as N	mg/L	2/ Year [b, c]	Grab
Copper, total recoverable	µg/L		

Footnotes:
a. Units: mg/L = milligrams per liter, µg/L = micrograms per liter
b. To the extent practicable, ammonia waterbody monitoring should occur on the same day as effluent ammonia monitoring and copper waterbody monitoring should occur on the same day as effluent copper monitoring.
c. Twice per year means one sample must be taken between May and July and one sample must be taken between August and October.

4.0 RECEIVING WATERBODY

4.1 Description of Receiving Waterbody

Woody Island Channel provides an essential approach from the outside waters of the Gulf of Alaska to the ports of Kodiak and USCG Base Kodiak. The Channel lies at the northwestern entrance to Chiniak Bay along the northeastern coast of Kodiak Island, south of Marmot Bay. Chiniak Bay is approximately 13 miles wide and reaches from Spruce Cape to the northwest to Cape Chiniak to the southeast. Woody Island Channel's eastern boundary is formed by Woody Island and continues along Woody Island's shoreline as it bends to the southeast before opening into Chiniak Bay. Woody Island Channel to the west of Woody Island flows through a number of islands and islets including Near, Holiday, and Crooked Islands before also merging with Chiniak Bay and adjoining St. Paul Harbor. Woody Island Channel is approximately 0.67 miles wide between the point where the Kodiak WWTF outfall enters the Channel and the nearest point on Woody Island. The approximate flood direction in Woody Island Channel is 60 degrees true.

4.2 Outfall Description

The City of Kodiak WWTF discharges secondary treated domestic wastewater to Woody Island Channel at 57° 48.172" North latitude and 152° 20.919" West longitude. The facility's outfall line extends approximately 900 feet from shore and terminates at a depth of approximately 30 feet below MLLW. The outfall line includes a 125-foot diffuser consisting of three distinct sections. Table 6 contains a summary of the diffuser's configuration.

Table 6- Diffuser Configuration

Diffuser Section	Length of Section	Diffuser Diameter	Number of Risers (all 10 inches tall)	Riser Type	Number of Ports per Riser	Port Diameter
One (closest to shore)	60 feet	18 inches	Four	T-type	Two	four inches
Two	40 feet	16 inches	Two	One T-type One Single Port	T-type: two Single Port: one	T-type five inches Single Port: 0.4 inches
Three (terminus of diffuser)	25 feet	14 inches	Two	T-type	Two	0.5 inches

4.3 Water Quality Standards

Section 301(b)(1)(C) of the CWA required the development of limits in permits necessary to meet water quality standards by July 1, 1977. Per 18 AAC 83.435, APDES permits must include conditions to ensure compliance

with WQS. Additionally, regulations in 18 AAC 70 require that the conditions in permits ensure compliance with the WQS. The State's WQS are composed of waterbody use classifications, numeric and/or narrative water quality criteria, and an Antidegradation Policy. The use classification system identifies the designated uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the designated use classification of each waterbody. The antidegradation policy ensures that the existing uses and the level of water quality necessary to protect the uses are maintained and protected.
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 under18 AAC 70.236(b). The receiving water for this discharge, Woody Island Channel, has not been reclassified, nor have site-specific water quality criteria been established. Therefore, existing uses and designated uses are the same and Woody Island Channel must be protected for all marine use classes listed in 18 AAC 70.020(a)(2). These marine water designated uses are water supply for aquaculture, seafood processing and industrial; contact and secondary recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life.

4.4 Water Quality Status of Receiving Water

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

Woody Island Channel is not included on the *State of Alaska 2022 Final Integrated Water Quality Monitoring and Assessment Report.* The report is no longer published, findings are accessed through the EPA How's My Waterbody website at: https://mywaterway.epa.gov/state/AK/water-quality-overview. No TMDL has been prepared for Woody Island Channel.

4.5 Mixing Zone Analysis

In accordance with 18 AAC 70.240, the Department may authorize a mixing zone in a permit. A chronic mixing zone is sized to protect the ecology of the waterbody as a whole and an acute mixing zone is sized to prevent lethality to passing organisms.

In the City of Kodiak's application for reissuance they requested, with some minor adjustments that were based on their analysis of their effluent data, the same mixing zone that DEC authorized in their 2018 APDES permit. As a part of the mixing zone application and modeling review process, DEC reviewed the Kodiak WWTF's discharge monitoring results from October 2018 through September 2023 and conducted an RPA on those pollutants that exceeded water quality criteria. The RPA showed that ammonia, copper, and temperature have reasonable potential to exceed water quality criteria at the end of the Kodiak WWTF's treatment process and prior to discharge to Woody Island Channel. While the City of Kodiak WWTF's effluent has mostly achieved compliance with FC Bacteria TBELs since the initiation of UV disinfection in October 2021, they have not demonstrated yet that they can consistently meet FC Bacteria water quality criteria at 18 AAC 70.020(b)(14)(D), therefore, FC Bacteria is also authorized in the mixing zone. See Fact Sheet Appendix A.2.2 for more details. Temperature requires the most dilution to meet chronic water quality criteria. Temperature is a non-toxic pollutant and does not have an acute water quality criterion. Copper, which also has reasonable potential to exceed water quality criteria, is a toxic pollutant that contains both acute and chronic water quality criteria and requires the most dilution to meet acute water quality criteria; therefore, copper is the driver of the acute mixing zone. Ammonia was the driver of the both the chronic and acute mixing zones in the 2018 permit. Therefore, the mixing zones authorized in the 2018 permit does not reflect current conditions and must be revised.

Appendix D outlines the regulatory criteria that must be met for the Department to authorize a mixing zone. These criteria include the size of the mixing zone, treatment technology, existing uses of the waterbody, human consumption, spawning areas, human health, aquatic life, and endangered species.

The following summarizes DEC's mixing zone analysis:

4.5.1 Size

In accordance with 18 AAC 70.240(k), the mixing zone must be as small as practicable. In order to ensure that the mixing zone is as small as practicable, DEC used CORMIX version 12.0GTD to model the chronic and acute and mixing zones. CORMIX is a widely used and broadly accepted modeling tool for accurate and reliable point source mixing analysis and predicts the distance at which a modeled parameter meets water quality criteria as well as the corresponding dilution at that point.

18 AAC 70.240(b)(2) requires the Department to consider the characteristics of the effluent after treatment of the wastewater. DEC reviewed the facility's effluent monitoring data from October 2018 through September 2023 to identify pollutants of concern and to determine which pollutants have reasonable potential to exceed water quality criteria and then which pollutant requires the most dilution to meet both chronic and acute water quality criteria.

DEC used the CORMIX outfall and diffuser configuration specifications and ambient conditions inputs upon which the 2018 authorized mixing zones were based. DEC adjusted the effluent flow rate to reflect the daily maximum design flow rate of 6.2 mgd rather than 4.0 mgd that was used in the 2018 mixing zones. Applying the daily maximum design flow rate assures that the mixing zones are properly sized and protective of water quality criteria at the boundary of the mixing zone.

Temperature was identified in the Kodiak WWTF's RPA as the pollutant requiring the most dilution to meet chronic quality criteria while copper was identified as requiring the most dilution to meet acute water quality criteria. Temperature was modeled as a non-toxic heated discharge and copper as a conservative toxic discharge. Ammonia has reasonable potential to exceed water quality criteria. Ammonia requires less dilution than temperature to meet the chronic water quality criterion and less dilution than copper to meet the acute water quality criterion; therefore, ammonia fits within the authorized mixing zones for temperature and copper. WET also has reasonable potential to exceed the WET chronic water quality criterion. If the WET trigger, 17 TUc, which is associated with the available dilution at the boundary of the mixing zone, is not exceeded, the receiving water at the boundary of the mixing zone is protected.

The 90th percentile current models were used to determine the length of the mixing zones and the 10th percentile current models were used to determine the width of the mixing zones. Both the length and widths of the mixing zones were doubled to account for the reversal of the ebb and flood tides. The length of the diffuser was added to the width of the mixing zones. The length of the mixing zones are oriented with the direction of the prevailing currents in Woody Island Channel. The resultant smallest practicable mixing zones are defined as follows:

> Chronic Mixing Zone: The chronic mixing zone has a dilution of 20:1 and is defined as the area centered over the diffuser with the length oriented parallel to the shoreline measuring 77 meters long and 40 meters wide.
>
> Acute Mixing Zone: The acute mixing zone has a dilution of 7.4:1 and is defined as the area centered over the diffuser with the length oriented parallel to the shoreline measuring 29 meters long and 39 meters wide.

According to EPA's Technical Support Document for Water Quality-based Toxics Control, lethality to passing organisms would not be expected if an organism passing through the plume along the path of maximum exposure is not exposed to concentrations exceeding the acute criteria when averaged over a one-hour time period. Furthermore, the travel time of an organism drifting through the acute mixing zone must be less than approximately 15 minutes if a one-hour exposure is not to exceed the acute criterion. CORMIX predicted that

the travel time of an organism drifting through the acute copper mixing zone to be approximately 27 seconds; therefore, there will be no lethality to organisms passing through the acute mixing zone.

Table 7 summarizes data used in CORMIX to model temperature, the driving parameter of the chronic mixing zone, and copper, the driving parameter of the acute mixing zone.

Table 7- Summary of CORMIX Version 12.0GTD Inputs

Parameter Modeled	Maximum Expected Temperature or Concentration	Ambient Temperature or Concentration	Water Quality Criteria
Temperature as ΔT (chronic)	19.89	0 ºC	1 ºC
Copper, total recoverable	39.42 µg/L (discharge concentration excess: 38.86 µg/L)	0.560 µg/L	5.78 µg/L acute (discharge concentration excess: 5.22 µg/L) 3.73 µg/L chronic (discharge concentration excess: 3.17 µg/L)
Outfall and Receiving Waterbody Characteristics			
Discharge Geometry	Submerged Multiport		
Outfall and Diffuser Length	Outfall 274.32 meters, diffuser 38.1 meters		
Number of Ports and Port Diameter	nine 4-inch diameter ports, four five-inch diameter ports- applied average of 4.3-inch port diameter (0.11 meters)		
Port Height above Channel Bottom	0.762 meters		
Depth at Discharge	7.198 meters		
Ambient Current	0.0557 meters per second low tidal current 0.486 meters per second high tidal current		
Wind Speed	2 meters per second		
Ambient Density	22.41 kilograms Sigma-t at surface 24.26 kilograms Sigma-t at bottom		
Effluent Characteristics			
Flow Rate	6.2 mgd		
Effluent Temperature	11 ºC (average daily maximum)		

4.5.2 Technology

In accordance with 18 AAC 70.240(c)(1), the most effective technological and economical methods should be used to disperse, treat, remove, and reduce pollutants. The Kodiak WWTF consists of an activated sludge process with UV disinfection. The treatment methods incorporated at the Kodiak WWTF are commonly employed and accepted for treatment of similar discharges throughout the United States.

4.5.3 Existing Use

In accordance with 18 AAC 70.240(c)(2) and (3) and18 AAC 70.240(c)(4)(B) and (C), the mixing zone has been appropriately sized to fully protect the existing uses of Woody Island Channel. Woody Island Channel's existing uses and biological integrity have been maintained and protected under the terms of the previous permit and shall continue to be maintained and protected under the terms of the reissued permit. Water quality criteria are developed to specifically protect the uses of the waterbody as a whole. Because water quality criteria for pollutants that demonstrated reasonable potential to exceed water quality criteria will be met prior to or at the boundary of the mixing zones, designated and existing uses in Woody Island Channel that are beyond the boundary of the mixing zones will be maintained and protected.

4.5.4 Human Consumption

In accordance with the conditions of the permit, and in accordance with 18 AAC 70.240(d)(6) the pollutants discharged cannot produce an objectionable color, taste, or odor in aquatic resources harvested for human consumption. There is no indication that the pollutants discharged have produced objectionable color, taste, or odor in aquatic resources harvested for human consumption. Signs are required to be posted to inform the public that certain activities such as harvesting of aquatic life for raw consumption should not take place in the mixing zone.

4.5.5 Spawning Areas

In accordance with 18 AAC 70.240(f), a mixing zone is not authorized in an area of anadromous fish spawning or resident fish for spawning redds for Arctic Grayling (*Thymallus arcticus*), northern pike (*Esox lucius*), inconnu/sheefish (*Stenodus leucichthys*) and all other whitefish in Alaska belonging to genera *Prosopium* and *Coregonus,* Arctic char (*Salvelinus alpinus*), Dolly Varden (*S. malma*), brook trout (*S. fontinalis*), rainbow trout(*Oncorhynchus mykiss*), cutthroat trout (*O. clarkia*), burbot *Lota*, landlocked coho salmon (*O.kisutch*), Chinooksalmon (*O. tshawytscha*), and sockeye salmon (*O. nerka*). The discharge from the Kodiak WWTF discharges to marine water; therefore, this condition is not applicable.

4.5.6 Human Health

In accordance with 18 AAC 70.240(d)(1), the mixing zone must not contain bioaccumulating, bioconcentrating, or persistent chemicals above natural or significantly adverse levels. 18 AAC 70.240(d)(2), states that the mixing zone must not present an unacceptable risk to human health from carcinogenic, mutagenic, teratogenic, or other effects as determined using risk assessment methods approved by DEC and consistent with 18 AAC 70.025. An analysis of the effluent data that was included with the Kodiak WWTF's application for permit reissuance, DMRs, and the results of the RPA conducted on pollutants of concern indicated that the level of treatment at their WWTF is protective of human health. The effluent data was used in conjunction with applicable water quality criteria, which serve the purpose of protecting human and aquatic life, to size the mixing zone to ensure all water quality criteria are met in the waterbody at the boundary of the mixing zone.

4.5.7 Aquatic Life and Wildlife

In accordance with 18 AAC 70.240, the mixing zones authorized in the permit shall be protective of aquatic life and wildlife. The mixing zones do not form a barrier to migratory fish species or fish passage nor will do they result in a reduction of fish population levels. A toxic effect will not occur in the water column, sediments, or biota outside the boundaries of the mixing zones. The CORMIX mixing zone modeling conducted for this

discharge incorporated the most stringent water quality criteria in the models for protection of the growth and propagation of fish, shellfish, other aquatic life, and wildlife, and all water quality criteria will be met at the boundary of the authorized mixing zones.

4.5.8 Endangered Species

In accordance with 18 AAC 70.240(c)(4)(F), the mixing zone will not cause an adverse effect on threatened or endangered species. The United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) did not respond to DEC's request for them to identify any threatened or endangered species.

DEC reviewed the USFWS website at https://ecos.fws.gov/ipac/ which showed that the threatened Northern Sea Otter and Steller's Eider, and the endangered Short-tailed Albatross may be present in the vicinity of the Kodiak WWTF outfall. DEC also consulted the NMFS endangered species mapper at https://alaskafisheries.noaa.gov/portal/apps/webappviewer/index.html?id=446543503a2e4660b0f5ee55e6407d27 which showed that the endangered Steller Sea Lion, and the Humpback, North Pacific Right, and Sperm Whales may be present near the Kodiak WWTF outfall.

DEC will provide a copy of the permit and fact sheet to the USFWS and NMFS when it is public noticed. Any comments received from the agencies regarding endangered species will be considered prior to issuance of the permit.

See Section 8.2 of the fact sheet for more information regarding endangered species.

5.0 ANTIBACKSLIDING

18 AAC 83.480 requires that "interim effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit, unless the circumstances on which the previous permit was based have materially and substantially changed since the permit was issued, and the change in circumstances would cause for permit modification or revocation and reissuance under 18 AAC 83.135." 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). 18 AAC 83.480(b) allows relaxed limitations 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. EPA's Interim Guidance for Performance-Based Reduction of NPDES Monitoring Frequencies (EPA, 1996), states that monitoring requirements are not considered effluent limitations under the CWA, and therefore Antibacksliding prohibitions would not be triggered by reductions in monitoring frequencies.

DEC reviewed the City of Kodiak's 2001 O&M Plan prepared by CH2M Hill and the 1999 Kodiak WWTF NPDES Permit and Fact Sheet. According to the O&M Plan and the NPDES Fact Sheet, the maximum monthly flow is 4.7 mgd and the daily maximum flow is 6.2 mgd. EPA applied the maximum monthly flow to monthly and weekly average BOD_5 and TSS mass-based limits and the daily maximum to daily maximum BOD_5 and TSS mass-based limits. The O&M Plan also specified an average annual design criteria of 3.7 mgd and peak hour design criteria of 8 mgd.

DEC modified the mass-based limits in the 2018 APDES permit by calculating BOD_5 and TSS monthly and weekly averages and daily maximums using 3.2 mgd. DEC also used 3.2 mgd in ammonia's monthly average and daily maximum mass-based limits. The monthly and weekly average and daily maximum flow limits remained unchanged from the NPDES permit at 4.7 mgd and 6.2 mgd respectively. The 2018 fact sheet stated that the permittee had not included a design criteria in their permit application and that 3.2 mgd was based on an email from the City of Kodiak. There is no documentation for a design flow criteria of 3.2 mgd and the Kodiak

WWTF has not reduced their design flow criteria; therefore, DEC has determined that the changes that had occurred in the 2018 permit to the mass-based limit calculations were technical mistakes. Therefore, DEC is modifying the 2018 BOD_5, TSS, and ammonia mass-based limits by applying the documented design (maximum monthly 4.7 mgd, daily maximum 6.2 mgd) to the mass-based limit calculations. Table 5 summarizes changes from the prior permit.

The effluent limitations in this permit reissuance are consistent with 18 AAC 83.480. Therefore, the permit effluent limitations, standards, and conditions in AK0021555 are as stringent as in the previously issued permit. Accordingly, no further backsliding analysis is required for this permit reissuance.

6.0 ANTIDEGRADATION

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the levelnecessary 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 State's Antidegradation policy is found in the 18 AAC 70 WQS regulations at 18 AAC 70.015. The Department's approach to implementing the Antidegradation policy is found in 18 AAC 70.016 *Antidegradation implementation methods for dischargesauthorized under the federal Clean Water Act*. Both the Antidegradation policy and the implementation methods are consistent with 40 CFR 131.12 and approved by EPA. This section analyzes and provides rationale for the Department's decisions in the permit issuance with respect to the Antidegradation policy and implementation methods.

Using the policy and corresponding implementation methods, the Department determines a Tier 1 or Tier 2classification and protection level on a parameter-by-parameter basis. A Tier 3 protection level applies to a designated water. At this time, no Tier 3 waters have been designated in Alaska.

18 AAC 70.015(a)(1) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected (Tier 1 protection level).

Woody Island Channel is not listed as impaired (Category 4 or 5) in Alaska's 2022 Integrated Water Quality Monitoring and Assessment Report; therefore, this antidegradation analysis conservatively assumes that the Tier 2 protection level applies to all parameters, consistent with 18 AAC 70.016(c)(1).

18 AAC 70.015(a)(2) states that if the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality must be maintained and protected, unless the Department authorizes a reduction in water quality (Tier 2 protection level).

The Department may allow a reduction of water quality only after the specific analysis and requirements under 18 AAC 70.016(b)(5)(A-C), 18 AAC 70.016(c), 18 AAC 70.016(c)(7)(A-F), and 18 AAC 70.016(d) are met. The Department's findings are as follows:

18 AAC 70.016(b)(5)

> ***(A)*** *existing uses and the water quality necessary for protection of existing uses have been identified based on available evidence, including water quality and use related data, information submitted by the applicant, and water quality and use related data and information received during public comment;*
>
> ***(B)*** *existing uses will be maintained and protected; and*
>
> ***(C)*** *the discharge will not cause water quality to be lowered further where the department finds that the parameter already exceeds applicable criteria in 18 AAC 70.020(b), 18 AAC 70.030, or 18 AAC 70.236(b).*

18 AAC 70.020 and 18 AAC 70.050 specify the protected water use classes for the State; therefore, the most stringent water quality criteria found in 18 AAC 70.020 and in the Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (DEC 2022) apply and were evaluated. This

will ensure existing uses and the water quality necessary for protection of existing uses of the receiving waterbody are fully maintained and protected.

The permit places limits and conditions on the discharge of pollutants. The limits and conditions are established after comparing TBELs and WQBELs and applying the more restrictive of these limits. The water quality criteria, upon which the permit effluent limits are based, serve the specific purpose of protecting the existing and designated uses of the receiving water. WQBELs are set equal to the most stringent water quality criteria available for any of the protected water use classes. This also ensures that the resulting water quality at and beyond the boundary of any authorized mixing zone will fully protect all existing and designated uses of the receiving waterbody as a whole.

The Department concludes the terms and conditions of the permit will be adequate to fully protect and maintain the existing uses of the water and that the findings under 18 AAC 70.016(b)(5) are met.

18 AAC 70.016(c)(7)(B) *each requirement under (b)(5) of this section for a discharge to a Tier 1 water is met;*

See 18 AAC 70.016(b)(5) analysis and findings above.

18 AAC 70.016(c)(7)(C) *point source and state-regulated nonpoint source discharges to the receiving water will meet requirements under 18 AAC 70.015(a)(2)(D); to make this finding the department will (i) identify point sources and state-regulated nonpoint sources that discharge to, or otherwise impact, the receiving water;*and *(ii) consider whether there are outstanding noncompliance issues with point source permits or required state-regulated nonpoint source best management practices, consider whether receiving water quality has improved or degraded over time, and, if necessary and appropriate, take actions that will achieve the requirements of 18 AAC 70.015(a)(2)(D); and (iii) coordinate with other state or federal agencies as necessaryto comply with (i) and (ii) of this subparagraph;*

The requirements under 18 AAC 70.015(a)(2)(D) state:

(D) all wastes and other substances discharged will be treated and controlled to achieve

(i) for new and existing point sources, the highest statutory and regulatory requirements; and

(ii) for nonpoint sources, all cost-effective and reasonable best management practices;

The highest statutory and regulatory requirements are defined at 18 AAC 70.015(d):

(d) For purposes of (a) of this section, the highest statutory and regulatory requirements are

(1) any federal technology-based effluent limitation identified in 40 C.F.R. 122.29 and 125.3, revisedas of July 1, 2017, and adopted by reference;

(2) any minimum treatment standards identified in 18 AAC 72.050;any treatment requirements imposed under another state law that is more stringent than a requirement of this chapter; and

(3) any water quality-based effluent limitations established in accordance with 33 U.S.C. 1311(b)(1)(C)(Clean Water Act, sec. 301(b)(1)(C)).

(4) any water quality-based effluent limitations established in accordance with 33 U.S.C. 1311(b)(1)(C)(Clean Water Act, sec. 301(b)(1)(C)).

The first part of the definition includes all federal technology-based effluent limit guidelines (ELGs) including "For POTWs, effluent limitations based upon…Secondary Treatment" at 40 CFR § 125.3(a)(1) defined at 40 CFR § 133.102, adopted by reference at 18 AAC 83.010(e). The ELGs set standards of performance for existing and new sources and are incorporated in the permit.

The second part of the definition references the minimum treatment standards for domestic wastewater discharges found at 18 AAC 72.050. The conditions of this permit require the permittee to meet or exceed the minimum treatment standards described in 18 AAC 72.050. The Kodiak WWTF provides secondary treatment of domestic wastewater with an activated sludge process and UV disinfection. The Department finds that this

requirement is met.

The third part of the definition refers to treatment requirements imposed under another state law that are more stringent than 18 AAC 70. Other regulations beyond 18 AAC 70 that apply to this permitting action include 18 AAC 15 and 18 AAC 72. Neither the regulations in 18 AAC 15 and 18 AAC 72, nor another state law that the Department is aware of impose more stringent requirements than those found in 18 AAC 70.

The fourth part of the definition refers to WQBELS. WQBELs are designed to ensure that the WQS of a waterbody are met and may be more stringent than TBELs. Section 301(b)(1)(C) of the CWA requires the development of limits in permits necessary to meet WQS by July 1, 1977. WQBELs included in APDES permits are derived from EPA-approved 18 AAC 70 WQS. APDES regulation 18 AAC 83.435(a)(1) requires that permits include WQBELs that can "achieve WQS established under CWA §303, including state narrative criteria for water quality." The permit requires compliance with the 18 AAC 70 and includes WQBELs developed for ammonia, copper, and temperature that are protective of water quality criteria at the boundary of the mixing zone.

After review of the applicable statutory and regulatory requirements, including 18 AAC 70, 18 AAC 72, and 18 AAC 83, the Department finds that the discharge from the Kodiak WWTF meets the highest applicable statutory and regulatory requirements and that the finding is met.

***18 AAC 70.016(c)*(7)(D)(i-ii)** *the alternatives analysis provided under (4)(C-F) of this subsection demonstrates that*

- *(i) a lowering of water quality under 18 AAC 70.015(a)(2)(A) is necessary; when one or more practicable alternatives that would prevent or lessen the degradation associated with the proposed discharge are identified, the department will select one of the alternatives for implementation; and*
- *(ii) the methods of pollution prevention, control, and treatment applied to all waste and other substances to be discharged are found by the department to be the most effective and practicable.*

The City of Kodiak addressed (4)(C-F) of this subsection in their Antidegradation Form 2G submittal. Excerpts from the submittal are included in the fact sheet below. The Department finds that this requirement is met.

18 AAC 70.016(c)(7)(E) *except if not required under (4)(F) of this subsection, the social or economic importance analysis provided under (4)(G) and (5) of this subsection demonstrates that a lowering of water quality accommodates important social or economic development under 18 AAC 70.015(a)(2)(A);*

The City of Kodiak addressed (4)(F) of this subsection in their Antidegradation Form 2G submittal. Excerpts from the submittal are included in the fact sheet below. The Department finds that this requirement is met.

18 AAC 70.016(c)(7)(F) 18 AAC 70.015 *and this section have been applied consistent with 33 U.S.C. 1326 (Clean Water Act, sec. 316) with regard to potential thermal discharge impairments.*

Temperature effluent limits are established in the permit that will assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on Woody Island Channel. The Department finds that this requirement is met.

The following content is from the City of Kodiak's Antidegradation Form 2G submittal.

Form 2G Sections 1 and 3- Facility Information (18 AAC 70.16(a)(5)(A-G)), Tier 1 Protection Level and Analysis (18 AAC 70.16(a)(b)):

The receiving waterbody, Woody Island Channel should have a Tier 2 protection level as defined under 18 AAC 70.016(c)(2)(A)-(E). Copper, ammonia, and temperature are pollutants of concern.

Concentrations and Persistence: ammonia (12 mg/L), copper (32.1 µg/L), temperature (16.9 ºC)

Ammonia dissociates in seawater (based on pH, salinity, and temperature) and it does not persist or

bioaccumulate. Copper is partially soluble in seawater and may exist in both dissolved and particulate forms depending on site-specific water quality characteristics. Temperature discharges are reduced very rapidly in the port jet plume, and it dissipates and is not persistent.

Potential Impacts:

Ammonia discharged to seawater can exhibit toxicity to fish in high concentrations, but it disperses and does not bioaccumulate. Dissolved copper in seawater disperses and can impact fish at high concentrations. Particulate copper can bind to sediment organic materials and is not toxic. Effluent temperature discharge impacts can create mixed temperature very close to diffuser ports that cause mobile marine organisms to avoid the temperature plume. Since the port jet plume are buoyant (due to temperature and low salinity) the seabed adjacent to the diffuser should not be exposed to continuous thermal plumes. ADEC's CORMIX modeling (10% Dry) documents the buoyant plume and mixed dilution of 14.7 at 1.16 meters from each port and plume center at 6.5 meters above seabed.

Form 2G Section 3– (Question 1) Tier 1 Protection and Analysis (18 AAC 70.016(b)):

The discharge is not to a Category 4 or Category 5 waterbody listed in the current approved Alaska's Integrated Water Quality Monitoring and Assessment Report.

Form 2G Section 4– (Questions 1 and 2) Tier 2 Protection and Analysis (18 AAC 70.016(c)):

The application is for an existing and expanded discharge that requires a Tier 2 analysis as defined under 18 AAC 70.016(c)(2)(A)-(E).

Form 2G Section 4– (Question 3A) Identification of receiving water quality and accompanying environmental impacts on the receiving water for each of the practicable alternatives.

Two effluent constituents (copper and temperature) show reasonable potential and do not have effluent limits and are considered "expanded discharge" constituents that require either treatment or dilution in mixing zones to meet water quality criteria. Background copper data (1.9 µg/L) shows Woody Island Channel has assimilative capacity for copper discharges. The maximum effluent copper concentration is 32.1 µg/L (n=49) and the City of Kodiak 2021 Consumer Confidence Report lists a 90% copper concentration of 537 µg/L in the drinking water supply. The practicable means to reduce effluent copper would be treatment of either the City's drinking water supply or a second alternative would involve treatment of the WWTF effluent. The treatment efficiency to reduce copper in water or wastewater are limited by the dissolved copper concentration in solution using a commercial adsorbent media installations for copper reduction. These methods to reduce copper in the City's drinking water or WWTF effluent would not impact receiving waters but would generate used adsorbent media as a solid waste that may or may not be allowed to be disposed in a municipal landfill and may require disposal in a hazardous waste cell or landfill.

Since effluent temperature has a reasonable potential to exceed temperature WQS numeric criteria, either treatment or dilution in mixing zones is needed. Background temperatures range from 5 to 12 deg. C in Woody Island Channel and the WQS criterion is a maximum of 15°C and a maximum rate of change limited to 0.5 deg. C per hour. The receiving water has assimilative capacity for the mixed Kodiak WWTF temperature discharges. Two potential practicable treatment methods to reduce effluent temperature at the WWTF would require installation and operation of cooling tower or installation and operation of a counter-current heat exchanger using seawater. A cooling tower would not impact receiving waters. The counter-current heat exchanger using seawater would create another underwater structure to intake cold seawater and discharge warmed seawater.

Effluent ammonia has effluent limits and is considered an "existing discharge" constituent that requires either treatment or dilution in mixing zones to meet water quality criteria. Background ammonia data (0.3 mg/L) shows Woody Island Channel has assimilative capacity for ammonia discharges. The maximum effluent ammonia concentration is 12 mg/L, and the average concentration is 4.1 mg/L. Practicable methods to reduce effluent ammonia would range from increased aeration treatment at the WWTF, installation and operation of side-stream ammonia treatment at the WWTF, or installation and operation of methods for nitrification treatment at the WWTF. These methods to reduce effluent ammonia would not impact receiving waters but would generate additional biosolids that require disposal in a municipal landfill.

Form 2G Section 4– (Question 3B) Evaluation of the cost of the practicable alternatives, relative to the degree of water quality degradation.

Copper -- Influent copper is primarily due to copper concentrations in the municipal drinking water supply. The City of Kodiak Public Utilities 2021 Consumer Confidence Report lists a 90% copper concentration of 537 µg/L in the drinking water supply. Two practicable means to reduce effluent copper that have been identified are treatment of the City's drinking water supply or treatment of the WWTF effluent. These treatment systems to reduce dissolved copper concentrations in solution would use commercial adsorbent media installations for copper reduction. Available commercial adsorbent media installations for copper reduction uses alumina media that covalently binds soluble copper. Series of flow-thru vessels would need to be designed for the site-specific application based on the system flow rates. The adsorbent media is pelletized, is only used for a limited duration, and it is not possible to regenerate or clean for repeated use and must be disposed. Disposal depends on chemical testing of the used adsorbent media by Toxicity Characteristic Leaching Procedure analysis to assess if it may be disposed in a municipal landfill.

Treatment for removal of copper in drinking water at the Kodiak water treatment facility or effluent at the Kodiak WWTF would require substantial capital investments and operations funds to install/operate the adsorbent media installations. Reducing raw drinking water copper from 537 µg/L to <10 µg/L in the drinking water supply would require a significant investment in an adsorbent media installation with a series of flow-thru vessels designed for the system flow rates. The estimated cost of the design and installation of the adsorbent media installation system at the Kodiak water treatment facility could range from $450,000 to $750,000, and the annual media replacement, chemical testing, and media disposal costs would exceed $300,000.

Reducing effluent copper from 32 to 5 µg/L (total) would require a significant investment in an adsorbent media installation with a series of flow-thru vessels designed for the WWTF flow rates. The estimated cost of the design and installation of the adsorbent media installation system at the Kodiak WWTF could range from $450,000 to $750,000, and the annual media replacement, chemical testing, and media disposal costs are estimated to cost more than $300,000.

Temperature -- Two potential practicable treatment methods to reduce effluent temperature at the Kodiak WWTF would require either installation and operation of a cooling tower, or installation and operation of a counter-current heat exchanger (using seawater) to reduce effluent temperature to match receiving water temperatures of 8 to 13 deg. C. A cooling tower or a heat exchanger would require space, piping, and mechanical and electrical infrastructure to function, as well as significant Operation and Maintenance (O&M) costs to operate to cool effluent flows that range from an average of 1.6 mgd to a maximum day flow of 5.36 mgd. A cooling tower installation would be confined to the WWTF site with piping, mechanical, and electrical infrastructure to operate year-round. If the objective of design is reducing effluent discharge temperature to the ambient seawater temperature of ~10 deg. C, then the design and construction costs could range from $350,000 to $550,000, and the annual O&M costs would exceed $250,000 for a cooling tower

A heat exchanger would require space, piping, and mechanical and electrical infrastructure to function, as well as significant O&M costs to operate to cool effluent flows. The heat exchanger would require a cold-water source to pipe into the heat exchanger and this could be seawater or groundwater from an onsite well. The heat exchanger would need to be sized for the effluent flow range (1.6 to 5.36 mgd). The heat exchanger would be located on the WWTF site with piping, mechanical, and electrical infrastructure to operate year-round. If seawater is the cooling water source, then an intake pipe would need to be designed, permitted, and constructed from the WWTF to Woody Island Channel. Unless the heated outflow from the heat exchanger can be disposed in Woody Island Channel (another thermal discharge source) or via injection, it would need to flow through a cooling tower prior to discharge. Assuming that the objective of design is reducing effluent discharge temperature to the ambient seawater temperature of ~10 deg. C, then the design and construction costs could range from $450,000 to $750,000, and the annual O&M costs would exceed $350,000 for a heat exchanger system.

A cooling tower would not impact receiving waters. The counter-current heat exchanger using seawater would

create another underwater structure to intake cold seawater and discharge warmed seawater.

Ammonia -- Ammonia treatment is included in the secondary treatment system and additional treatment alternatives that are practicable for the Kodiak WWTF include: 1) design and installation of larger horsepower pumps in the existing two aeration basins to enhance aeration, 2) design and installation of an effluent side-stream ammonia treatment system from the secondary clarifiers, and 3) modifications to secondary clarifiers to increase solids retention time for nitrification treatment of ammonia. These additional ammonia treatment additions beyond the existing aeration and secondary treatment system would require a wide range of substantial capital investments and facility operational and energy expenditures to achieve a range of reductions in effluent ammonia concentrations.

Design and installation of larger horsepower pumps in the existing two aeration basins to enhance aeration would be the lowest investment cost and would yield the lowest reduction in effluent ammonia. Design and construction costs could range from $200,000 to $350,000, and the annual O&M costs including added electric usage would exceed $200,000.

Design and installation of an effluent side-stream ammonia treatment system from the secondary clarifiers would be the intermediate investment cost and would yield an intermediate level of reduction in effluent ammonia. Design and construction costs could range from $400,000 to $750,000, and the annual O&M costs including added electric usage would exceed $200,000.

Design and installation of modifications to secondary clarifiers to increase solids retention time for nitrification treatment of ammonia would be the highest investment cost and would yield the highest level of reduction in effluent ammonia. Design and construction costs could range from $900,000 to $1,550,000, and the annual O&M costs including added electric usage would exceed $300,000.

Form 2G Section 4– (Question 3C) Identification of a proposed practicable alternative that prevents or lessens water quality degradation while also considering accompanying cross-media environmental impacts.

None of the potential practicable alternatives for the Kodiak WWTF reduction of copper, temperature, and ammonia that are discussed in Section 4 -Question 38 (above) are proposed since they are not feasible for the City of Kodiak WWTF due to the magnitude of capital and O&M costs for each alternative. If the City of Kodiak WWTF was required by ADEC to fund the design, construction, and operation of additional treatment systems for reduction of effluent copper, ammonia and temperature as described above in answers to Section 3 - Question 38 the source of such large funding amounts is unknown. Funding these additional treatment system elements would be an undue burden to the small working community in Kodiak and it would negatively impact the quality of life and immigration of new residents and businesses. In 2023, the estimated median household income level in Kodiak is $67,391, and approximately 500 of 5,500 people living in the City of Kodiak have incomes below the poverty level.

Form 2G Section 4– (Question 4) Social or Economic Importance

Social Importance Analysis areas selected for analysis: community services provided, public health or safety improvements, infrastructure improvements.

Economic Importance Analysis areas selected for analysis: tax base impacts

The City of Kodiak's WWTF is a significant and critical investment in public health and safety. The design, operation, and maintenance of the collection system, treatment facilities, and outfall structure are essential to provide the Kodiak community with reliable waste treatment and disposal that allow for economic and social development. In addition, these facilities are key to protecting public health and environmental quality for the community – in the sewage drainage system onshore as well as in Woody Island Channel offshore. The WWTF staff have performed receiving water monitoring as required in the APDES permit and these water quality sampling have shown that the WWTF discharge via the submerged multi-port diffuser has not adversely impacted water quality or biota in Woody Island Channel. The City has a long track record of investing in the WWTF to operate and maintain the collection system and WWTF infrastructure to comply with state and federal regulations, and to sustain and improve public health and environmental quality for the community. The Kodiak WWTF and associated staff provide essential support and a positive effect on the community through

the following activities:

- Employment of WWTF and City sewer services staff,
- Collection system improvements to allow infrastructure improvements for residential customers, and
- Biosolids management for the City and the USCG Kodiak Base at the Kodiak Biosolids Composting Facility (Solid Waste Permit No. SWZA060-25)

Form 2G Section 5- (Question 1) Protection Level and Analysis (18 AAC 70.16(d))

The discharge is not to a designated Tier 3 water.

7.0 OTHER PERMIT CONDITIONS

7.1 Quality Assurance Project Plan (QAPP)

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, implement and/or maintain the QAPP. The QAPP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing, and shipping samples; laboratory analysis; precision and accuracy requirements; data reporting, including method detection/reporting limits; and quality assurance/quality control criteria. The permittee is required to amend the QAPP whenever any procedure addressed by the QAPP is modified. The plan shall be retained on site and made available to the Department upon request.

7.2 Operation and Maintenance Plan (O&M Plan)

The permit requires the permittee to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limitations, monitoring requirements, and all other permit requirements at all times. The permittee is required to review and update the O&M Plan that was required under the previous permit within 120 days of the effective date of the final permit to ensure that it includes appropriate best management practices and pollution prevention measures. The plan shall be retained on site and made available to the Department upon request.

7.3 Industrial User Survey

18 AAC 83.340 requires POTWs to identify and locate all Significant Industrial Users (SIUs) that discharge process wastewaters and associated pollutants to their wastewater treatment system. General and specific pretreatment prohibitions at 40 CFR 403.5, adopted by reference at 18 AAC 83.010(g)(2), contain prohibitions that apply to each industrial user introducing pollutants into a POTW, whether or not the industrial user is subject to other National Pretreatment Standards, or any national, State, or local Pretreatment Requirements. Therefore, in order to assess whether an industry or business has the potential to violate any general or specific pretreatment prohibition, and to determine if a pretreatment program should be developed and/or if pretreatment requirements should be included in the City of Kodiak WWTF wastewater discharge permit, the permittee is required to submit with their permit reissuance application, Form 2A, a list of those industries or businesses that discharge and/or have the potential to discharge non-domestic wastewater to the WWTF's collection system. DEC may request further information on specific industries or business to assist in this evaluation.

7.4 Electronic Discharge Monitoring Report

The permittee must submit DMR data electronically through NetDMR per Phase I of the E-Reporting Rule (40 CFR 127) upon the effective date of the permit. Authorized persons may access permit information by logging into the NetDMR Portal (https://cdxnodengn.epa.gov/oeca-netdmr-web/action/login). DMRs submitted in compliance with the E-Reporting Rule are not required to be submitted as described in permit APPENDIX A – Standard Conditions unless requested or approved by the Department. Any DMR data required by the Permit that cannot be reported in a NetDMR field (e.g., mixing zone receiving water data, etc.), shall be included as an attachment to the NetDMR submittal. DEC has established an e-Reporting Information website at

https://dec.alaska.gov/water/compliance/electronic-reporting-rule that contains general information about this new reporting format.

Phase II of the E-Reporting rule will integrate electronic reporting for all other reports required by the Permit (e.g., Annual Reports and Certifications) and implementation is expected to occur during the term of the permit. Permittees should monitor DEC's E-Reporting Information website (http://dec.alaska.gov/water/compliance/electronic-reporting-rule) for updates on Phase II of the E-Reporting Rule and will be notified when they must begin submitting all other reports electronically. Until such time, other reports required by the Permit may be submitted in accordance with permit APPENDIX A – Standard Conditions.

7.5 Standard Conditions

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

8.0 OTHER LEGAL REQUIREMENTS

8.1 Ocean Discharge Criteria

Section 403(a) of the CWA, Ocean Discharge Criteria, prohibits the issuance of a permit under Section 402 of the CWA for a discharge into the territorial sea, the water of the contiguous zone, or the oceans except in compliance with Section 403. Permits for discharges seaward of the baseline of the territorial seas must comply with the requirements of Section 403, which include development of an Ocean Discharge Criteria Evaluation (ODCE).

Interactive nautical charts depicting Alaska's baseline plus additional boundary lines are available at https://www.charts.noaa.gov/ChartCatalog/Alaska.html and interactive maps at https://alaskafisheries.noaa.gov/mapping/arcgis/rest/services/NOAA_Baseline/MapServer.

The charts and maps are provided for information purposes only. The U.S. Baseline committee makes the official determinations on baseline. Ocean Discharge Criteria are not applicable for marine discharges to areas located landward of the baseline of the territorial sea.

A review of the baseline line maps revealed that the baseline extends across Chiniak Bay, seaward of Long and Woody Island across to Chiniak. The City of Kodiak WWTF outfall terminus is positioned landward of the baseline of the territorial sea; therefore, Section 403 of the CWA does not apply to the permit, and an ODCE analysis is not required to be completed for this permit reissuance. Further, the permit requires compliance with WQS such that 40 CFR 125.122(b) is met and therefore the discharge is presumed not to cause unreasonable degradation of the marine environment.

8.2 Endangered Species Act

The Endangered Species Act (ESA) requires federal agencies to consult with the USFWS and NMFS to determine whether their actions could beneficially or adversely affect any threatened or endangered species or habitats. NMFS is responsible for administration of the ESA for listed cetaceans, seals, sea lions, sea turtles, anadromous fish, marine fish, marine plants, and corals. All other species (including polar bears, walrus, and sea otters) are administered by the USFWS.

As a state agency, DEC is not required to consult with these federal agencies regarding permitting actions; however, DEC voluntarily contacted the agencies to notify them of the proposed permit issuance and to obtain listings of threatened and endangered species near the discharge. DEC contacted the USFWS and NMFS on

June 1, 2023 and requested them to identify any threatened or endangered species under their jurisdiction in the vicinity of the Kodiak WWTF outfall. Neither agency responded.

DEC reviewed the USFWS website at https://ecos.fws.gov/ipac/ which showed that the threatened Northern Sea Otter and Steller's Eider, and the endangered Short-tailed Albatross may be present in the vicinity of the Kodiak WWTF outfall. DEC also consulted the NMFS endangered species mapper at https://alaskafisheries.noaa.gov/portal/apps/webappviewer/index.html which showed that the endangered Steller Sea Lion, and the Humpback, North Pacific Right, and Sperm Whales may be present near the Kodiak WWTF outfall.

The fact sheet and the permit will be provided to the agencies for review during the public notice period and any comments received from these agencies will be considered prior to issuance of the permit.

8.3 Essential Fish Habitat (EFH)

EFH) includes the waters and substrate (sediments, etc.) necessary for fish from commercially-fished species to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires federal agencies to consult with NOAA when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. As a State agency, DEC is not required to consult with NMFS regarding permitting actions, but voluntarily contacts NMFS to notify them of the proposed permit issuance and to obtain listings of EFH in the area. DEC contacted NMFS on June 1, 2023 to provide them the opportunity to share concerns with DEC regarding EFH. NMFS did not respond.

DEC accessed the NMFS Endangered Species Act Critical Habitat Mapper on the NMFS website at https://www.fisheries.noaa.gov/alaska/habitat-conservation/essential-fish-habitat-efh-alaska which showed that the area near the Kodiak WWTF outfall could be EFH for numerous species including skate, pollock, sole, flounder, rockfish, pacific cod, mackerel, Irish lord, sablefish, octopus, and all five species of salmon.

This fact sheet and the permit will be provided to NMFS for review during the public notice period and any comments received from NMFSS will be considered prior to issuance of the permit.

8.4 Sludge (Biosolids) Requirements

Sludge means any solid, semi-solid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. State and federal requirements regulate the management and disposal of sewage sludge (biosolids). The permittee must consult both state and federal regulations to ensure proper management of the biosolids and compliance with applicable requirements.

8.4.1 State Requirements

The Department separates wastewater and biosolids permitting. The permittee should contact the Department's Solid Waste Program for information regarding state regulations for biosolids. The permittee can access the Department's Solid Waste Program web page for more information and who to contact.

8.4.2 Federal Requirements

EPA is the permitting authority for the federal sewage sludge regulations at 40 CFR Part 503. Biosolids management and disposal activities are subject to the federal requirements in Part 503. The Part 503 regulations are self-implementing, which means that a permittee must comply with the regulations even if no federal biosolids permit has been issued for the facility.

A POTW is required to apply for an EPA biosolids permit. The permittee should ensure that a biosolids permit application has been submitted to EPA. In addition, the permittee is required to submit a biosolids permit application to EPA for the use or disposal of sewage sludge at least 180 days before this APDES permit expires in accordance with 40 CFR §§122.21(c)(2) and 122.21(q) [see also 18 AAC 83.110(c) and 18 AAC 83.310, respectively]. The application form is NPDES Form 2S and can be found on EPA's website, www.epa.gov, under NPDES forms. A completed NPDES Form 2S should be submitted to:

U.S. Environmental Protection Agency
Region 10, NPDES Permits Unit OWW-130
Attention: Biosolids Contact
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

The EPA Region 10 telephone number is 1-800-424-4372. Information about EPA's biosolids program and CWA Part 503 is available at www.epa.gov and either search for 'biosolids' or go to the EPA Region 10 website link and search for 'NPDES Permits'.

8.5 Permit Expiration

The permit will expire five years from the effective date of the permit.

9.0 REFERENCES

Alaska Department of Environmental Conservation (ADEC), 2022. Integrated water quality monitoring and assessment report. https://dec.alaska.gov/water/water-quality/integrated-report Accessed November 28, 2023.

ADEC, 2022. 18 AAC 70, Water quality standards, as amended through November 13, 2023.

ADEC, 2022. Alaska water quality criteria manual for toxic and other deleterious organic and inorganic substances, as amended through September 8, 2022.

ADEC, 2014. Alaska Pollutant Discharge Elimination System permits reasonable potential analysis and effluent limits development guide.

Doneker, Robert and Jirka, Gerhard. 2007. CORMIX user manual, U.S. Environmental Protection Agency,EPA-823-K-07-001, December 2007, updated July 2021.

National Oceanic and Atmospheric Administration. https://www.habitat.noaa.gov/apps/efhmapper/. Accessed November 27, 2023.

U.S. Environmental Protection Agency. USEPA, 1991. Technical support document for water quality-based toxics control, EPA/505/2-90-001, USEPA Office of Water, Washington D.C., March 1991.

U.S. Fish and Wildlife Service iPac information for planning and consultation. https://ecos.fws.gov/ipac/. Accessed November 28, 2023.

APPENDIX A. BASIS FOR EFFLUENT LIMITATIONS

A.1 Statutory and Regulatory Basis

18 Alaska Administrative Code (AAC) 70.010 prohibits conduct that causes or contributes to a violation of the water quality standards (WQS). 18 AAC 15.090 requires that permits include terms and conditions to ensure criteria are met, including operating, monitoring, and reporting requirements.

The regulations require the permitting authority to make this evaluation using procedures that account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving waterbody. The limits must be stringent enough to ensure that WQS are met and must be consistent with any available wasteload allocation. The Clean Water Act (CWA) requires a Publicly Owned Treatment Works (POTWs) to meet effluent limits based on available wastewater treatment technology, specifically, secondary treatment effluent limit standards found at Title 40 Code of Federal Regulations (CFR) 133, adopted by reference at 18 AAC 83.010(e). The Alaska Department of Environmental Conservation (Department or DEC) may find, by analyzing the effect of an effluent discharge on the receiving waterbody, that secondary treatment effluent limits are not sufficiently stringent to meet Alaska WQS. In such cases, the Department is required to develop more stringent water quality-based effluent limits (WQBELs), which are designed to ensure that the WQS of the receiving waterbody are met.

Secondary treatment effluent limits for POTWs do not limit every pollutant that may be present in the effluent. Limits have only been developed for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. Effluent from a POTW may contain other pollutants, such as bacteria, ammonia, or metals, depending on the type of treatment system used and the quality of the influent to the POTW. When technology-based effluent limits (TBELs) do not exist for a pollutant expected to be present in the effluent, the Department must determine if the pollutant may cause or contribute to an exceedance of a water-quality criterion for the waterbody. If a pollutant causes or contributes to an exceedance of a water-quality criterion, a WQBEL for the pollutant must be established in the permit. Table A-1 summarizes the basis for effluent limits contained in the permit. Further details for each effluent limit follow in this section.

Table A-1- Basis for Effluent Limits

Parameter	Units [a]	EFFLUENT LIMITS				
		Daily Minimum	Monthly Average	Weekly Average	Daily Maximum	Basis for Limit
Total Discharge Flow	mgd	---	4.7	---	6.2	18 AAC 72.245
BOD_5	mg/L	---	30	45	60	18 AAC 83.010(e) 18 AAC 83.540
	lbs/day	---	1,176	1,764	3,102	
TSS	mg/L	---	30	45	60	18 AAC 83.010(e) 18 AAC 83.540
	lbs/day	---	1,176	1,764	3,102	
BOD_5 & TSS Minimum Percent Removal	%	85				18 AAC 83.010(e)
pH	S.U.	6.5	---	---	8.5	18 AAC 70.020(b)(18)
Temperature	ºC	---	18	---	27	18 AAC 70.020(b)(22)
Dissolved Oxygen	mg/L	6.0	---	---	17	18 AAC 70.020(b)(15)
Fecal Coliform (FC) Bacteria	FC/100 mL	---	200	400	800	18 AAC 72.050(a)(3) 18 AAC 72.990(25)
Enterococci Bacteria	MPN/100mL	---	35	---	130 [b]	18 AAC 70.020(b)(14)
Total Ammonia as Nitrogen	mg/L	---	9.39	14	19.09	18 AAC 70.020(b)(23) 18 AAC 83.530 18 AAC 83.540
	lbs/day		368	549	987	
Copper, total recoverable	µg/L	---	23	35	39	18 AAC 70.020(b)(23) 18 AAC 83.530 18 AAC 83.540
	lbs/day		902	1,372	2,017	

Footnotes:

a. Units: mgd = million gallons per day, mg/L = milligrams per liter, lbs/day = pounds per day, S.U. = standard units, FC/100 mL = Fecal Coliform per 100 milliliters, MPN/100 mL = most probable number per 100 milliliters, µg/L= micrograms per liter, ºC =degrees Celsius

b. Not more than one sample, or if more than ten enterococci bacteria samples are collected during the 30-day monthly reporting period, not more than 10% of the samples may exceed a statistical threshold value of 130 cfu/100 mL.

A.2 Technology-Based Effluent Limitations in the Kodiak WWTF Permit

A.2.1 BOD_5 and TSS

The CWA requires a POTW to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977. The secondary treatment standards in 40 CFR §133.102, which the Department has adopted in 18 AAC 83.010(e), are TBELs that apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. In addition to the federal secondary treatment

regulations in 40 CFR Part 133, the State of Alaska at 18 AAC 72.990(59) contains BOD_5 and TSS maximum daily characteristics. The secondary treatment limits are listed in Table A-2.

Table A-2- Secondary Treatment Effluent Limits

Parameter	Units	Average Monthly Limit	Average Weekly Limit	Daily Maximum Limit	Average Monthly Minimum Removal
BOD_5	mg/L	30	45	60	85%
TSS	mg/L	30	45	60	
pH	S.U.	6.0 – 9.0 S.U. at all times			

A.2.2 Fecal Coliform (FC) Bacteria

Alaska Wastewater Regulations at 18 AAC 72.050. Minimum treatment (a)(3) states that the department may authorize a person to discharge domestic wastewater into or onto water or land if the discharge to surface waters has received secondary treatment and has been disinfected. 18 AAC 72.990(25) defines disinfect as meaning to treat by means of chlorination, ozonation, application of ultraviolet light (UV), sterilization, or another chemical, physical, or other process designed to reduce or eliminate pathogenic organisms and produce an effluent with the following characteristics:

(A) an arithmetic mean of the values for a minimum of five effluent samples collected in 30 consecutive days that does not exceed 200 FC/100 mL; and
(B) an arithmetic mean of the values for effluent samples collected in seven consecutive days that does not exceed 400 FC/100/mL.

The above limits are based on the technological capability of disinfection; therefore, DEC is applying them as TBELs in the permit. In order to ensure the attainment of the mean FC Bacteria concentrations, DEC has also established 800 FC/100 mL as a daily maximum TBEL. Establishing a maximum limit creates an upper boundary whereby if FC Bacteria concentrations do not exceed the daily maximum limit, there will be an increased likelihood that the FC Bacteria concentrations used for averaging, will comply with the monthly and weekly FC Bacteria concentration average limits.

As a result of a compliance schedule in the prior permit that required the City of Kodiak to meet more stringent FC Bacteria effluent limits than their permit had previously, the City of Kodiak upgraded their WWTF by adding UV disinfection. Upgrades were completed in October 2021completed; therefore, DEC only considered FC Bacteria monitoring results that were collected after the implementation of UV disinfection. Daily maximum concentration between October 2021 and September 2023 ranged from 2 FC/100 mL to 208 FC/100 mL.

The Kodiak WWTF, while their effluent has mostly be in compliance with the FC Bacteria TBELs, they have not demonstrated yet that they can consistently meet FC Bacteria water quality criteria at 18 AAC 70.020(b)(14)(D) which states that FC Bacteria criteria for the harvesting for consumption of raw mollusks or other raw aquatic life the geometric mean of samples may not exceed 14 FC/100 mL, and not more than 10% of the samples may exceed a FC most probable number of 43 FC/100 mL. Therefore, the final FC Bacteria TBELs from the prior permit (average monthly 200 FC/100 mL, average weekly 400 FC/100 mL, daily maximum 800 FC/100mL) are carried forward in the reissued permit.

A.3 Water Quality-Based Effluent Limitations

WQBELs included in Alaska Pollutant Discharge Elimination System (APDES) permits are derived from WQS. APDES regulation 18 AAC 83.435(a)(2) requires that permits include WQBELs that can achieve WQS established under CWA Section 303, including state narrative criteria for water quality. The State's WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an

antidegradation policy. The use classification system identifies the designated uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the designated use classification of each waterbody. Designated uses are those uses specified in WQS for each waterbody or segment whether or not they are being attained [40 CFR Section 131.3(f)]. Existing uses are those uses actually attained in a waterbody on or after November 28, 1975, whether or not they are included in the WQS [40 CFR Section 131.3].

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 criteria per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b).

The receiving waterbody for the discharge, Woody Island Channel, has not been reclassified, nor have site-specific water quality criteria been established. Therefore, Woody Island Channel must be protected for all marine water designated uses. The marine water designated uses are: water supply for aquaculture, seafood processing and industrial; contact and secondary recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life.

A.3.1 Reasonable Potential Analysis

The Department used the process described in the Technical Support Document for Water Quality-Based Toxics Control (Environmental Protection Agency, 1991) and DEC's guidance, APDES *Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 30, 2014) to evaluate the Kodiak WWTF's effluent. Discharge monitoring reports from October 2018 to September 2023 and Form 2A Application to Discharge Effluent and Expanded Effluent Testing Data were reviewed to identify pollutants of concern. Pollutants of concern are those pollutants that already have a TBEL or WQBEL for a particular pollutant, pollutants with a total maximum load waste load allocation or watershed analysis, pollutants identified as present in the effluent through monitoring, or those pollutants that are likely to be present in the effluent based on the nature of the operation. The monitoring results revealed the presence of ammonia, copper, and temperature at levels above water quality criteria; therefore, these pollutants are pollutants of concern and were selected for further reasonable potential analysis (RPA).

When evaluating the effluent to determine if WQBELs based on chemical-specific numeric criteria are needed, the Department projects the receiving waterbody concentration for each pollutant of concern downstream of where the effluent enters the receiving waterbody. The chemical-specific concentration of the effluent and receiving waterbody and, if appropriate, the dilution available from the receiving waterbody, are factors used to project the receiving waterbody concentration. If the projected concentration of the receiving waterbody exceeds the numeric criterion for a limited parameter, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a WQBEL must be developed.

The Department may authorize a small volume of receiving water to provide dilution of the effluent; this volume is called a mixing zone. Mixing zone allowances will increase the allowable mass loadings of the pollutant to the waterbody. A mixing zone can be used only when there is adequate receiving waterbody flow volume, and the concentration of the pollutant of concern in the receiving waterbody is below the numeric water quality criterion necessary to protect the designated uses of the waterbody.

A.3.2 Water Quality-Based Effluent Limits in the Kodiak WWTF Permit

A.3.2.1 pH

Alaska WQS at 18 AAC 70.020(b)(18)(A)(i) (aquaculture) and 18 AAC 70.020(b)(18)(C) (Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife) states that the pH water quality criteria for marine water, "May not be less than 6.5 or greater than 8.5. Standard Units (S.U.) and may not vary more than 0.2 pH unit outside the naturally occurring range.".

DEC reviewed the monthly pH effluent monitoring results of the City of Kodiak WWTF from October 2018 – September 2023. The minimum pH value reported as 6.5 S.U. and the maximum pH value reported was 8.2 S.U. The effluent meets pH water quality criteria; therefore, the pH water quality-based limits contained in the prior permit (6.5 S.U. daily minimum, 8.5 S.U. daily maximum) are carried forward in the reissued permit.

A.3.2.2 Temperature

Alaska WQS at 18 AAC 70.20(b)(22) states that temperature for aquaculture, growth and propagation of fish, shellfish, other aquatic life, and wildlife and harvesting for consumption of raw mollusks or other aquatic life, "may not cause the weekly average temperature to increase more than 1 degree Celsius (°C). The maximum rate of change may not exceed 0.5 °C per hour. Normal daily temperature cycles may not be altered in amplitude or frequency."

DEC analyzed the reasonable potential for temperature to exceed water quality criteria as the difference in temperature or Delta T (ΔT) between the effluent and boundary of the mixing zone. Zero and negative temperature values do not result in lowering of water quality of the receiving water per application of the State's temperature water quality standard. Therefore, DEC used only positive receiving water temperature values in the reasonable potential analysis and mixing zone modelling. This resulted in the assumption of a critical receiving water temperature of 0 °C and 1 °C as the water quality standard numeric criteria that must be met at the boundary of the mixing zone (0 °C + 1 °C = 1 °C). DEC used the facility's monthly daily maximum temperature values between October 2018 and September 2023 to reflect the worst-case scenario for ΔT. The temperature ranged from 6.2 °C to 17.5 °C. DEC determined that temperature has reasonable potential to exceed water quality standards; therefore, DEC developed WQBELs (daily maximum 27 °C, monthly average 18 °C).

A.3.2.3 *Dissolved Oxygen (DO)*

Alaska WQS at 18 AAC 70.020(b)(15)(A)(i) Aquaculture states that surface marine DO concentrations for aquaculture, contact recreation, secondary recreation, the harvesting for consumption of raw mollusks or other raw aquatic life, and the growth and propagation of fish, shellfish, other aquatic life, and wildlife, must not be less than 6.0 milligrams per liter (mg/L) and that in no case may DO levels exceed 17 mg/L.

DEC reviewed DO monitoring data from October 2018 – September 2023. During this period, with the exception of two reported concentrations below 6.0 mg/L, the facility consistently met the above stated DO water-quality criteria. DO daily concentrations ranged from 5.9 mg/L to 10.2 mg/L. Therefore, DEC has determined the facility can meet DO water quality-criteria and has modified the daily minimum DO limit contained in the prior permit from 4.0 mg/L to 6.0 mg/L. The 17 mg/L daily maximum remains unchanged in the reissued permit.

A.3.2.4 Enterococci Bacteria

Alaska WQS at 18 AAC 70.020(b)(14)(B) for contact recreation specifies that the enterococci bacteria concentration shall not exceed 35 enterococci cfu/100mL, and not more than an 10% of the samples may exceed a concentration of 130 enterococci cfu/100mL. Contact recreation is defined as activities in which there is direct and intimate contact with water. These activities typically only take place during the summer season, May to September.

Under the previous permit enterococci bacteria was monitored once per month May through September. The City of Kodiak completed disinfection upgrades on October 1, 2021; therefore, DEC only reviewed enterococci bacteria monitoring results from after the completion of the upgrades beginning with the following season in May 2022 (first month of the required sampling period following completion of UV

disinfection installation) through September 2023. During this time period, there was only one exceedance of water quality criteria, with results ranging from 1.0 cfu/100mL to 2,420 cfu/100 mL. The City of Kodiak noted an upset at the facility at the time the enterococci bacteria sample with the 2,420 cfu/100 mL concentration was collected. Because the sample is not representative of normal operating conditions, DEC did not include the 2,420 cfu/100 mL sample result in the evaluation of enterococci bacteria compliance with water quality criteria. With the exclusion of the non-representative sample, results ranged from 1.0 cfu/100mL to 24.1 cfu/100 mL. The facility has demonstrated that the Kodiak WWTF effluent consistently meets enterococci bacteria water quality criteria; therefore, enterococci bacteria water quality criteria are applied as effluent limits in the reissued permit and must be met prior to discharge into Woody Island Channel.

A.3.2.5 Total Ammonia, as Nitrogen

Alaska WQS at 18 AAC 70.020(b)(23) states that the concentration of substances in water may not exceed the numeric criteria in the Alaska Water Quality Criteria Manual. Total ammonia is the sum of ionized (NH4+) and un-ionized ammonia (NH3). Temperature, pH, and salinity affect which form, NH4+ or NH3 is present. NH3 is more toxic to aquatic organisms than NH4+ and predominates with higher temperature and pH. Biological wastewater treatment processes reduce the amount of total nitrogen in domestic wastewater; however, without advanced treatment, wastewater effluent may still contain elevated levels of ammonia as nitrogen. Excess ammonia as nitrogen in the environment can lead to dissolved oxygen depletion, eutrophication, and toxicity to aquatic organisms.

DEC used the 85th percentile of pH and temperature and the 15th percentile salinity receiving water data collected by the City of Kodiak from Woody Island Channel to establish an acute ammonia water quality criterion of 7.96 mg/L and a chronic ammonia water quality criterion of 1.2 mg/L. Effluent ammonia monitoring from October 2018 to September 2023 daily maximum results ranged from 1.0 mg/L to 12 mg/L. The RPA of the effluent data indicates that there is reasonable potential for ammonia to exceed water quality criteria at the end of pipe. Since there is reasonable potential for ammonia to exceed water quality criteria at the end of the pipe, WQBELs were developed for ammonia. The WQBELs (39 mg/L daily maximum, 23 mg/L monthly average), are less stringent than the WQBELs in the prior permit (19.09 mg/L daily maximum, 9.39 mg/L monthly average). 18 AAC 83.480, Reissued Permits, states that a reissued permit may not contain effluent limits that are less stringent than the previous permit; therefore, DEC has selected the more stringent ammonia effluent limits for the reissued permit.

18 AAC 83.530(d) requires effluent limits from a continuously discharging POTW to be stated as average weekly and average monthly limits unless impracticable. Secondary treatment standards at 18 AAC 83.605 establishes average weekly limits (AWL) as being 1.5 times the average monthly limit (AML). Following this precedent, the AWL for ammonia is derived by multiplying ammonia's AML of 9.39 mg/L 1.5 times to obtain an AWL of 14 mg/L. See Appendix B for details on reasonable potential determination and Appendix C for details on permit limit derivation.

A.3.2.6 Copper, total recoverable

Alaska WQS at 18 AAC 70.020(b)(23) states that the concentration of substances in water may not exceed the numeric criteria for aquatic life for marine water shown in the Alaska Water Quality Criteria Manual. The acute aquatic life copper concentration (total recoverable) may not exceed 5.8 micrograms per liter (µg/L) and the chronic aquatic life copper concentration (total recoverable) may not exceed 3.7 µg/L.

DEC reviewed Copper monitoring data from October 2018 to September 2023. Results ranged from 8.3 µg/L to 34 µg/L. An outlier result of 701 µg/L for the month of May 2020 was omitted from analysis because the result was attributed to sample bottle contamination. The RPA of the effluent data indicates that there is reasonable potential for copper to exceed water quality criteria. Since there is reasonable potential

for copper to exceed water quality criteria at the end of the pipe, WQBELs were developed for copper (daily maximum 39 µg/L, average monthly 23 µg/L).

18 AAC 83.530(d) requires effluent limits from a continuously discharging POTW to be stated as average weekly and average monthly limits unless impracticable. Secondary treatment standards at 18 AAC 83.605 establishes AWLs as being 1.5 times the AML. Following this precedent, the AWL for copper is derived by multiplying ammonia's AML of 23 µg/L 1.5 times to obtain an AWL of 35 µg/L. See Appendix B for details on reasonable potential determination and Appendix C for details on permit limit derivation.

APPENDIX B. REASONABLE POTENTIAL DETERMINATIONB

The following describes the process the Alaska Department of Environmental Conservation (the Department or DEC) used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to a violation of Alaska Water Quality Standards (WQS). The Department used the process described in the *Technical Support Document* (TSD) *for Water Quality-Based Toxics Control* (Environmental Protection Agency, 1991) and DEC's guidance, *Alaska Pollutant Discharge Elimination System Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 30, 2014) (RPA Guide) to determine the reasonable potential for any pollutant to exceed a water quality numeric criterion.

To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, the Department compares the maximum projected receiving waterbody concentration to the criteria for that pollutant. Reasonable potential to exceed exists if the projected receiving waterbody concentration exceeds water quality criteria, and a water quality-based effluent limit (WQBEL) must be included in the permit (18 Alaska Administrative Code 83.435).

The ambient concentration in the mass balance equation is based on a reasonable worst-case estimate of the pollutant concentration upstream from the discharge. For criteria that are expressed as maxima, the 85th percentile of the ambient data is generally used as an estimate of the worst case. If ambient data is not available, DEC uses 15% of the most stringent given pollutant's criteria as a worst-case example. Copper is used as an example to demonstrate the reasonable potential determination process.

B.1 Mass Balance

For a discharge to a flowing waterbody, the maximum projected receiving waterbody concentration is determined using a steady state model represented by the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \text{(Equation B-1)}$$

Where,

C_d = Receiving waterbody concentration downstream of the effluent discharge

C_e = Maximum projected effluent concentration

C_u = Assumed receiving waterbody ambient concentration

Q_d = Receiving waterbody flow rate = $Q_e + Q_u$

Q_e = Effluent flow rate (set equal to the design flow of the wastewater treatment facility)

Q_u = Receiving waterbody flow rate

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_e Q_e + C_u Q_u}{Q_e + Q_u} \qquad \text{(Equation B-2)}$$

The above form of the equation assumes that the discharge is rapidly and completely mixed with the receiving waterbody. If a mixing zone based on a percentage of the critical flow in the receiving waterbody is authorized based on the assumption of incomplete mixing with the receiving waterbody, the equation becomes:

$$C_d = \frac{C_e Q_e + C_u (Q_U \times MZ)}{Q_e + (Q_u \times MZ)} \qquad \text{(Equation B-3)}$$

Where, MZ = the fraction of the receiving waterbody flow available for dilution.

Where mixing is rapid and complete, MZ is equal to 1 and equation B-2 is equal to equation B-3 (i.e., all of the critical low flow volume is available for mixing). If a mixing zone is not authorized, dilution is not considered when projecting the receiving waterbody concentration, and

$$C_d = C_e \quad \text{(Equation B-4)}$$

In other words, if a mixing zone is not authorized, the Department considers only the concentration of the pollutant in the effluent regardless of the upstream flow and concentration. If the concentration of the pollutant in the effluent is less than the WQS numeric criteria, the discharge cannot cause or contribute to a water quality violation for that pollutant. In this case, the mixing or dilution factor (% MZ) is equal to zero and the mass balance equation is simplified to $C_d = C_e$.

Equation B-2 can be simplified by introducing a dilution factor (D):

$$D = \frac{Q_e + Q_u}{Q_e} \quad \text{(Equation B-5)}$$

After the D simplification, this becomes:

$$C_d = \frac{(C_e - C_u)}{D} + c_u \quad \text{(Equation B-6)}$$

B.2 Maximum Projected Effluent Concentration

To calculate the maximum projected effluent concentration, the Department used the procedure described in section 3.3 of the TSD, "*Determining the Need for Permit Limits with Effluent Monitoring Data*" and the process described in section 2.4 of DEC's RPA Guide. In this procedure, the 99th percentile of the effluent data is the maximum projected effluent concentration which is used in the calculation of the maximum projected receiving waterbody concentration.

Since there are a limited number of data points available, the 99th percentile is calculated by multiplying the maximum observed effluent concentration (MOC) by a reasonable potential multiplier (RPM). The RPM is the ratio of the 99th percentile concentration to the MOC and accounts for the statistical uncertainty in the effluent data. The RPM is calculated from the coefficient of variation (CV) of the data and the number of data points. The CV is defined as the ratio of the standard deviation of the data set to the mean. When fewer than 10 data points are available, the TSD and DEC's RPA Guide recommends assuming that the CV is equal to 0.6. A CV value of 0.6 is a conservative estimate that assumes a relatively high variability. In the example of copper, the Department used ProUCL version 5.2, a statistical software program, to determine a CV of 0.4126. ProUCL indicated that the data set follows a Gamma statistical distribution. Therefore, the RPM equation in section 2.4.2.1 of the RPA Guide is used to determine the RPM for copper.

$$RPM = \frac{\hat{\mu}_n + z_{99}\,\hat{\sigma}}{\hat{\mu}_n + p_n\,\hat{\sigma}} \quad \text{(Equation B-7)}$$

Where,

z_{99} = the z − statistic at the 99th percentile = 2.326

$\hat{\mu}_n$ = mean calculated by ProUCL = 16.78

$\hat{\sigma}$ = the standard deviation calculated by ProUCL = 6.923

p_n = the z − statistic at the 95th percent confidence level of $(1 - 0.95)^{\frac{1}{n}} = 0.953$

n = number of valid data samples = 62

$$RPM = 1.2$$

The maximum expected concentration (MEC) is determined by multiplying the MOC by the RPM:

$$MEC = (RPM)(MOC) \quad \text{(Equation B-8)}$$

MOC = 34 micrograms per liter (µg/L)

In the case of copper,

MEC = (1.2)(34) = 40.8 µg/L*

* The above MEC calculation is simplified. The Department's RPA tool calculates the MEC using unrounded figures than contain a higher degree of precision. The actual MEC as calculated in the RPA tool is 39 µg/L.

Comparison with copper water quality criteria

In order to determine if RP exists for this discharge to exceed water quality criteria, the highest projected concentration is compared with the most stringent water quality criteria.

Acute: 39 µg/L > 5.8 µg/L

Chronic: 39 µg/L > 3.7 µg/L

There is reasonable potential for copper to exceed water quality criteria. Therefore, WQBELs for copper are required. Appendix C describes the process DEC used to calculate copper WQBELs. Table B-1 summarizes the data, multipliers, and criteria used to determine reasonable potential to exceed water quality criteria for copper, ammonia, and temperature.

Table B-1- Reasonable Potential Calculation Summary

Parameter	MOC	Number of Samples	Upstream Concentration	CV	RPM	MEC	Water Quality Criteria
Copper (µg/L)	34	62	0.56	0.4	1.2	39	5.8 (acute) 3.7 (chronic)
Ammonia as Nitrogen (milligrams per liter)	12	60	0.18	0.6	1.4	17	7.96 (acute) 1.2 (chronic)
Temperature (ΔT) (degrees Celsius)	17.5	60	0	0.3	1.1	19.9	1

APPENDIX C. EFFLUENT LIMITS

If the Alaska Department of Environmental Conservation (the Department or DEC) does not authorize a mixing zone, water quality standards (WQS) numeric criteria are applied at the end of the pipe, and technology-based effluent limits (TBELs) are selected for those parameters that are solely technology based.

When DEC authorizes a mixing zone, parameters are identified in the mixing zone that will require dilution to meet WQS numeric criteria. If there are TBELs for an identified parameter in the mixing zone, TBELs apply at the end of the pipe, and WQS numeric criteria for that parameter, apply at the boundary of the mixing zone. If the reasonable potential analysis (RPA) requires the development of water-quality based effluent limits (WQBELs) for specific parameters in order to protect human health criteria at the boundary of the mixing zone, WQBELs are applied as end-of-pipe effluent limits. Those parameters that are not identified in the authorized mixing zone, must meet applicable water quality numeric criteria at the end of pipe. In the absence of water quality criteria for a particular pollutant, such as for 5-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS), TBELs are applied as end-of pipe effluent limits.

In the case of the Kodiak Wastewater Treatment Facility (WWTF), copper, ammonia, and temperature demonstrated reasonable potential to exceed water quality criteria at the end of pipe. Temperature required the most dilution to meet chronic water quality criteria and copper required the most dilution to meet acute water quality criteria. Copper is illustrated below as an example.

C.1 Effluent Limit Calculation

Once the Department determines that the effluent has a reasonable potential to exceed a WQS, a WQBEL for the pollutant is developed. The Department used the process described in the *Technical Support Document* (TSD) *for Water Quality-Based Toxics Control* (Environmental Protection Agency, 1991) and DEC's guidance, *Alaska Pollutant Discharge Elimination System RPA and Effluent Limits Development Guide* (June 30, 2014) (RPA Guide) to calculate WQBELs for copper. The first step in calculating WQBELs is the development of a wasteload allocation (WLA) for the pollutant.

C.2 Mixing Zone-based WLA

When the Department authorizes a mixing zone for the discharge, the WLA is calculated using the available dilution, background concentrations of the pollutant, and the WQS. For human health criteria, the WLA is applied directly as an average monthly limit (AML). The daily maximum limit (DML) is then calculated from the AML by applying a multiplier.

C.3 "End-of-Pipe" WLAs

In many cases, there is no dilution available, either because the receiving waterbody exceeds the criteria or because the Department does not authorize a mixing zone for a particular pollutant. When there is no dilution available, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee's discharge does not contribute to an exceedance of the criterion. When a human health criterion applies to a pollutant, the chronic dilution factor is used to calculate a WLA.

C.4 Permit Limit Derivation

The Department applies the statistical approach described in Chapter 5 of the TSD to calculate the DML and the AML. This approach considers effluent variability (using the coefficient of variation (CV)) and sampling frequency.

The DML is based on the CV of the data and the probability basis, while the AML is dependent on these two variables and the monitoring frequency. As recommended in the TSD, the Department used a probability basis of 95% for the AML calculation and 99% for the DML calculation.

The following is a summary of the steps to derive WQBELs from WQS numeric criteria for pollutants that have reasonable potential to exceed water quality numeric criteria. These steps are found in the RPA Guide and the guidance's accompanying Microsoft Excel RPA Tool.

Step 1- Determine the WLA

The first step in developing a WQBEL is to develop a WLA for the pollutant. A WLA is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality criteria or a total maximum daily load in the receiving waterbody.

In cases where a mixing zone is not authorized, either because the receiving waterbody already exceeds the criterion, the receiving waterbody flow is too low to provide dilution, or for some other reason one is not authorized, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee will not cause or contribute to an exceedance of the criterion.

The acute and chronic aquatic life criteria are converted to WLAs using the following equation:

$$WLA_{a,c,hh} = \left(WQC_{a,c,hh}\right)\left(D_{a,c,hh}\right) + C_s\left(1 - D_{a,c,hh}\right)$$

$$WLA_{a,c,hh} = WQC_{a,c,hh}\left(\frac{Q_d + Q_s}{Q_d}\right) + C_s\left(1 - \left[\frac{Q_d + Q_s}{Q_d}\right]\right)$$

Where: $D_{a,c} = Dilution = \frac{(Q_d + Q_s)}{Q_d}$

$D_{hh} = (Dilution\ [Human\ Health]) = D_c\ (Dilution[Chronic\ Aquatic\ Life])$

$Q_d = Critical\ Discharge\ Flow$

$C_s = Critical\ Upstream\ Concentration$

$WLA_{a,c} = Wasteload\ Allocation\ (\ acute, ammonia)$

$WQC_{a,c} = \ C_r\ = Water\ Quality\ Criterion(acute, chronic)$

For copper,

$D_a\ = 7.4$

$D_c\ = 20$ (available dilution from temperature, the driver of the chronic mixing zone)

$C_s = 0.56\ micrograms\ per\ liter$ (µg/L)

$WLA_a\ =$ 39 µg/L

$WQC_c = 64$ µg/L

Step 2 - Determine the Long-Term Average (LTA)

The WLAs are converted to LTAs using multipliers that are derived from equations in section 5.4 of the TSD:

$$LTA_a = \ WLA_a * exp(0.5\sigma^2 - z_{99}\sigma)$$

$$LTA_c = \ WLA_c * exp(0.5\sigma_4^2 - \ z_{99}\sigma_4)$$

Where:

$z_{99} = the\ z - statistic\ at\ the\ 99^{th} percentile = 2.326$

$LTA_a\ only$: $\sigma\ = ln[CV^2 + 1]^{1/2}$

$$LTA_a\ only\text{: } \sigma^2 = ln[CV^2 + 1]$$

$$LTA_c\ only\text{: } \sigma_4 = \ ln\left[\left(\frac{CV^2}{4}\right) + 1\right]^{1/2}$$

$$LTA_c\ only\text{: } \sigma_4^2 = ln\left[\left(\frac{CV^2}{4}\right) + 1\right]$$

$$CV = coefficient\ of variation$$

For copper:

$$CV = \ 0.4126$$

$$LTA_a = \ 17\ \mu g/L$$

$$LTA_c = \ 40\ \mu g/L$$

Step 3 – Choosing the More Limiting LTA

To protect a waterbody from both acute and chronic effects, the more limiting of the two LTAs is used to derive the effluent limits. In the case of copper, the LTA_a is more limiting.

Step 4 - Calculate the Permit Limits

The DML and AML are calculated using the following equations that are found in Table 5-2 of the TSD:

$$DML_{aquatic\ life} = LTA * exp(z_{99}\sigma - 0.5\sigma^2)$$

Where:

$$z_{99} = the\ z - statistic\ at\ the\ 99^{th} percentile = 2.326$$

$$\sigma_n = ln[CV^2 + 1]^{1/2}$$

$$\sigma_n^2 = ln[CV^2 + 1]$$

$$CV = coefficient\ of variation$$

$$AML_{aquatic\ life} = LTA * exp(z_{95}\sigma_n\ - 0.5\sigma_n^2)$$

Where:

$$z_{95} = the\ z - statistic\ at\ the\ 95^{th} percentile = 1.645$$

$$\sigma_n = \ ln\left[\left(\frac{CV^2}{n}\right) + 1\right]^{1/2}$$

$$\sigma_n^2 = ln\left[\left(\frac{CV^2}{n}\right) + 1\right]$$

$$CV = coefficient\ of variation$$

$$n = number\ of\ samples\ per\ month$$

For copper:

$CV = 0.4126$

$n = 62$

$DML = 39$ µg/L

$AML = 23$ µg/L

C.5 Mass-Based Limits

Alaska Pollutant Discharge Elimination System regulations at 18 Alaska Administrative Code (AAC) 83.540 require that effluent limits be expressed in terms of mass unless they cannot appropriately be expressed by mass, if it is infeasible, or if the limits can be expressed in terms of other units of measurement. In addition, 18 AAC 83.520 requires that effluent limits for a publicly owned treatment works be calculated based on the design flow of the facility. Expressing limitations in terms of concentration as well as mass encourages the proper operation of a facility at all times. The mass-based limits are expressed in pounds per day and are calculated as follows:

mass-based limit (pounds (lbs)/day) = concentration limit (milligrams per liter) × design flow (million gallons per day (mgd)) × 8.34 (lbs/gallon)

C.6 Flow

Flow is based on the hydraulic design capacity of the WWTF (flow rate as gallons or mgd) and is determined by a professional engineer and approved by the Department during the WWTF plan review process conducted per 18 AAC 72. A flow limit based on the design capacity ensures that the WWTF operates within its capabilities to receive and properly treat sustained average flow quantities and specific pollutants.

C.7 Effluent Limit Summary

Table C-1 provides a summary and reference to those parameters in the Kodiak WWTF that contain effluent limits at the point of discharge.

Table 1- Summary of Effluent Limitations

Parameter	Fact Sheet Reference
BOD_5	Appendix A-Section A.2.1
TSS	Appendix A- Section A.2.1
pH	Appendix A- Section A.3.2.1
Temperature	Appendix A- Section A.3.2.2
Dissolved Oxygen	Appendix A- Section A.3.2.3
Fecal Coliform Bacteria	Appendix A-Section A.2.2
Enterococci Bacteria	Appendix A-Section A.3.2.4
Total Ammonia, as Nitrogen	Appendix A-Section A.3.2.5
Copper, total recoverable	Appendix A-Section A.3.2.6

APPENDIX D. MIXING ZONE ANALYSIS CHECKLIST

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 are satisfied, as well as provide justification to authorize a mixing zone in an Alaska Pollutant Discharge Elimination System permit. See Fact Sheet Section 4.5 for the Kodiak Wastewater Treatment Facility mixing zone analysis.

Criteria	Description	Resources	Regulation
Size	Is the mixing zone as small as practicable?	Technical Support Document for Water Quality-Based Toxics Control DEC's Reasonable Potential Analysis Guidance Environmental Protection Agency's Permit Writers' Manual CORMIX	**18 AAC 70.240(k)**
Technology	Were the most effective technological and economical methods used to disperse, treat, remove, and reduce pollutants?		**18 AAC 70.240(c)(1)**
Low Flow Design	**For streams, rivers, or other flowing fresh waters.** - Determine low flow calculations or documentation for the applicable parameters.		**18 AAC 70.240(l))**
Existing Use	Does the mixing zone… (1) maintain and protect designated and existing uses of the waterbody as a whole? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(2)**
	(2) impair overall biological integrity of the waterbody? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(3)**
	(3) create a public health hazard that would preclude or limit existing uses of the waterbody for water supply or contact recreation? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(B)**

Criteria	Description	Resources	Regulation
	(4) preclude or limit established processing activities or established commercial, sport, personal use, or subsistence fish and shellfish harvesting? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(C)**
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 approved as proposed or authorized with conditions.**		**18 AAC 70.240(d)(6)**
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, chinook, and sockeye salmon? **If yes, mixing zone prohibited.**		**18 AAC 70.240(f)**
Human Health	Does the mixing zone… (1) contain bioaccumulating, bioconcentrating, or persistent chemical above natural or significantly adverse levels? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(d)(1)**
	2) contain chemicals expected to present an unacceptable risk to human health from carcinogenic, mutagenic, teratogenic, or other effects as determined using risk assessment methods approved by the Department? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(d)(2)**
	(5) occur in a location where the department determines that a public health hazard reasonably could be expected? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(k)(4)**

Criteria	Description	Resources	Regulation
Aquatic Life	Does the mixing zone… (1) result in a reduction in fish or shellfish population levels? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(d)**
	(2) form a barrier to migratory species or fish passage? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(G)**
	(3) result in undesirable or nuisance aquatic life? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(d)(5)**
	(4) result in permanent or irreparable displacement of indigenous organisms? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(E)**
	(5) result in a reduction in fish or shellfish population levels? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(D)**
	(6) prevent lethality to passing organisms; or exceed acute aquatic life criteria at and beyond the boundaries of a smaller initial mixing zone surrounding the outfall, the size of which shall be determined using methods approved by the Department? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(d)(7)** **18 AAC 70.240(d)(8)**
	(7) cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(A)**

Criteria	Description	Resources	Regulation
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 the United States Fish and Wildlife Service or National Oceanic and Atmospheric Association? If yes, will conservation measures be included in the permit to avoid adverse effects? **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(F)**