ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT FACT SHEET – FINAL

Permit Number: **AK0053724**

Spring Creek Correctional Center Wastewater Treatment Facility

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Wastewater Discharge Authorization Program

555 Cordova Street

Anchorage, AK 99501

Public Comment Period Start Date: June 24, 2016
Public Comment Period Expiration Date: July 25, 2016
Alaska Online Public Notice System

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

CITY OF SEWARD

For wastewater discharges from

Spring Creek Correctional Center Wastewater Treatment Facility
404 Delphin Street
Seward, AK 99664

The Alaska Department of Environmental Conservation (the Department or DEC) proposes to issue an APDES individual permit (AK0053724) to the City of Seward. 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 Spring Creek Correctional Center Wastewater Treatment Facility 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
- proposed monitoring requirements in the permit

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 15 days after receiving the Department's decision to the Director of the Division of Water at the following address:

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

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

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

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

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

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

Documents are Available

The permit, fact sheet, 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: http://www.dec.state.ak.us/water/wwdp/index.htm .

Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 555 Cordova Street Anchorage, AK 99501 (907) 269-6285	Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 410 Willoughby Avenue, Suite 310 Juneau, AK 99801 (907) 465-5180
Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 43335 Kalifornsky Beach Rd. - Suite 11 Soldotna, AK 99669 (907) 262-5210	

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1.0 APPLICANT

This fact sheet provides information on the Alaska Pollutant Discharge Elimination System (APDES) permit for the following entity:

Name of Facility:	Spring Creek Correctional Center Wastewater Treatment Facility (Spring Creek WWTF)
APDES Permit Number:	AK0053724
Facility Location:	404 Delphin Street, Seward, AK
Mailing Address:	PO Box 167, Seward, AK 99664-0167
Facility Contact:	Mr. Richard Adelmann, (907) 362-1627

The map in Fact Sheet Appendix A show the locations of the treatment facility and the discharge location.

2.0 FACILITY INFORMATION

The City of Seward (City) owns and operates the Spring Creek WWTF located on the eastern side of Resurrection Bay, approximately six miles from Seward, Alaska. The facility provides secondary treatment and equivalent to secondary treatment of domestic wastewater prior to discharge into Resurrection Bay on the east side of the bay. Spring Creek WWTF has a flow design capacity of 0.195 million gallons per day (mgd). The facility primarily serves a population of approximately 600 - 700 inmates and staff at the Spring Creek Correctional Facility, a state operated maximum security prison. The treatment facility also treats domestic wastewater from the Seward Marine Industrial Center (SMIC), which provides maintenance and repair areas for servicing ships, and the domestic wastewater from a seafood processing plant with a seasonally varying population of up to 100. There are no wastewater contributions from industrial sources.

Treatment is provided by an aerated lagoon system. A single lagoon constructed in 1987 was separated into six cells by baffle curtains. In April 2015, the baffle curtain between cells one and two was removed. The curtain had been in need of repair for at least 10 years and the decision to remove the curtain was based on engineering advice that the lagoon has been effectively operating as a five-cell lagoon for many years. Per design, the lagoon provides 30 days detention. Aeration is provided by two Sutorbuilt blowers designed to provide 370 cubic feet per minute (cfm) of air each. Normal operation is for one blower to operate during the winter and both blowers to operate during the summer. Headwork facilities consist of bar screen and comminutors. Flow is measured by run time meters for the influent pumps. The actual discharge from the lagoon contains an additional component from precipitation.

The treated effluent flows by gravity through an eight inch high-density polyethylene (HDPE) pipe a distance of approximately 3,500 feet to the shoreline. The original outfall pipe was replaced in early 2016 during a harbor dredging project. The relocated eight inch HDPE pipe has a new alignment from shore, an added diffuser, and discharges to deeper water. There were no changes to the treatment processes as a result of the outfall project. The outfall pipe discharges treated wastewater into Resurrection Bay approximately 1200 feet from shore at a depth of 84 feet below mean lower low water at a latitude of 60º 05’ 16” north and a longitude of 149º 21’ 54” west.

A report written by Michael L. Foster & Associates (June 2008), evaluating repair and operation recommendations for the lagoon, estimated that around the year 2000, the baffle curtain between cells one and two started to pull away from the bottom of the liner. The baffle continued to tear until maintenance was performed on the lagoon, which began in April 2015. Maintenance included the

removal of the damaged baffle, upgrading the aeration bubblers, and sludge removal. For the months of April, May, and June of 2015, there was no discharge from the facility due to lagoon maintenance and post-maintenance while the lagoon refilled. Discharge from the lagoon began again in July 2015. While the lagoon maintenance was occurring, the influent was trucked to the Lowell Point Wastewater Treatment Facility, the City of Seward's other treatment lagoon (regulated via APDES Permit Number AK0021890). Once discharging recommenced, it took the lagoon approximately six to seven months to stabilize and produce BOD_5 and fecal coliform bacteria effluent monitoring results in a range similar those prior to maintenance.

Table 1 summarizes the facility's performance as a five-cell lagoon system for the time period of April 1, 2010 through April 30, 2016. Average flow and the flow range are compared to the flow design capacity and an estimate of influent Biochemical Oxygen Demand, 5-day (BOD_5) and Total Suspended Solids (TSS) loading are given. The permittee was not required to report influent monthly loading during the 2004 general permit authorization cycle so the estimates in the table have been derived using the reported percent removals and effluent average monthly loadings. Averages and ranges of other monitored parameters are given and compared to the 2004 general permit authorization (2004 authorization) effluent limits.

Table 1: Facility Performance

Parameter [a]	Units [b]	2004 Authorization Limit	Average	Range
Maximum Daily Flow	mgd	0.195	0.057	0.033 – 0.14
Estimated Influent Monthly BOD_5 Load	lbs/day	-----	201	44 – 850
Effluent Monthly BOD_5 Concentration	mg/L	30	26	6 - 81
Effluent Monthly BOD_5 Load	lbs/day	49	13	4 - 37
Monthly BOD_5 % Removal	%	65	93	66 – 98
Estimated Influent Monthly TSS Load	lbs/day	-----	203	25 - 800
Effluent Monthly TSS Concentration	mg/L	45	25	6 – 48
Effluent Monthly TSS Load	lbs/day	73	13	1 - 36
Monthly TSS % Removal	%	65	92	74 - 98
Effluent Fecal Coliform (FC) Bacteria - Monthly Geometric Means [c]	FC/100 mL	100,000	4870	320 – 26,500
Effluent Monthly pH	SU	6 – 9	-----	6.8 – 8.0
Effluent Dissolved Oxygen - Monthly Minimum	mg/L	2	9.4	2.3 – 13.3

Note:

a. All average facility performance data and range data is determined from data submitted on DMRs from April 2010 through March 2015.
b. mgd = million gallons per day, lbs/day = pounds per day, mg/L = milligrams per liter, % = percent, mL = milliliter, SU = standard pH units
c. The fecal coliform bacteria monthly geometric mean average and range do not include an outlier from 11/30/2015 of a reported 116,382 FC/100 mL.

2.1 Background

The City was first issued a National Pollutant Discharge Elimination System (NPDES) individual permit by the Environmental Protection Agency (EPA) for the discharge of treated wastewater from Spring Creek WWTF in 1987. In June 2004, the City was issued an authorization to discharge under the NPDES General Permit AKG571000, which expired on July 20, 2009.

In October 2008, the Alaska Department of Environmental Conservation (the Department or DEC) received approval from EPA to administer the NPDES Program in the State of Alaska. Under state regulations at Title 18 Alaska Administrative Code (18 AAC) 83.155(c), a permit may be administratively extended past the expiration date provided the permittee submits a timely and complete application for a new permit prior to the expiration of the current permit. Prior to general permit AKG571000 expiring, the City submitted a Notice of Intent (NOI) for continued coverage under a new replacement general permit. When the general permit expired in 2009, a replacement general permit was not available. Therefore, because the City had submitted the NOI in a timely manner, Spring Creek WWTF continued to operate under an administrative extension of the general permit authorization.

On December 31, 2014, prior to authorization of coverage under the new replacement general permit (AKG573000), the permittee submitted an application for an individual permit.

3.0 COMPLIANCE HISTORY

Discharge Monitoring Reports (DMRs) from July 2004 to April 2016 were reviewed to determine the facility's compliance with effluent limits. Appendix D presents permit limitation exceedances.

Five inspections have been conducted on the Spring Creek WWTF since the 2004 authorization. Three inspections were conducted by DEC staff and two were conducted by EPA staff.

An inspection was conducted on July 19, 2007 by DEC staff. The inspector noted that the baffle curtain between cell one and cell two was in need of repair to prevent short circuiting along the edges. It was also noted that the pH check standards were expired and the outfall warning sign was missing.

EPA conducted an inspection on August 7, 2007. The inspection report identified six points of concern. As with the DEC inspection conducted the previous month, the baffle curtain between cell one and cell two was noted as needing repair and it was noted that the required outfall warning sign was missing. EPA also commented on the lack of the development of a quality assurance plan (QAP) required in the permit to be developed and implemented, concern over the temperature that samples were received at the contract laboratory, the need for maintaining a pH calibration log, and concern over whether the method of sampling influent and effluent produced representative samples.

May 7, 2008, EPA conducted a review of the DMRs submitted from July 2004 to April 2008 and conducted an inspection of Spring Creek WWTF. The DMR review resulted in 36 BOD_5 and TSS exceedances and 31 dissolved oxygen violations. The dissolved oxygen violations are questionable due to inconsistencies in effluent dissolved oxygen limits. See further explanation below, in this Section. It was also noted that the City failed to submit DMRs for the months of September 2007 and November 2007. Deficiencies identified during the inspection were similar to those noted in the previous year's inspection; the lack of signs posted in the discharge area and the question of whether the samples were representative of the nature of the discharge. Four violations were noted, three of which had been noted during the previous year's inspection. No QAP had been developed and implemented as required by the

permit, samples received by the contract laboratory exceeded method temperature requirements, the baffle curtain separating cells one and two in the lagoon was torn, and written explanations concerning some noncompliance events were not submitted to EPA as required in the permit.

In conjunction with EPA's inspection in 2008, a notice of violation (NOV) was issued on July 22, 2008 for ongoing noncompliance with the permit effluent limits, noncompliance reporting, improper facility maintenance, and improper sample handling and quality assurance. August 13, 2008 the City of Seward submitted a response to the NOV. The City submitted a picture of the required signage, noted that they were changing their sampling techniques and frequency to provide better representation of the discharge, submitted a QAP for monitoring and laboratory procedures, noted that procedures were put into place to assure samples arrive at the laboratory at the correct temperature, had hired an engineer to review the design and operation of the lagoon and recommend fixes to address the torn baffle curtain, and noted that they will improve reporting on noncompliance events.

DEC conducted another inspection April 9, 2009. Deficiencies and violations noted during past inspections were reevaluated and DEC inspectors found that some had been corrected. Sample temperatures during transport to a contract laboratory were maintained within acceptable ranges, on-site pH check standards were current, composite samplers are now in use, and though the proper signage was missing at the time of the inspection the inspectors were told this was due to a recent winter storm. A copy of a QAP for the Spring Creek WWTF last signed 8/1/2008 is in the DEC's facility hard copy file.

On May 7, 2015, DEC conducted an announced inspection of Spring Creek WWTF. The inspection was elicited by a citizen complaint of plastic debris and other floatable garbage on the beach near the facility outfall. Prior to the inspection, an Integrated Compliance Information System (ICIS) violations report was pulled from the EPA database for review. The violation report showed effluent violations between June 30, 2009 and March 31, 2015 for BOD_5, TSS, and flow. See further discussion of effluent limit exceedances below in this Section and in Appendix D.

During the inspection, the debris on the beach was explained by the permittee to be the result of the lagoon water level being lowered to conduct scheduled lagoon sludge removal and liner repair. As the water level lowered floatable debris made its way through and around a screen and then discharged into the receiving water. At the time of the inspection cleanup of the beach was under way. As a result of the May 2015 inspection, DEC issued a NOV dated May 26, 2015. The NOV noted four violations: pollutants that are not part of the normal operation of the facility, in the form of floatable plastics and other debris, were being discharged; mixing zone sampling process, methods, and map are not included in the facility's QAP; there are effluent limit exceedances from April 2009 through March 2015; and the pH buffer solutions used in the analysis of pH to determine compliance with permit limits were expired.

During the review of Spring Creek WWTF's DMR data for this permit's issuance, it was noticed that there are inconsistencies between the limits set in the 2004 authorization and the limits coded into the EPA data base, ICIS, and therefore, appearing as limits on the DMRs. The inconsistencies were found with BOD_5 limits and dissolved oxygen limits. See Table 2 for a summary of the differences between the limits included in the 2004 authorization and those coded in ICIS.

BOD_5 effluent limit exceedances noted during EPA's DMR review in 2008 were determined by comparison of reported data to effluent limits imposed in the 2004 authorization, and therefore were correctly noted. For dissolved oxygen the authorization issued by EPA in 2004, specifies a minimum limit of 2.0 mg/L for dissolved oxygen that was then coded into ICIS, however, DEC's writing of the authorization specified a minimum limit of 7 mg/L. Evidence indicates that the limit of 7 mg/L in DEC's copy of the authorization was intended to be 2 mg/L and that 7 mg/L was entered in error. A mixing zone was authorized for dissolved oxygen which infers that limits were modified to allow for dilution.

Water quality criteria for dissolved oxygen in marine water is a minimum of 6 mg/L so a minimum limit of 7 mg/L would be more stringent than water quality criteria and would have no need for dilution.

Table 2: Conflicting Effluent Limits Summary

Parameter	Units	2004 General Permit Authorization	EPA's Data Base (ICIS) and on DMRs
BOD_5 Average Monthly Limit	mg/L	30	45
	lbs/day	48.8	49
BOD_5 Daily Maximum	mg/L	60	------
	lbs/day	97.6	98
Dissolved Oxygen Daily Minimum	mg/L	7	2
Dissolved Oxygen Daily Maximum	mg/L	------	------

For the permit reissuance review of effluent exceedances, submitted data was compared to the limits included in the 2004 authorization with the exception of dissolved oxygen. Data submitted for dissolved oxygen were compared to the minimum limit of 2.0 mg/L.

From July 2004 through April 2016 there were 53 BOD_5 exceedances, 22 TSS exceedances, two fecal coliform bacteria exceedances, two flow exceedances, one dissolved oxygen exceedance, and one pH exceedance. It should be noted that in the three years prior to maintenance being conducted on the lagoon, April 2012 through March 2015, there were only eight BOD_5 exceedances and one TSS exceedance. For full details of the reported exceedances, see Appendix D.

4.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

4.1 Basis for Permit Effluent Limits

The Clean Water Act (CWA) requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBEL) or water quality-based effluent limits (WQBEL). A TBEL is set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the water quality standards (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 publicly owned Spring Creek WWTF, are derived from the secondary treatment standards and/or treatment equivalent to secondary treatment found in Title 40 Code of Federal Regulations (40 CFR) §133.102 and 40 CFR §133.105, adopted by reference at 18 AAC 83.010(e).

The effluent limits imposed in the permit for BOD_5, carbonaceous biochemical oxygen demand, 5-day ($CBOD_5$), and $CBOD_5$ percent removal are based on secondary treatment standards and those imposed for BOD_5 percent removal, TSS, and TSS percent removal, are based on the equivalent to secondary treatment standards. To be eligible for discharge limitations based on

equivalent to secondary treatment standards, a facility must demonstrate: that effluent concentrations despite proper operation and maintenance, consistently exceed the secondary standards at 40 CFR §133.102(a) and (b); the principle treatment process is a trickling filter or waste stabilization pond; and the treatment works provide significant biological treatment of municipal wastewater. For further discussion on Spring Creek WWTF's eligibility for the application of equivalent to secondary standards, see Appendix B.

For pollutants of concern identified from DMR data with no associated TBELs, but that have reasonable potential to cause or contribute to an exceedance of water quality criteria, WQBELs are established to be protective of the designated uses of the receiving water. In cases where both TBELs and WQBELs are applicable, as in the case with pH in this permit, the more stringent limit is retained as the final permit effluent limit. The basis for the effluent limits in the permit is provided in Appendix B.

4.2 Basis for Effluent, Influent, and Receiving Water Monitoring

In accordance with Alaska Statute (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 receiving water data to determine if additional effluent limits are required and/or to monitor effluent's impact on the receiving water body quality.

The permit also requires the permittee to perform effluent monitoring required by the APDES Form 2A application, so that this data will be available when the permittee applies for reissue of its APDES permit. The permittee is responsible to conduct the monitoring and report results on DMRs, in reports, or on the application for reissuance, as appropriate, to the Department.

4.3 Effluent Limits and Monitoring Requirements

The effluent limit and monitoring changes being made in the 2016 individual permit from those imposed in the 2004 authorization are: more restrictive pH limits, more restrictive dissolved oxygen limits, the removal of total residual chlorine limits and monitoring, more restrictive fecal coliform bacteria effluent limits, the addition of enterococci bacteria monitoring, the addition of ammonia monitoring, and the addition of $CBOD_5$ limits and monitoring (see Appendices B and C for more details).

pH – The effluent pH limits in the 2004 authorization were a minimum daily of 6 SU and a maximum daily of 9 SU. A limit range of 6 – 9 SU required a mixing zone to meet water quality criteria. Effluent data submitted on DMRs from April 2010 through April 2016 indicates that water quality criteria can be obtained at the end of the pipe; therefore, pH limits in the 2016 permit are a minimum daily of 6.5 SU and a maximum daily of 8.5 SU.

Dissolved Oxygen – The previous permit authorization specifies a dissolved oxygen minimum daily limit as 7 mg/L and did not include a maximum daily limit. Applicable water quality criteria for dissolved oxygen in marine water is a minimum daily limit of 6.0 mg/L and a maximum daily limit of 17 mg/L. Water quality criteria for dissolved oxygen in fresh water is a minimum daily limit of 7 mg/L and a maximum daily limit of 17 mg/L. It is believed the minimum limit of 7 mg/L was applied in error as the effluent from the Spring Creek WWTF discharges into marine waters. The 2016 permit includes

the correct water quality criteria for dissolved oxygen in marine water including a maximum daily limit.

Total Residual Chlorine – The 2004 authorization included a monthly average and a maximum daily effluent limit for total residual chlorine. A mixing zone for total residual chlorine was also authorized. Spring Creek WWTF does not use chlorine for disinfection, therefore there is no reason to believe chlorine is otherwise expected to be present in the effluent. Accordingly, there is no documented basis for concern warranting the continued inclusion of chlorine permit effluent limits and in addition the permit includes a prohibition on discharging total residual chlorine. Therefore, no chlorine effluent limits or chlorine monitoring are included in the 2016 permit. See Section 6.0, Antibacksliding, for further discussion.

Fecal Coliform Bacteria –The Department reviewed fecal coliform bacteria data submitted from April 2010 through April 2016 and determined that Spring Creek WWTF's treatment system can treat wastewater to a level that can achieve more stringent effluent limits for fecal coliform bacteria than those imposed in the 2004 authorization. However, the level of treatment is insufficient for fecal coliform bacteria to reach applicable water quality criteria at the end of the pipe and therefore continues to require dilution from a mixing zone. Fecal coliform bacteria effluent limits in the 2016 permit are based on the facility's performance, the dilution available in the mixing zone, and applicable water quality criteria. See Appendices B and C for more information on the determination.

Enterococci Bacteria – Enterococci bacteria monitoring has been added to the effluent monitoring requirements, however, no limits are established. Enterococci bacteria monitoring is included in the permit based on EPA promulgation of enterococci bacteria standards for marine waters to protect primary contact recreation. On October 10, 2000, the Beaches Environmental Assessment and Coastal Health (BEACH) Act was signed into law amending the CWA. The BEACH Act addresses pathogens and pathogen indicators in coastal recreational waters. Water quality criteria for bacteria are based on levels of indicator bacteria, which demonstrate the presence of pathogens in fecal pollution. Fecal coliform bacteria have been the recommended indicator organisms in the past. Enterococci bacteria are being evaluated as possible indicator organisms in marine waters and for possible inclusion in future permit(s) as a permit limit.

Total Ammonia – In Spring Creek WWTF's 2004 general permit authorization, ammonia was not required to be monitored. As part of the application for an individual permit, the permittee submitted ammonia results from three effluent sampling events taken over a three week period. All three samples were above the applicable ammonia water quality criteria and DEC determined that ammonia is a pollutant of concern. In accordance with Section 2.4.1 of the *APDES Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 30, 2014), DEC used best professional judgment to determine that in this case, an ammonia data set of three samples was insufficient to complete the reasonable potential analysis (RPA) process and calculate an ammonia WQBEL. The 2016 permit requires monitoring ammonia in the effluent stream to develop a more robust data set for evaluating ammonia during the next permit reissuance.

$CBOD_5$ – In accordance with 40 CFR 133.102(a)(4), adopted by reference in 18 AAC 83.010(e), the permitting authority has the option of substituting $CBOD_5$ in lieu

of the parameter BOD_5. During the applicant review process, the applicant requested that the parameter BOD_5 be substituted with $CBOD_5$. However, since prior $CBOD_5$ data is not available, $CBOD_5$ limits are set equal to secondary treatment standards. This includes the $CBOD_5$ percent removal. Data collected during this permit cycle will be used to determine the facility's eligibility for equivalent to secondary treatment standards, specifically $CBOD_5$ percent removal. BOD_5 limits and monitoring have been retained to evaluate the site-specific relationship between $CBOD_5$ and BOD_5 concentrations. Future permits may choose to require monitoring of only one of the two parameters.

Table 3 summarizes the effluent limits and monitoring requirements.

Table 3: Outfall 001: Effluent Limits and Monitoring Requirements

	Effluent Limits					Monitoring Requirements		
Parameter	**Units [a]**	**Minimum Daily**	**Average Monthly**	**Average Weekly**	**Maximum Daily**	**Sample Location**	**Sample Frequency**	**Sample Type**
Total Discharge Flow	mgd	-----	Report	-----	0.195	Effluent	5/Week	Measured or Estimated
BOD_5	mg/L	-----	30	45	60	Effluent	1/Month	Grab or 24-hour Composite [b]
	lbs/day	-----	49	73	98			
BOD_5	mg/L	-----	Report	-----	Report	Influent	1/Month	Grab or 24-hour Composite [b]
BOD_5 Percent Removal	%	-----	65 [c]	-----	-----	Influent and Effluent	1/Month	Calculated [d]
$CBOD_5$	mg/L	-----	25	40	Report	Effluent	1/Month	Grab or 24-hour Composite [b]
	lbs/day	-----	41	65	Report			
$CBOD_5$	mg/L	-----	Report	-----	Report	Influent	1/Month	Grab or 24-hour Composite [b]
$CBOD_5$ Percent Removal	%	-----	85 [c]	-----	-----	Influent and Effluent	1/Month	Calculated [d]
TSS	mg/L	-----	45	65	-----	Effluent	1/Month	Grab or 24-hour Composite [b]
	lbs/day	-----	73	106	-----			
TSS	mg/L	-----	Report	-----	Report	Influent	1/Month	Grab or 24-hour Composite [b]
TSS Percent Removal	%	-----	65 [c]	-----	-----	Influent and Effluent	1/Month	Calculated [d]
Total Ammonia, as Nitrogen (N)	mg/L	-----	Report	-----	Report	Effluent	1/Two Months	Grab
Fecal Coliform Bacteria	FC /100 mL	-----	9,600 [e, f]	14,000 [f]	29,000 [e]	Effluent	1/Month	Grab
Enterococci Bacteria [f]	#/100 mL	-----	-----	-----	Report	Effluent	1/Month May through September [g]	Grab
pH	SU	6.5	-----	-----	8.5	Effluent	3/Week	Grab

Table 3: Outfall 001: Effluent Limits and Monitoring Requirements

	Effluent Limits					Monitoring Requirements		
Parameter	**Units [a]**	**Minimum Daily**	**Average Monthly**	**Average Weekly**	**Maximum Daily**	**Sample Location**	**Sample Frequency**	**Sample Type**
Dissolved Oxygen	mg/L	6.0	-----	-----	17	Effluent	1/Month	Grab

Notes:

a. mgd = million gallons per day; mg/L = milligrams per liter; lbs/day = pounds per day; % = percent; mL = milliliter; # = number; SU = standard pH units

b. Composite samples must consist of at least eight grab samples collected at equally spaced intervals and proportionate to flow so that composite samples reflect influent/effluent quality during the compositing period.

c. Limit represents a minimum.

d. Minimum % removal = [(average monthly influent concentration in mg/L – average monthly effluent concentration in mg/L) / (average monthly influent concentration in mg/L)] X 100

e. In a 30-day period, the geometric mean may not exceed 9,600 FC/100 mL and not more than 10 percent of samples may exceed 29,000 FC/100 mL.

f. All fecal coliform and enterococci bacteria average results 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 $(100 \text{ X } 200 \text{ X } 300)^{1/3} = 181.7$

g. One sample shall be collected each month, May through September, on the same day as the fecal coliform sample is taken.

4.4 Influent and Effluent Monitoring

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 permittee has the option of taking more frequent samples than required under the permit. These additional samples can be used for averaging if they are conducted using Department – approved test methods (found in 18 AAC 70 and 40 CFR Part 136 [adopted by reference in 18 AAC 83.010]), and if method detection limits (MDLs) are less than the effluent limitations.

The permit requires monitoring of the effluent for BOD_5, $CBOD_5$, TSS, fecal coliform bacteria, pH, dissolved oxygen, and flow to determine compliance with the effluent limitations. The permit also requires monitoring of the influent for BOD_5, $CBOD_5$, and TSS to calculate monthly removal rates for these parameters. In addition, the permit includes requirements to monitor the effluent for total ammonia as N and enterococci bacteria in order to conduct a future reasonable potential analysis to determine if discharges might cause an exceedance of applicable water quality criteria in the receiving water body.

Effluent monitoring frequencies in the 2016 permit are the same as were required in the 2004 authorization with the exception of the removal of monitoring for total residual chlorine and the addition of monitoring ammonia as N and enterococci bacteria. Total residual chlorine monitoring has been removed because chlorine is not being used by the facility for disinfection. Effluent ammonia samples taken in February and March of 2015 indicate that the effluent contains concentrations of ammonia above applicable water quality criteria. Monitoring of ammonia during the 2016 permit cycle will develop a statistically more robust data set for determining reasonable potential.

Table 3 presents the influent and effluent monitoring requirements.

The permittee shall perform the additional effluent testing in the APDES application Form 2A for POTWs. The permittee shall submit the results of this additional testing with their application for reissuance of the APDES permit. The permittee shall consult and review Form 2A upon permit issuance to ensure that the required monitoring in the application will be completed prior to submitting a request for permit renewal. A copy of Form 2A can be found at: http://dec.alaska.gov/water/wwdp/index.htm.

4.5 Whole Effluent Toxicity Monitoring

18 AAC 83.335 requires that an applicant must submit, with a permit application, whole effluent toxicity (WET) test results if the facility has a design flow rate greater than or equal to 1.0 mgd; has an approved pretreatment program or is required to develop a pretreatment program; or the Department requires WET monitoring. Spring Creek WWTF was not required to submit WET data with the permit application. The facility has a design flow rate of less than 1.0 mgd, does not have a pretreatment program, and the facility's coverage under General Permit AKG571015 did not require WET monitoring.

The discharge from the Spring Creek WWTF is consistent with other lagoon systems in Alaska, consisting solely of domestic wastewater. The Department does not consider WET to be a concern at this facility. Therefore, WET testing is not required in this permit.

4.6 Receiving Water Body Monitoring and Reporting Requirements

The 2004 authorization required monitoring of the receiving water body at two locations, the boundary of the mixing zone and the shoreline. Pollutants required to be monitored at the boundary of the mixing zone were fecal coliform bacteria and total residual chlorine, each twice per year, and pH and dissolved oxygen upon request by DEC. Only fecal coliform bacteria was required to be monitored at the shoreline location set at a frequency of twice per year.

Monitoring fecal coliform bacteria concentrations at the boundary of the mixing zone has been removed in the 2016 permit. Effluent fecal coliform bacteria limits are based on the dilution available in the mixing zone ensuring that water quality criteria will be met at the boundary of the mixing zone. Mixing zone modeling indicates that though the discharge plume is positively buoyant, it does not reach the receiving water body surface at the boundary of the mixing zone. Therefore, samples collected at the water body's surface at the boundary of the mixing zone would not be influenced by the discharge and therefore not provide meaningful information.

Monitoring total residual chlorine at the boundary of the mixing zone has been removed in the 2016 permit. Spring Creek WWTF does not use chlorine to disinfect effluent prior to discharging. There is no reason to believe total residual chlorine would be a pollutant found in the effluent nor at the boundary of the mixing zone as a result of the discharge.

Monitoring fecal coliform bacteria at the shoreline location has been retained in the 2016 permit, however, the frequency of monitoring has been changed to once a month May through September. The May through September monitoring schedule is also required for monitoring enterococci bacteria at the shoreline. The samples are required to be taken on the same day so results can be compared. The monitoring of bacteria at the shoreline during the months of May through September is to coincide with when the receiving water would most likely be used for primary contact recreation. After two years of monitoring, the permittee can submit a written request to decrease the shoreline monitoring. Departmental written approval must be received prior to discontinuing monitoring.

Monitoring the ambient receiving water body for ammonia, temperature, pH, and salinity have been added to the 2016 permit. The data will be used to calculate ammonia criteria and, if applicable, to evaluate reasonable potential during the next permit reissuance.

Results from the shoreline monitoring must be submitted on the DMR for the month in which the sample was collected. Ambient monitoring results must be submitted as a Monitoring Summary Report with the permittee's application for permit reissuance. Table 4 is a summary of the shoreline and ambient monitoring requirements.

Table 4: Receiving Water Body Monitoring Requirements

Parameter	Units	Location	Sample Frequency	Sample Type
Fecal Coliform Bacteria	FC/100 mL	Shoreline	1/Month (May-Sept.) [a]	Grab
Enterococci Bacteria	#/100 mL	Shoreline	1/Month (May-Sept.)	Grab
Total Ammonia as N	mg/L	Ambient	4/Year [b]	Grab
Temperature	°C	Ambient	4/Year	Grab
pH	SU	Ambient	4/Year	Grab
Salinity	grams/kilogram	Ambient	4/Year	Grab

Note:
a. Sampling at the shoreline takes place during the months of May through September and fecal coliform bacteria and enterococci bacteria samples must be taken on the same day.
b. Four time per year means, one sample taken May through June, one sample taken July through August, one sample taken September through October, and one sample taken November through April.

4.7 Electronic Reporting (E-Reporting) Rule

The permittee is responsible for electronically submitting DMRs and other reports in accordance with 40 CFR §127. The start dates for e-reporting are provided in 40 CFR §127.16. DEC has established a website at http://dec.alaska.gov/water/Compliance/EReportingRule.htm that contains general information. As DEC implements the E-Repointing Rule, more information will be posted on this webpage. The permittee will be further notified by DEC in the future about how to implement the conditions in 40 CFR §127.

5.0 RECEIVING WATER BODY

Spring Creek WWTF discharges treated effluent into the marine waters of Resurrection Bay at latitude 60° 5' 16" north, longitude 149° 21' 54" west. Resurrection Bay is located on the northeastern side of the Kenai Peninsula. The City of Seward is located at the head of Resurrection Bay with the Spring Creek WWTF located on the east side of the bay.

5.1 Water Quality Standards

Regulations in 18 AAC 70 require that the conditions in permits ensure compliance with WQS. The state's WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an antidegradation policy. The use classification system designates the uses that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the State to support the use classification of each water body.

The antidegradation policy ensures that the existing uses and necessary water quality are maintained.

Water bodies 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 water bodies in Alaska can also have site–specific water quality criterion per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b). Resurrection Bay has not been reclassified, nor have site-specific water quality criteria been established in the vicinity of the Spring Creek WWTF discharge. Therefore, Resurrection Bay must be protected for all marine designated use classes listed in 18 AAC 70.020(a) which consists of the following: water supply for aquaculture, seafood processing and industry; 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.

5.2 Water Quality Status of Receiving Water

Any part of a water body 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. Resurrection Bay is not included on the *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report*, July 15, 2010.

5.3 Mixing Zone Analysis

In accordance with state regulations at 18 AAC 70.240, as amended through June 26, 2003, the Department may authorize a mixing zone in a permit.

The City submitted an APDES Mixing Zone Application Form 2M requesting a mixing zone the same size as was authorized in the 2004 authorization; the area of a 100 meter radius circle centered over the end of the outfall pipe. The pollutants for which a mixing zone was requested were fecal coliform bacteria and ammonia.

The submitted Mixing Zone Application provided outfall information for the outfall that was being used at the time the application was submitted. DEC also received plans for the relocation of the outfall pipe, which took place in early 2016, as part of a harbor dredging project scheduled in the near vicinity. The physical point at which the relocated outfall pipe enters the receiving water remains the same, but the pipe leaves shore at a different angle, the pipe's length from shore to point of discharge is longer, and a two foot diffuser has been added to the end of the pipe. All mixing zone modeling has been conducted using characteristics associated with the relocated outfall.

The effluent from Spring Creek WWTF is treated to secondary and equivalent to secondary standards and discharged to the marine waters of Resurrection Bay. The 1620 foot outfall pipe runs at an angle out from the shoreline and terminates at approximately 1182 feet from shore.

Effluent data submitted on DMRs from April 1, 2010 through April 30, 2016 were reviewed and it was determined that a mixing zone for fecal coliform bacteria is appropriate. Permit limits must be met at the end of the effluent pipe prior to discharge into Resurrection Bay and fecal coliform bacteria must meet applicable water quality criteria at the boundary of the mixing zone.

Appendix E, Mixing Zone Analysis Checklist, outlines criteria that must be considered when the Department analyzes a permittee's request for a mixing zone. These criteria include the size of the mixing zone, treatment technology, existing uses of the water body, human consumption,

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

Size In accordance with 18 AAC 70.255, the Department determined that the size of the mixing zone for the Spring Creek WWTF wastewater discharge is appropriate.

Information submitted by the permittee as well as DEC generated supplemental information was used to model the discharge plume's interaction with the receiving water body. Site and facility specific variables were entered into CORMIX, a conceptual modeling program. Information used to determine a mixing zone size through CORMIX includes characteristics of the receiving water and the effluent discharge, as well as local geographical conditions and physical characteristics of the outfall.

The facility design flow rate was used in the models as the discharge flow and three ambient velocities (0.1 knots, 0.5 knots, and 1.0 knots) were used to simulate varying tidal velocities. The ambient density was determined using ambient salinities and temperatures submitted by the applicant and from the document *Hydrography, Nutrient Chemistry and Primary Productivity of Resurrection Bay, Alaska*, Institute of Marine Science, University of Alaska. Due to an influence of fresh water on the surface of the receiving water and temperature variances with water depth, water density at the surface differs from the density at the depth of the discharge resulting in linear density stratification in the receiving water.

An acute mixing zone is sized to prevent lethality to passing organisms. According to EPA (1991), 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 average exposure is not to exceed the acute criterion. The 2004 authorization did not authorize an acute mixing zone. For the 2016 permit, ammonia is the only pollutant of concern that has acute water quality criteria. However, due to the small dataset and the lack of seasonal data, DEC has determine that there is insufficient data on which to perform an acute mixing zone analysis. Sampling requirements set forth in the permit will result in a dataset of 30 effluent ammonia samples covering all seasons. This data will be used in the next permit reissuance to more accurately size an acute mixing zone.

A chronic mixing zone is sized to protect the ecology of the water body as a whole. The chronic mixing zone will continue to be defined as the area of a 100 meter radius circle centered over the end of the outfall pipe. Under the conditions of the relocated outfall, the available dilution has been determined by CORMIX to be 684:1. Fecal coliform bacteria limits are calculated using the chronic dilution factor of 684 to ensure water quality criteria for fecal coliform bacteria will be met at and beyond the boundary of the chronic mixing zone.

Technology In accordance with 18 AAC 70.240(a)(3), the Department finds that available evidence reasonably demonstrates that the effluent from Spring Creek WWTF will be treated to remove, reduce, and disperse pollutants using methods found by the Department to be the most effective and technological and economical feasible, consistent with the highest statutory and regulatory treatment requirements.

Spring Creek WWTF is a five cell aerated lagoon system that provides significant biological treatment of municipal wastewater and as such is eligible for equivalent to secondary treatment

as listed in 40 CFR §133.105, as adopted by reference in 18 AAC 83.010(e), if secondary treatment standards cannot be achieved through proper operation and maintenance. A review of monitoring data from the facility, April 2010 through April 2016, has demonstrated that Spring Creek WWTF is eligible for equivalent to secondary standards for BOD_5 and TSS. Monitoring data collected following recent maintenance of the lagoon, generally supports the same conclusion; however, it took several months for the lagoon to stabilize and a more robust data set needs to be collected before the data can be considered representative of the facility's performance level. Therefore, the Department has applied a combination of both secondary and equivalent to secondary standards for BOD_5 and TSS which are consistent with the standards imposed on facilities in Alaska with similar treatment systems.

Existing Use In accordance with 18 AAC 70.245, the mixing zone has been appropriately sized to fully protect the existing uses of the Resurrection Bay. WQS at 18 AAC 70.020(a) classifies Resurrection Bay as protected for the following marine water uses: aquaculture, seafood processing, and industrial water supply; contact and secondary water recreation; growth and propagation of fish, shell fish, aquatic life and wild life; and harvesting for the consumption of raw mollusks or other raw aquatic life. The water body's existing uses were maintained and protected under the terms of the previous permit. The mixing zone authorization does not propose any modifications that would result in changes to existing uses.

Human Consumption Under the conditions of the permit, and in accordance with 18 AAC 70.250(b)(2) and (b)(3), the pollutants discharged cannot produce objectionable color, taste, or odor in aquatic resources harvested for human consumption; nor can the discharge preclude or limit established processing activities or commercial, sport, personal use, or subsistence fish and shellfish harvesting. There has been no indication that established fishing or shellfish harvesting has been precluded by the discharge, and signs are required to be posted to inform the public that certain activities such as harvesting of aquatic life for raw consumption and primary contact recreation should not take place in the mixing zone. The Department finds that the permit requirements will be protective of the water body's uses.

Spawning Areas In accordance with 18 AAC 70.255(h), the mixing zone is not authorized in a known spawning area for anadromous fish or resident fish spawning redds for chum salmon, coho salmon, pink salmon, sockeye salmon, Dolly Varden, and steelhead trout. The Alaska Department of Fish and Game (ADF&G) interactive regulatory and interactive essential fish habitat (EFH) maps at http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=maps.maps do not indicate any EFH, to include spawning areas, in the vicinity of the Spring Creek WWTF discharge. The Department determines 18 AAC 70.255(h) to be met.

Human Health In accordance with 18 AAC 70.250 and 18 AAC 70.255, the mixing zone authorized in the permit shall be protective of human health and will not result in pollutants discharged at levels that will bioaccumulate, bioconcentrate, or persist above natural levels in sediments, water, or biota, or at levels that otherwise will create a public health hazard through encroachment on a water supply or contact recreation uses. An analysis of the effluent testing data that was included with Spring Creek WWTF wastewater discharge application and the results of the reasonable potential analysis conducted on pollutants of concern indicate that the level of treatment at Spring Creek WWTF is protective of human health. The quality of the effluent is required to meet water quality criteria either at the end of the pipe or at the boundary of the mixing zone. (See Appendix C)

Aquatic Life and Wildlife In accordance with 18 AAC 70.250 and 18 AAC 70.255, the mixing zone authorized in the permit shall be protective of aquatic life and wildlife. Pollutants for which the mixing zone will be authorized will not accumulate in concentrations outside of the mixing zone that are undesirable, present a nuisance to aquatic life, cause permanent or irreparable displacement of indigenous organisms, or result in a reduction in fish or shellfish population levels. Based on a review of effluent data and mixing zone modeling, the Department concludes that the discharge will meet all water quality criteria at the boundary of the mixing zone.

Endangered Species In accordance with 18 AAC 70.250(a)(2)(D), the authorized mixing zone will not cause an adverse effect on threatened or endangered species. The National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) were contacted as noted in Section 9.2 and Section 9.3. Some listed species do exist in the vicinity of the facility. DEC has determined that issuance of the permit is unlikely to affect any of the threatened or endanger species in the vicinity of the discharge. DEC will provide a copy of the permit and fact sheet to NMFS and USFWS when it is public noticed. Any comments received from the agencies regarding endangered species will be considered prior to issuance of the permit.

6.0 ANTIBACKSLIDING

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

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

The effluent limitations in the 2016 permit are consistent with 18 AAC 83.430. The permit effluent limitations, standards, and conditions are as stringent as or more stringent than in the 2004 general permit authorization with the exception of dissolved oxygen effluent limits, total residual chlorine effluent limits, and the monitoring frequencies of fecal coliform bacteria and total residual chlorine at the boundary of the mixing zone.

Inconsistencies in effluent dissolved oxygen limits were identified during the data review process as part of the permit development. EPA issued an authorization in 2004 which specifies a minimum effluent

dissolved oxygen limit of 2.0 mg/L and that limit was coded into EPA's data base, ICIS, and on Spring Creek WWTF's site-specific DMR. DEC's writing of the authorization specified a minimum effluent dissolved oxygen limit of 7 mg/L. DEC's authorization also included a mixing zone for dissolved oxygen which infers that water quality criteria was modified at allow for dilution. However, water quality criteria for dissolved oxygen in marine water is a minimum of 6 mg/L, a concentration less stringent than the 7 mg/L. Therefore, a dissolved oxygen limit of 7 mg/L would not require a mixing zone to meet dissolved oxygen water quality criteria. The Department maintains that the 7 mg/L entry was in error and 2.0 mg/L was the intended effluent dissolved oxygen limit. 18 AAC 83.480(b)(2) provides that an APDES permit may be renewed, reissued, or modified to contain less stringent effluent limits applicable to a pollutant if the Department determines that a technical mistake was made in issuing the previous permit. DEC has determined the effluent dissolved oxygen limit of 7 mg/L was in error and therefore imposing an effluent dissolved oxygen limit of 6 mg/L in the 2016 permit is consistent with 18 AAC 83.480(b)(2).

Chlorine effluent limits and chlorine monitoring in the 2004 authorization applied only if chlorine was used as a disinfectant in the effluent treatment process. Spring Creek WWTF did not and does not use chlorine in the facility's treatment process. In accordance with 18 AAC 83.135(b)(2) a permit may be modified if the Department received new information that was not available at the time of the permit issuance, and the new information would have justified the imposition of different permit conditions at the time of issuance. The monitoring of total residual chlorine in the receiving water at the boundary of the mixing zone has also been removed from the 2016 permit. There is no reason to believe total residual chlorine would be a pollutant found at the boundary of the mixing zone as a result of the discharge because chlorine is not used in the effluent treatment process. The removal of effluent limits, effluent monitoring, and receiving water monitoring for total residual chlorine is consistent with 18 AAC 83.135(b)(2).

Mixing zone modeling conducted as part of the 2016 permitting process indicated that though the discharge plume is positively buoyant, it does not reach the receiving water body's surface at the boundary of the mixing zone. At the time the 2004 mixing zone was authorized, the level of modeling conducted during the 2016 modeling was not available. Samples collected at the water body's surface at the boundary of the mixing zone would not be influenced by the discharge and therefore not provide meaningful information. The removal from the 2016 permit of fecal coliform bacteria monitoring in the receiving water at the boundary of the mixing zone is consistent with 18 AAC 83.135(b)(2), which provides for cause to modify a permit as a result of new information being available.

7.0 ANTIDEGRADATION

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, WQBELs may be revised as long as the revision is consistent with the State's Antidegradation Policy. The Antidegradation Policy of WQS (18 AAC 70.015) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. This section analyzes and provides rationale for the Department's decisions in the permit issuance with respect to the Antidegradation Policy.

The Department's approach to implementing the Antidegradation Policy, found in 18 AAC 70.015, is based on the requirements in 18 AAC 70 and the Department's *Policy and Procedure Guidance for Interim Antidegradation Implementation Methods*, dated July 14, 2014. Using these procedures and policy, the Department determines whether a water body, or portion of a water body, is classified as Tier

1, Tier 2, or Tier 3, where a higher numbered tier indicates a greater level of water quality protection. At this time, no Tier 3 waters have been designated in Alaska. Resurrection Bay is not listed as impaired on DEC's most recent *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report*; therefore, a Tier 1 designation is not warranted. Accordingly, this antidegradation analysis conservatively assumes that the discharge is to a Tier 2 water body.

The State's Antidegradation Policy in 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 (i.e. Tier 2 waters), that quality must be maintained and protected. The Department may allow a reduction of water quality only after finding that five specific requirements of the Antidegradation Policy at 18 AAC 70.015(a)(2)(A)-(E) are met. The five findings and the Department's determination are as follows:

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

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

   Spring Creek WWTF primarily treats wastewater from the Spring Creek Correctional Center, an Alaska Department of Corrections maximum security prison. The institution is the state's only maximum security prison with a capacity of over 500 male inmates and employs more than 200 staff.

   The Spring Creek WWTF also supplies treatment of domestic wastewater for businesses associated with the Seward Maine Industrial Center (SMIC) and a seafood processing plant. SMIC is a vital component of the City's marine-related economic base. The seafood processing plant employs 20-40 seasonal workers and retains three employees on a permanent basis.

   The Department concludes that the operation of the Spring Creek WWTF and the authorization of the discharge accommodates the important economic and social development of the City of Seward and the State of Alaska and that the finding is met.

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

   The permit reissuance application does not propose any change that would result in wastewater of lower quality being discharged from the Spring Creek WWTF than has been historically discharged under the previously issued NPDES general permit authorization. The water quality criteria in 18 AAC 70.020 are the bases for the permit effluent limits and serve the specific purpose of protecting the existing and designated uses. Modeling results and the results of monitoring data submitted during the previous permit cycle indicated the discharge authorized by the permit conform to the requirements of 18 AAC 70.020.

   The Department has not established or adopted site-specific criteria for Resurrection Bay in the vicinity of the discharge. Therefore, criteria allowed by 18 AAC 70.235 have not been violated by issuance of the permit.

   Spring Creek WWTF treats domestic wastewater and there are no known non-domestic industrial users. Due to the nature of the wastewater and the dilution available in the authorized chronic

mixing zone, violations of the WET water quality criteria, found at 18 AAC 70.030, are not likely at the boundary of the mixing zone.

The Department has determined that the reduction in water quality will not violate applicable criteria found in 18 AAC 70.020, 18 AAC 70.325, or 18 AAC 70.030 and that this requirement has been met.

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

   WQS, upon which the permit effluent limits are based, serve the specific purpose to protect existing and designated uses of the receiving water. The list of the uses Resurrection Bay is protected for can be found in this fact sheet, Section 5.3, Existing Uses. Resurrection Bay is protected for all designated uses; 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* (2008) were selected for use in the RPA of Spring Creek WWTF effluent. This will ensure that the resulting water quality at the boundary of the authorized mixing zone will fully protect all designated uses of the receiving water body.

   The Department concludes the water quality of the receiving waters will be adequate to protect all existing uses and therefore this finding is satisfies.

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

   The methods of prevention, control, and treatment the Department finds to be most effective and reasonable are currently in use at the facility and include meeting federal (40 CFR 133) and State (18 AAC 72.050) secondary and equivalent to secondary treatment requirements. The treatment employed at Spring Creek WWTF is similar in nature to other like lagoon facilities and their discharges throughout the United States, including Alaska. The permit requires that Spring Creek WWTF has both an updated Quality Assurance Project Plan (QAPP) and an Operations and Maintenance (O&M) Plan to ensure protocol for discharging adequately treated wastewater is followed to the extent feasible.

   The Department concludes that the finding to address pollution prevention, control, and treatment is met.

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

   The applicable "highest statutory and regulatory treatment requirements" are defined in 18 AAC 70.990(30) (as amended June 26, 2003) and in the Department's *Policy and Procedure Guidance for Interim Antidegradation Implementation Methods*. Accordingly, there are three parts to the definition:

   (A) Any federal technology-based effluent limitation guidelines identified in 40 CFR §125.3 and 40 CFR §122.29, as amended through August 15, 1997, both adopted by reference at 18 AAC 83.010;

   (B) Minimum treatment standards in 18 AAC 72.040; and

(C) Any treatment requirement imposed under another state law that is more stringent than a requirement of this chapter.

The first part of the definition includes all federal technology-based effluent limit guidelines, including "For POTWs, effluent limitations based upon …….Secondary Treatment" at 40 CFR §125.3(a)(1) defined at 40 CFR §133, adopted by reference at 18 AAC 83.010(e), which are incorporated in this permit. (CWA Section 304(d) states that biological treatment facilities such as lagoons are deemed the equivalent of secondary treatment.)

The second part of the definition 18 AAC 70.990(B) (2003) appears to be in error, as 18 AAC 72.040 describes discharges to sewers and not minimum treatment. The correct reference appears to be the minimum treatment standards found at 18 AAC 72.050, which refers to domestic wastewater discharges only. The authorized domestic wastewater discharge is in compliance with minimum treatment standards found in 18 AAC 72.050 as reflected by the permit limits specifying equivalent to secondary treatment standards.

The third part includes any more stringent treatment required by state law, including 18 AAC 70 and 18 AAC 72. The correct operation of equipment, water quality monitoring, and implementation of secondary and equivalent to secondary treatment standards for the domestic wastewater discharge (40 CFR 133 and 18 AAC 72.050) will control the discharge and satisfy all applicable state requirements.

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 Spring Creek WWTF meets the highest applicable statutory and regulatory requirements and that the finding is met.

8.0 OTHER PERMIT CONDITIONS

8.1 Disinfection Analysis Report

The Spring Creek WWTF was eligible for coverage under a general permit for domestic wastewater treatment lagoons, however, the Spring Creek WWTF could not meet the general permit required fecal coliform bacteria limits without disinfection and therefore requested an individual permit. The Department is requiring the permittee to conduct an analysis of the economic and technical feasibility of adding disinfection to the facility's treatment process.

The report must include an evaluation of different disinfection alternatives, any upgrades or changes that would be required to incorporate a disinfection alternative, an estimate of the cost to incorporate each disinfection alternative, and an estimated time frame for incorporating a disinfection alternative including an analysis of time it may take to obtain any necessary funding.

The permittee must submit the disinfection analysis report with their application for permit reissuance. This report will be the basis for decisions made by DEC as to whether a compliance schedule associated with implementation of disinfection will be included in a future permit reissuance for discharge from the Spring Creek WWTF.

8.2 Quality Assurance Project Plan

The permittee is required to develop procedures to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to update the QAPP within 120 days of the effective date of the final permit. Additionally, the permittee must submit a letter to the Department within 120 days of the effective date of the permit stating that

the plan has been implemented within the required timeframe. The QAPP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples; laboratory analysis; and data reporting. 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.

8.3 Industrial User Survey

The permittee is required to submit with their permit reissuance application, Form 2A, an Industrial User Survey report. The goal of the Industrial User Survey is to identify industries that discharge non-domestic wastewater into the Spring Creek WWTF collection (and ultimately the treatment system) that have the potential to adversely impact the treatment capabilities of the Spring Creek WWTF and the quality of the treated wastewater. The results will be used to determine if the Spring Creek WWTF may need to develop a pretreatment program or include pretreatment requirements in their wastewater discharge permit. The pretreatment program is authorized under CFR 40 Part 403, adopted by reference in 18 AAC 83.010(g)(2).

8.4 Operation and Maintenance 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 limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to submit written notice to DEC within 120 days of the effective date of the permit stating that an O&M Plan for its facility has been developed or updated and implemented. If an O&M Plan has already been developed and implemented, the permittee need only to review the existing plan to make sure it is up to date and all necessary revisions are made. The plan shall be retained on site and made available to the Department upon request.

8.5 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.

9.0 OTHER LEGAL REQUIREMENTS

9.1 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 ocean except in compliance with Section 403. Permits for discharge 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).

An interactive map depicting Alaska's baseline plus additional boundary lines is available at http://www.charts.noaa.gov/OnLineViewer/AlaskaViewerTable.shtml. The map is provided for information purposes only. The U.S. Baseline committee makes the official determinations on baselines.

A review of the map's baselines revealed that Spring Creek WWTF outfall terminus is positioned landward of the baseline of territorial sea; therefore, an ODCE analysis is not required to be completed for this permit reissuance.

9.2 Endangered Species Act

The Endangered Species Act (ESA) requires federal agencies to consult with the National Oceanic and Atmospheric Administration (NOAA) NMFS and the USFWS if their actions could beneficially or adversely affect any threatened or endangered species. As a state agency, DEC is not required to consult with these federal agencies regarding permitting actions. However, the Department values input from these agencies and has voluntarily contacted the agencies to notify them of the development of the permit and to obtain a list of threatened and endangered species near the point of discharge.

NMFS is responsible for administration of the ESA as it applies to listed cetaceans, seals, sea lion, 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. On March 24, 2015 DEC contacted NMFS and USFWS requesting identification of any threatened or endangered species under their jurisdiction in the vicinity of the Spring Creek WWTF outfall.

On March 25, 2015, NMFS responded by email to DEC's request for comment and directed DEC to a NMFS maintained interactive endangered species map at http://alaskafisheries.noaa.gov/mapping/esa/. DEC reviewed this map for threatened and endangered species near Spring Creek WWTF outfall. The NMFS email response and NMFS map identified four endangered species that may occur within the area of the mixing zone; the endangered Steller sea lion (*Eumetopias jubatus*), humpback whales (*Megaptera novaeangliae*), North Pacific right whale (*Eubalaena japonica*), and sperm whale (*Physeter macrocephalus*). In NMFS's email response, it is stated that there is no designated critical habitat for threatened or endangered species under NMFS jurisdiction at the outfall site.

No response was received from USFWS. However, USFWS's web site, found at http://www.fws.gov/alaska/fisheries/endangered/, was reviewed by DEC and found no indication that there are ESA-listed species under USFWS jurisdiction recorded in Resurrection Bay near the Spring Creek WWTF discharge outfall.

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

9.3 Essential Fish Habitat

Essential fish habitat (EFH) includes the waters and substrate (sediments, etc.) necessary for fish from commercially-fished species to spawn, breed, feed, or grow to maturity. The 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 federal agencies regarding permitting actions; however, on March 24, 2015 DEC contacted NOAA NMFS to notify them of the issuance of the permit and to obtain listings of EFH near the subject discharge. On March 25, 2015, DEC received an email response from NMFS which directed DEC to a NOAA Fisheries website at http://alaskafisheries.noaa.gov/habitat/efh.htm.

DEC will provide NMFS with copies of the permit and fact sheet during the public notice period. Any comments received from NMFS regarding EFH will be considered prior to issuance of the permit.

9.4 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.

9.4.1 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.

9.4.2 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

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 EPA Region 10 website link and search for 'NPDES Permits'.

9.5 Permit Expiration

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

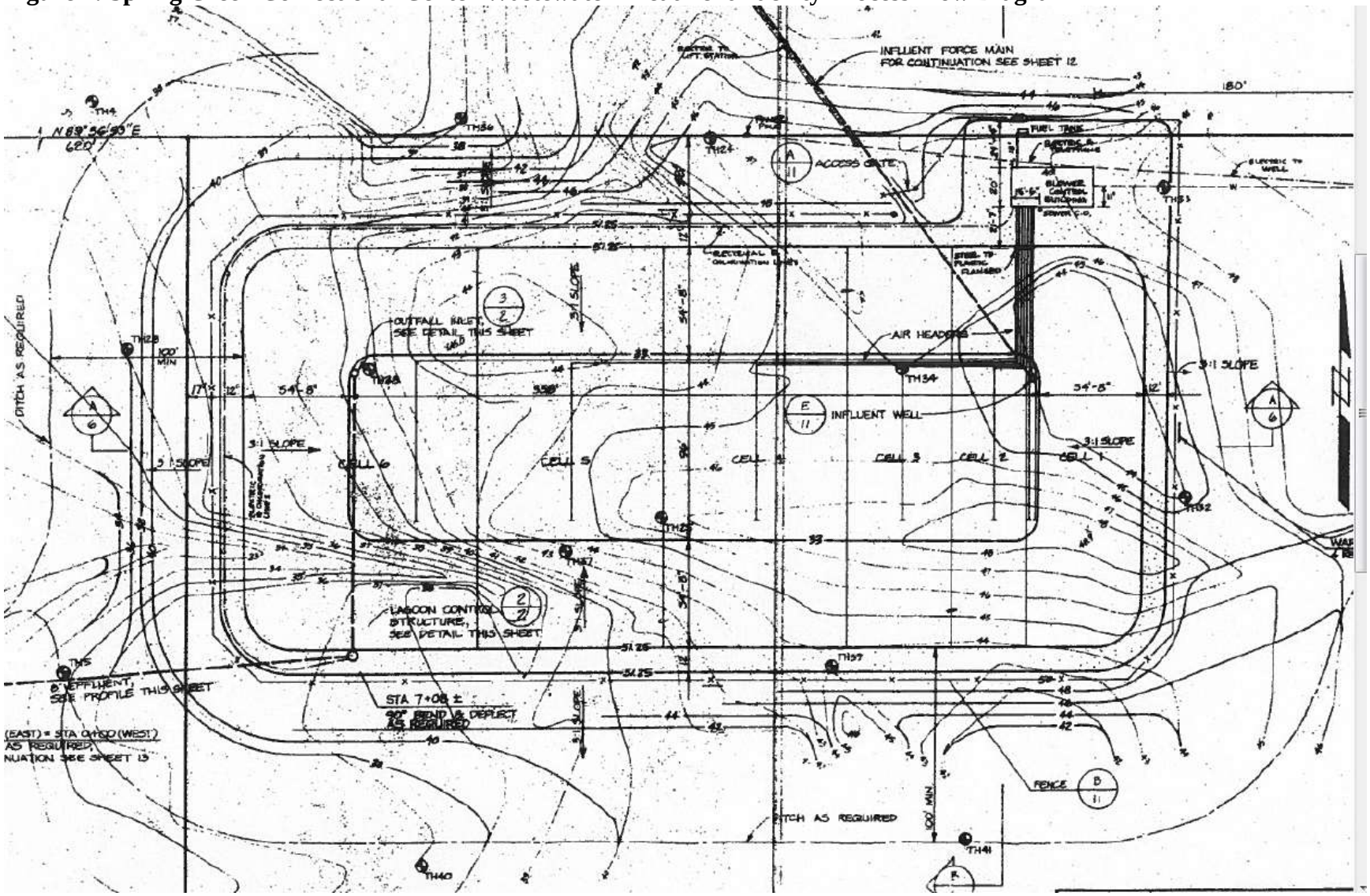
10.0 References

- Alaska Department of Environmental Conservation, *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances*, as amended through December 12, 2008.
- Alaska Department of Environmental Conservation, *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances*, as amended through June 26, 2003.
- Alaska Department of Environmental Conservation, 18 AAC 70 Water Quality Standards, as amended June 26, 2003.
- Alaska Department of Environmental Conservation, 18 AAC 70 Water Quality Standards, as amended April 8, 2012.
- Alaska Department of Environmental Conservation, *Interim Antidegradation Implementation Methods*, Policy and Procedure 05.03.103, July 14 2010.
- Alaska Department of Environmental Conservation, *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report*, July 15, 2010.
- Alaska Department of Environmental Conservation, *Alaska Pollutant Discharge Elimination System (APDES) Permits Reasonable Potential Analysis and Effluent Limits Development Guide*, June 30, 2014.
- Environmental Protection Agency, *Technical Support Document for Water Quality-Based Toxics Control*, 1991, EPA/505/2-90-001.

APPENDIX A FACILITY INFORMATION

Figure 1: Spring Creek Correctional Center Wastewater Treatment Facility Map

Figure 2: Spring Creek Correctional Center Wastewater Treatment Facility Process Flow Diagram



APPENDIX B BASIS FOR EFFLUENT LIMITATIONS

The Clean Water Act (CWA) requires Publicly Owned Treatment Works (POTWs) to meet effluent limits based on available wastewater treatment technology, specifically, secondary treatment standards found at Title 40 Code of Federal Regulations (40 CFR) 133, adopted by reference in Alaska Administrative Code (AAC) 18 AAC 83.010(e). The Alaska Department of Environmental Conservation (the Department or DEC) may find, by analyzing the effect of an effluent discharge on the receiving water body, that secondary treatment effluent limits are not sufficiently stringent to meet water quality standards (WQS). In such cases, the Department is required to develop more stringent water quality-based effluent limits (WQBEL), which are designed to ensure that the WQS of the receiving water body are met.

Secondary treatment effluent limits for POTWs do not limit every parameter that may be present in the effluent. Secondary treatment effluent limits have only been developed for biochemical oxygen demand, 5-day (BOD_5), carbonaceous biochemical oxygen demand, 5-day ($CBOD_5$), total suspended solids (TSS), and pH. Effluent from a POTW may contain other pollutants, such as bacteria, chlorine, ammonia, or metals, depending on the type of treatment system used and the quality of the influent to the POTW (e.g., industrial facilities, as well as residential areas discharge into the POTW). When technology-based effluent limits (TBEL) do not exist for a particular pollutant expected to be in the effluent, the Department must determine if the pollutant may cause or contribute to an exceedance of a water quality criteria for the water body. If a pollutant causes or contributes to an exceedance of a water quality criteria, a WQBEL for the pollutant must be established in the permit.

B.1 Technology-Based Effluent Limitations

B.1.1 Secondary Treatment and Equivalent to Secondary Treatment Effluent Limits

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, which all POTWs were required to meet by July 1, 1977. In 1984, the definition of secondary treatment was revised to include special consideration for facilities that use trickling filters or waste stabilization ponds (i.e., lagoons) as the principal process. CWA Section 304(d)(4) deems biological treatment facilities such as lagoons, as treating wastewater to a level equivalent of secondary treatment. The Department has adopted the secondary treatment and equivalent to secondary treatment TBELs, which are found in 40 CFR §133.102 and 40 CFR §133.105 respectively, adopted by reference in 18 AAC 83.010(e). The TBELs identify the minimum level of effluent quality attainable by application of secondary treatment or equivalent to secondary treatment in terms of BOD_5, $CBOD_5$, TSS, and pH.

40 CFR §133.105 describes the minimum level of effluent quality attainable by facilities to be eligible for treatment equivalent to secondary treatment.

1) The BOD_5, $CBOD_5$, and TSS effluent concentrations consistently achievable through proper operation and maintenance of the treatment works exceeds the minimum level of the effluent quality set forth as attainable by secondary treatment,
2) A trickling filter or waste stabilization pond is used as the principal process, and
3) The treatment works provides significant biological treatment of municipal wastewater.

Following evaluations according to 40 CFR §133.101(g), 40 CFR §133.101(f), and §133.105(f)(1), the Spring Creek Correctional Center Wastewater Treatment Facility (Spring Creek WWTF) meets the requirement of providing biological treatment of wastewater by way of a lagoon system. A review of five years of effluent monitoring data, April 2010 through March 2015, shows that the facility could not consistently meet secondary treatment requirements for BOD_5 and TSS. However, in the 25 plus years of operation there is no documentation of the accumulated sludge being removed from the lagoon, nor has the lagoon had significant maintenance to its aeration system or baffles. During the summer of 2015, the City of Seward (City) took maintenance action to fix a torn baffle curtain, service the lagoon's aerators, and remove sludge buildup. Until effluent data is reported for at least a full year, it is unknown what impact these maintenance activities may have on the effluent quality. Therefore, for this permit issuance, DEC is imposing effluent limits corresponding to those required of similar, aerated lagoon, facilities throughout Alaska; secondary standards for BOD_5 and equivalent to secondary standards for BOD_5 percent removal, TSS, and TSS percent removal. Until monitoring data becomes available on which to base a determination as to whether the facility meets the requirements for equivalent to secondary treatment standards, secondary standards must be applied for $CBOD_5$, including $CBOD_5$ percent removal.

On September 1, 2013, DEC issued an Alaska Pollutant Discharge Elimination System (APDES) general permit (AKG573000) covering domestic wastewater treatment lagoons. Spring Creek WWTF is an aerated lagoon similar in nature to those authorized by the general permit and BOD_5, BOD_5 percent removal, TSS, and TSS percent removal effluent limits are included in the 2016 permit consistent with those set in the general permit. The effluent limits imposed in the general permit, and in the 2016 permit for BOD_5 are based on secondary treatment standards and those imposed for BOD_5 percent removal, TSS, and TSS percent removal are based on the equivalent to secondary treatment standards. These limits are also consistent those set in Spring Creek WWTF's 2004 authorization.

In addition to the federal secondary treatment regulations in 40 CFR 133, the State of Alaska requires maximum daily limitations of 60 milligrams per liter (mg/L) for BOD_5 in its own secondary treatment regulations (18 AAC 72.990)(59). Table B-1 summarizes secondary treatment standards and equivalent to secondary treatment standards.

Table B-1: Secondary and Equivalent to Secondary Treatment Standards

Parameter	Average Monthly		Average Weekly		Maximum Daily		Minimum Monthly	
	Secondary Treatment [a]	Equivalent to Secondary Treatment [b]	Secondary Treatment	Equivalent to Secondary Treatment	Secondary Treatment	Equivalent to Secondary Treatment	Secondary Treatment	Equivalent to Secondary Treatment
BOD_5 (mg/L)	30	45	45	65	60	-----	-----	-----
BOD_5 - percent removal	85% (minimum)	65% (minimum)	-----	-----	-----	-----	85 %	65 %
$CBOD_5$ (mg/L)	25	40	40	60	-----	-----	-----	-----
$CBOD_5$ - percent removal	85% (minimum)	65% (minimum)	-----	-----	-----	-----	85 %	65 %
TSS (mg/L)	30	45	45	65	60	-----	-----	-----
TSS – percent removal	85% (minimum)	65% (minimum)	-----	-----	-----	-----	85 %	65 %
pH	Both secondary and equivalent to secondary treatment requires pH to be between a range of 6.0 to 9.0 standard pH units (SU).							

Note:
a. Secondary Treatment effluent limits from 40 CFR 133.102 adopted by reference at 18 AAC 83.010(e)
b. Equivalent to Secondary Treatment effluent limits from 40 CFR 133.105 adopted by reference at 18 AAC 83.010(e)

B.1.2 Mass-Based Limitations

The regulation at 18 AAC 83.540 requires that effluent limits be expressed in terms of mass, if possible. The regulation at 18 AAC 83.520 requires that effluent limits for a POTW be calculated based on the design flow of the facility in million gallons per day (mgd). The mass based limits are expressed in pounds per day (lbs/day) and are calculated as follows:

Mass based limit (lbs/day) = concentration limit (mg/L) × design flow (mgd) × 8.341[1]

The BOD_5 mass limits for the permit are:

Average Monthly Limit = 30 mg/L x 0.195 mgd x 8.34[1] = 48.79 = 49 lbs/day

Average Weekly Limit = 45 mg/L x 0.195 mgd x 8.34 = 73.18 = 73 lbs/day

Maximum Daily Limit = 60 mg/L x 0.195 mgd x 8.34 = 97.58 = 98 lbs/day

The $CBOD_5$ mass limits for the permit are:

Average Monthly Limit = 25 mg/L x 0.195 mgd x 8.34[1] = 40.66 = 41 lbs/day

Average Weekly Limit = 40 mg/L x 0.195 mgd x 8.34 = 65.05 = 65 lbs/day

[1] 8.341 is a conversion factor with units (lbs x L) / (mg x gallon x 10^6)

The TSS mass limits for the permit are:

Average Monthly Limit = 45 mg/L × 0.195 mgd × 8.34 = 73.18 = 73

Average Weekly Limit = 65 mg/L × 0.195 mgd × 8.34 = 105.71 = 106

B.1.3 Specific Technology-Based Effluent Limits

B.1.3.1 *BOD_5 and Total Suspended Solids*

The permit imposes TBELs for secondary treatment and equivalent to secondary treatment for BOD_5, $CBOD_5$, and TSS.

Table B-2: BOD_5, $CBOD_5$, and TSS Selected TBELs

Parameter	Average Monthly	Average Weekly	Maximum Daily	Basis
BOD_5	30 mg/L	45 mg/L	60 mg/L	Secondary Treatment, 40 CFR 133.102, adopted by reference at 18 AAC 83.010(e)
BOD_5 % Removal	65% (minimum)	------	------	Equivalent to Secondary Treatment, 40 CFR 133.105, adopted by reference at 18 AAC 83.010(e)
$CBOD_5$	25 mg/L	40 mg/L	------	Secondary Treatment, 40 CFR 133.102, adopted by reference at 18 AAC 83.010(e)
$CBOD_5$ % Removal	85% (minimum)	------	------	Secondary Treatment, 40 CFR 133.102, adopted by reference at 18 AAC 83.010(e)
TSS	45 mg/L	65 mg/L	------	Equivalent to Secondary Treatment, 40 CFR 133.105, adopted by reference at 18 AAC 83.010(e)
TSS % Removal	65% (minimum)	------	------	Equivalent to Secondary Treatment, 40 CFR 133.105, adopted by reference at 18 AAC 83.010(e)

B.2 Water Quality – Based Effluent Limitations

B.2.1 Statutory and Regulatory Basis

18 AAC 70.010 prohibits conduct that causes or contributes to a violation of the WQS.
18 AAC 15.090 requires that permits include terms and conditions to ensure water quality 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 water body. The limits must be stringent enough to ensure that WQS are met and must be consistent with any available wasteload allocation (WLA).

B.2.2 Reasonable Potential Analysis

When evaluating the effluent to determine if WQBELs based on chemical-specific numeric criteria are needed, the Department projects the receiving water body concentration for each pollutant of concern down current of where the effluent enters the receiving water body. The chemical-specific concentration of the effluent and receiving water body and, if appropriate, the dilution available from the receiving water body, are factors used to project the receiving water body concentration. If the projected concentration of the receiving water body 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 criteria, and a WQBEL must be developed.

According to 18 AAC 70.990(38), a mixing zone is an area in a water body surrounding, or down current of, a discharge where the effluent plume is diluted by the receiving water within which specified water quality criteria may be exceeded. Water quality criteria may be exceeded within a mixing zone. A mixing zone can be authorized only when adequate receiving water body flow exists, and the concentration of the pollutant of concern in the receiving water body is below the numeric criterion necessary to protect the designated uses of the water body.

The Department reviewed Spring Creek WWTF effluent data collected April 1, 2010 through April 30, 2016 and determined that the pollutants of concern are fecal coliform bacteria and ammonia. Other pollutants, for which monitoring data was submitted, were not considered to be of concern because data showed that effluent concentrations were consistently below applicable water quality criteria. The Department evaluated fecal coliform bacteria for reasonable potential using the *Alaska Pollutant Discharge Elimination System (APDES) Permits Reasonable Potential Analysis and Effluent Limits Development Guide*, June 2014, (RPA Guidance). See Appendix C for more details on the reasonable potential analysis procedure.

B.2.3 Procedure for Deriving Water Quality-Based Effluent Limits

WQBELs for fecal coliform bacteria effluent limits are based on the available dilution in a mixing zone restricted to the same size as was authorized in the 2004 authorization. This permit also contains WQBELs set equal to water quality criteria found in WQS

B.2.4 Specific Water Quality-Based Effluent Limits

B.2.4.1 *Floating, Suspended or Submerged Matter, including Oil and Grease*

The water quality criteria for floating solids, debris, sludge, deposits, foam, scum, or other residues suspended or submerged are narrative. The most stringent standard, found at 18 AAC 70.020(b)(20)(A)(ii), as amended through June 26, 2003, requires that marine waters, “May not, alone or in combination with other substances or wastes, make the water unfit or unsafe for the use; cause a film, sheen, or discoloration on the receiving of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines.” This narrative criteria is included in the permit.

B.2.4.2 *Chlorine*

Chlorine is not being used by the facility for disinfection or in any other stage of the treatment process and therefore no limits have been set for total residual chlorine.

B.2.4.3 *pH*

The criteria found at 18 AAC 70.020(b)(18)(A)(i), amended as of April 8, 2012, for water supply for aquaculture and the growth and propagation of fish, shellfish, other aquatic life, and wildlife are the most stringent standards for pH. These standards state that marine waters, "May not be less than 6.5 or greater than 8.5, and may not vary more than 0.2 pH unit outside of the naturally occurring range."

As noted above in Section B.1.1, pH also has TBELs of a range between 6.0 standard pH units (SU) and 9.0 SU as part of secondary and equivalent to secondary treatment standards.

The 2004 authorization contained TBELs for pH; however, a review of submitted pH data indicates that the facility can meet the more stringent WQBELs. The 2016 permit pH effluent limits of a range between 6.5 SU and 8.5 SU are identical to the more stringent WQBELs and shall apply at the end-of-pipe.

Table B-3: Selection of pH Permit Limits

	Minimum Daily (SU)	Maximum Daily (SU)
Technology Based Limits	6.0	9.0
Water Quality-Based Limits	6.5	8.5
Selected Limits	6.5	8.5

B.2.4.4 *Dissolved Oxygen*

The criteria for agricultural water supply; contact and secondary water recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life are the most stringent standards for dissolved oxygen. The standards at 18 AAC 70.020(b)(15)(A)(i), amended as of April 8, 2012, require that surface dissolved oxygen concentrations in marine water may not be less than 6.0 mg/L nor greater than 17 mg/L; the concentration of total dissolved gas may not exceed 110% of saturation at any point of sample collection. Reported effluent dissolved oxygen concentrations from April 2010 through April 2016 were reviewed. The June 2010 reported effluent dissolved oxygen concentration was the only reported concentration that was outside water quality criteria range of 6.0 mg/L to 17 mg/L. Therefore, a minimum daily effluent limit of 6.0 mg/L and a maximum daily effluent limit of 17 mg/L have been included in the 2016 permit.

B.2.4.5 *Fecal Coliform Bacteria*

The criteria at 18 AAC 70.020(b)(14) for marine waters designated for use for harvesting for consumption of raw mollusks or other raw aquatic life are the most stringent standards for fecal coliform bacteria. The criteria requires that the fecal coliform (FC) bacteria may not exceed 14 FC/100 milliliter (mL), and not more than 10% of the all samples may exceed 43 FC/100 mL.

The 2004 authorization set fecal coliform bacteria effluent limits at a monthly geometric mean of 100,000 FC/100 mL and a maximum daily limit of 150,000 FC/100 mL. Fecal coliform bacteria samples taken between April 2010 and April 2016 were reviewed. The reported monthly geometric means ranged from 320 to 26,500 FC/100 mL with one outlier of 116,382 FC/100 mL, and the reported daily maximums ranged from 400 to 26,500

FC/100 mL with one outlier of 3,870,000 FC/100 mL. The outliers occurred five months following maintenance being performed on the lagoon. The monitoring data indicates that fecal coliform bacteria will exceed water quality criteria at the end of the pipe and will require a mixing zone to meet water quality criteria; however, the data also indicates that the facility can achieve more stringent effluent limits than those included in the 2004 authorization. The mixing zone size remains the same as was authorized in the 2004 authorization so fecal coliform bacteria limits are based on the available dilution.

Applying the mixing zone dilution factor of 684 to the 14 FC/100 mL and 43 FC/100 mL standards to be achieved at the boundary of the mixing zone, the monthly geometric mean limit at the end of the pipe would be 684 X 14 FC/100 mL = 9,576 FC/100 mL (rounded to 9,600 FC/100 mL) and the maximum daily limit would be 684 X 43 FC/100 mL = 29,412 FC/100 mL (rounded to 29,000 FC/100 mL).

Under 18 AAC 83.530, limits for POTWs must include weekly average limits unless impracticable. The weekly average limit for fecal coliform bacteria in this permit follows the precedent set by the secondary treatment standard at 18 AAC 83.605 for BOD_5 and TSS, where the weekly limit equals 1.5 times the calculated monthly average limit. For this permit the weekly geometric mean limit is 9576 FC/100 mL X 1.5 = 14,364 FC/100 mL (rounded to 14,000 FC/100 mL).

B.2.4.6 *Total Ammonia (as Nitrogen)*

Total ammonia is the sum of ionized and un-ionized ammonia. The unionized form of ammonia is more toxic to aquatic organisms than the ionized form and is more predominate with higher pH and temperature and lower salinity. Because the toxicity of ammonia in marine water is dependent on pH, temperature, and salinity, the water quality criteria are also pH, temperature, and salinity-dependent. The water quality criteria are based on the worst case conditions and for Spring Creek WWTF the critical concentrations for pH, temperature, and salinity are based on data submitted by the applicant from sampling locations near the point of discharge and ambient data collected by the City's other treatment facility, Lowell Point WWTF, on the other side of Resurrection Bay. It was necessary to include data from the Lowell Point WWTF monitoring because data collected near the point of discharge did not include pH measurements, and temperature measurements were either given as a range or was only collected during one sampling event. A combination of data sources provided the best information to make a permit determination regarding ammonia. Based on a pH of 7.8 SU, a temperature of 15° C, and a salinity of 30 grams/kilogram (g/kg), the acute and chronic criteria for total ammonia is 13.2 mg/L and 2.0 mg/L, respectively. The 2016 permit requires monitoring ambient receiving water body for pH, temperature, salinity, and ammonia to confirm or adjust ammonia water quality criteria used in this determination for the next permit reissuance.

Spring Creek WWTF under coverage by general permit AKG571000, was not required to monitor ammonia. As part of the application for an individual permit, facilities that discharge greater than 0.1 mgd, such as Spring Creek WWTF, are required to submit at least three pollutant scans, for select parameters, that are no more than four and one-half years old. Ammonia is one of these parameters and the permittee analyzed three samples for ammonia during the months of February and March of 2015. Results from the three ammonia samples showed exceedances of ammonia water quality criteria at the end of the pipe. However, consistent with DEC RPA Guidance, DEC determined that there was

insufficient data on which to perform a robust, statistically meaningful analysis. The permit requires bimonthly (once every two months) monitoring of ammonia so that a robust dataset that tracks ammonia effluent variability over the permit term is available to evaluate ammonia reasonable potential when the permit is reissued.

B.2.4.7 *Enterococci Bacteria*

Enterococci bacteria are indicator organisms of harmful pathogens recommended by EPA as the best indicator of health risk in marine water used for recreation. In 1986, EPA published *Ambient Water Quality Criteria for Bacteria* that contained recommended bacteria water quality criteria for primary contact recreational users. The Beaches Environmental Assessment and Coastal Health Act that followed in 2000 required states and territories with coastal recreation waters to adopt bacteria criteria into their WQS, that were at least as protective as EPA's 1986 published bacteria criteria, by April 10, 2004. Alaska did not adopt the enterococci bacteria into the Alaska WQS by the April 10, 2004 deadline; therefore EPA promulgated the 1986 bacteria criteria for Alaskan coastal recreational waters in 2004. Accordingly, monitoring for enterococci bacteria shall be required in the 2016 permit. At the end of the five year permit cycle, DEC will evaluate the monitoring data as part of the next individual permit.

APPENDIX C REASONABLE POTENTIAL DETERMINATION

The following describes the process the Alaska Department of Environmental Conservation (the Department or DEC) used to determine if the discharge authorized in the 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 for Water Quality-Based Toxics Control* (TSD) (Environmental Protection Agency (EPA), 1991) and DEC's guidance, *Alaska Pollutant Discharge Elimination System (APDES) Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 30, 2014) (RPA Guidance) to determine the reasonable potential for any pollutant to exceed a water quality 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 water body concentration to the water quality criteria for that pollutant. Reasonable potential to exceed exists if the projected receiving water body concentration exceeds the criteria, and a water quality-based effluent limit must be included in the permit (18 AAC 83.435). This section discusses how the maximum projected receiving water body concentration is determined.

C.1 Mass Balance

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

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

where,

C_d = Receiving water body concentration down current of the effluent discharge

C_e = Maximum projected effluent concentration

C_u = 85th percentile measured receiving water body up current concentration

Q_d = Receiving water body 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 water body flow

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

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

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

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

where

MZ is the fraction of the receiving water body flow available for dilution.

Where mixing is rapid and complete, MZ is equal to 1 and Equation C-2 is equal to Equation C-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 water body concentration, and

$$C_d = C_e \qquad \text{(Equation C-4)}$$

In other words, if a mixing zone is not authorized (either because the receiving water body already exceeds water quality criteria or the Department does not allow one), the Department considers only the concentration of the pollutant in the effluent regardless of the receiving water body flow and concentration. If the concentration of the pollutant in the effluent is less than the water quality 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 C-2 can be simplified by introducing a "dilution factor":

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

After the dilution factor simplification, this becomes:

$$C_d = \frac{(C_e - C_U) + C_U}{D} \qquad \text{(Equation C-6)}$$

C.2 Maximum Projected Effluent Concentration

To calculate the maximum projected effluent concentration, the Department used DEC RPA Guidance. 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 water body concentration.

Since there are a limited number of data points available, the 99th percentile is calculated by multiplying the maximum reported effluent concentration by a "reasonable potential multiplier" (RPM). The RPM is the ratio of the 99th percentile concentration to the maximum reported effluent concentration 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 recommends making the assumption that the CV is equal to 0.6. A CV value of 0.6 is a conservative estimate that assumes a relatively high variability.

Because a lognormal distribution type was selected from ProUCL (a statistical software program) for fecal coliform bacteria, the equation in Section 2.4.2.2 of the RPA Guidance is used to determine the RPM for fecal coliform bacteria.

$$\text{RPM} = \frac{\exp(Z_{99} * \sigma - 0.5 * \sigma^2)}{\exp(P_n * \sigma - 0.5 * \sigma^2)} \qquad \text{(Equation C-7)}$$

Where,

Z_{99} = the z-statistic at the 99th percentile = 2.326
σ = the lognormal standard deviation calculated by ProUCL
σ^2 = the lognormal variance (square of the standard deviation calculated by ProUCL)
p_n = the z-statistic at the 95th percentile level of $(1 - 0.95)^{1/n}$
n = the number of valid data samples

For fecal coliform (FC) bacteria the data set contained 68 samples, therefore:

Z_{99} = the z-statistic at the 99th percentile = 2.326
σ = lognormal standard deviation = 1.112
σ^2 = square of the standard deviation = 1.237
P_{68} = the z-statistic at the 95th percentile level of $(1 - 0.95)^{1/68}$ = 1.716
n = the number of valid data samples = 68
Maximum reported concentration (MRC) for fecal coliform bacteria (FC) = 26,900 FC/100 mL

$$\text{RPM} = \frac{\exp(2.326 * 1.112 - 0.5 * 1.237)}{\exp(1.716 * 1.112 - 0.5 * 1.237)} = 1.971 \qquad \text{(Equation C-7)}$$

The maximum projected effluent concentration (C_e) is determined by multiplying the MRC by the RPM.

$$C_e = \text{MRC X RPM} = 26{,}900 \text{ FC/100 mL X } 1.971 = 53{,}020 \text{ FC/100 mL} \qquad \text{(Equation C-8)}$$

To determine the receiving water body concentrations down current of the effluent discharge (C_d), Equation C-6 is used.

$$C_d = \frac{(C_e - C_U)}{D} + C_U \qquad \text{(Equation C-6)}$$

Using fecal coliform bacteria as an example:

C_e = 53,020 FC/100 mL

C_u = 2.1 FC/100 mL
(in this case ambient data for fecal coliform bacteria is not available so C_u becomes 15% the most stringent fecal coliform bacteria criteria (14 FC/100 mL);
14 FC/100 mL X 0.15 = 2.1 FC/100 mL

$D_{(chronic)}$ = 684

$$\text{Chronic } C_d = \frac{(\text{FC}/100 - 2.1 \text{ FC}/100 \text{ mL})}{684} + 2.1/100 \text{ mL} = 79.6 \text{ FC}/100 \text{ mL}$$

C.3 Comparison with ambient criteria

In order to determine if reasonable potential exists for this discharge to violate the ambient criteria, the highest projected concentrations at the boundary of the mixing zone are compared with the ambient criteria. Using fecal coliform bacteria as an example:

Chronic:	79.6 FC/100 mL > 14 FC/100 mL (chronic criteria)	**YES**, there is a reasonable potential to violate

Since there is reasonable potential for the effluent to cause an exceedance of chronic water quality criteria for protection of aquatic life, a water quality-based effluent limit (WQBEL) for fecal coliform bacteria is required. See Tables C-1 and C-2 for reasonable potential calculations.

C.4 Up Current (Ambient) Concentration of Pollutant

The ambient concentration in the mass balance equation is based on a reasonable worst-case estimate of the pollutant concentration up current from the discharge. For criteria that are expressed as maxima (such as ammonia and chlorine), the 95th percentile of the ambient data is generally used as an estimate of the worst-case. When ambient concentrations are not available, 15% of the most stringent applicable water quality criteria is used. No fecal coliform bacteria concentrations were available from the ambient receiving water thus 15% of the most stringent criteria has been used to represent a worst-case estimate.

Table C-1 summarizes the data used to determine the maximum projected effluent concentration and Table C-2 summarized the data used to determine if reasonable potential exists. The most stringent criterion for fecal coliform bacteria is the chronic criteria and has been used below in the reasonable potential determinations.

Table C-1: Maximum Projected Effluent Concentration Calculation

Parameter	Max. Reported Effluent Conc.	Number of Samples	CV	RPM	Max Projected Effluent Conc. (C_e)
Fecal Coliform Bacteria	26,900	68	1.56	1.971	53,020

Table C-2: Reasonable Potential Determination

Parameter	Maximum Projected Effluent Conc. (C_e)	Effluent Flow (Q_e), mgd	Up Current Conc. (C_u) [a]	Dilution Ratio (D)	Maximum Conc. at Boundary of Mixing Zone (C_d)	Most Stringent Criterion	Does C_d Exceed Criteria?
Fecal Coliform Bacteria (Chronic)	53,020	0.195	2.1	684	79.6	14	Yes

Note:
a. Ambient concentration used is 15% of the most stringent water quality criteria.

C.5 Effluent Limit Calculations

The Department determined that fecal coliform bacteria does have reasonable potential to exceed criteria and WQBELs must be developed.

Fecal coliform bacteria effluent limits in this permit have been established based on an authorized mixing zone. The permittee applied for a mixing zone, and modeling of the mixing zone, sized the same as was authorized in the 2004 authorization, indicates that a dilution of 684 is available at the point of discharge. Applying the mixing zone dilution factor of 684 and the fecal coliform bacteria water quality criteria of 14 FC/100 mL and 43 FC/100 mL which must be achieved at the boundary of the mixing zone, the monthly geometric mean limit at the end of the pipe would be 684 X 14 FC/100 mL = 9,576

FC/100 mL (rounded to 9,600 FC/100 mL) and the maximum daily limit would be 684 X 43 FC/100 mL = 29,412 FC/100 mL (rounded to 29,000 FC/100 mL).

Under 18 AAC 83.530, limits for publicly owned treatment works must include weekly average limits unless impracticable. The weekly average limit for fecal coliform bacteria in this permit follows the precedent set by the secondary treatment standard at 18 AAC 83.605 for BOD_5 and TSS, where the weekly limit equals 1.5 times the calculated monthly average limit. For this permit the weekly average limit is 9,576 FC/100 mL X 1.5 = 14,364 FC/100 mL (rounded to 14,000 FC/100 mL).

APPENDIX D EFFLUENT EXCEEDANCES – July 2004 – April 2016

Parameter	Units [b]	Limit Violation		Effluent Limit	Value Reported on DMR [c]
		Year	Month(s)		
BOD_5 [a], Average Monthly	mg/L	2004	August	30	47
			September	30	43
			October	30	32
		2005	May	30	38
			July	30	41
			August	30	38
		2006	June	30	67
			July	30	36
			September	30	40
			October	30	34
		2007	June	30	44
			July	30	44
			August	30	38
		2008	January	30	50
			June	30	65
		2009	June	30	58
			October	30	56
		2010	June	30	37
			July	30	38
			September	30	33
			October	30	33
			December	30	31
		2011	February	30	31
			March	30	38
			April	30	34
			June	30	42
			July	30	34
			October	30	53
			December	30	35
		2012	June	30	42
			October	30	43
		2013	June	30	54
			September	30	44
		2014	February	30	47
			July	30	33
		2015	August	30	35
			September	30	54
			October	30	81
			November	30	40
BOD_5, Average Monthly	lbs/day	2005	November	49	65
BOD_5, Average Weekly	mg/L	2004	August	45	50
		2006	June	45	67

		2007	June	45	57
		2008	January	45	50
			June	45	65
		2009	June	45	58
			October	45	56
		2011	October	45	53
		2013	June	45	54
		2014	February	45	47
		2015	September	45	54
			October	45	81
			November	45	40
TSS [d], Average Monthly	mg/L	2004	July	45	49
			August	45	86
			September	45	54
			October	45	48
		2005	June	45	60
			July	45	85
			August	45	91
		2006	July	45	60
			August	45	62
			September	45	66
		2007	June	45	51
			July	45	61
			October	45	50
		2008	March	45	48
			July	45	49
		2014	October	45	48
TSS, Average Weekly		2004	August	65	117
		2005	July	65	85
		2005	August	65	123
TSS, Percent Removal	%	2004	July	65	60
		2004	August	65	57
		2004	December	65	55
Dissolved Oxygen, Minimum Daily	mg/L	2004	September	2.0	1.0
Flow, Maximum Daily	mgd	2010	April	0.195	0.54
			August	0.195	0.498
pH, Maximum	SU	2008	July	9	9.7
Fecal Coliform Bacteria, Geometric Mean, Monthly	FC/100 mL	2016	November	100,000	116,382
Fecal Coliform Bacteria, Maximum Daily	FC/100 mL	2016	November	150,000	3,870,000

Note:

a. BOD_5 = Biochemical Oxygen Demand, 5-Day
b. mg/L = milligram per liter; lbs/day = pounds per day; % = percent; SU = standard units; FC/100 mL = fecal coliforms per 100 milliliters
c. DMR = Discharge Monitoring Report
d. TSS = Total Suspended Solids

APPENDIX E MIXING ZONE ANALYSIS CHECKLIST

Mixing Zone Authorization Checklist

based on Alaska Water Quality Standards (2003)

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

Criteria	Description	Resources	Regulation	MZ Approved Y/N
Size	Is the mixing zone as small as practicable? - Applicant collects and submits water quality ambient data for the discharge and receiving water body (e.g. flow and flushing rates) - Permit writer performs modeling exercise and documents analysis in Fact Sheet at: ►Appendix C, Table C-2; Reasonable Potential Determination ►Section 5.3 Mixing Zone Analysis - describe what was done to reduce size.	•Technical Support Document for Water Quality Based Toxics Control •Fact Sheet, Appendix C •Fact Sheet, Appendix D • DEC's RPA Guidance • EPA Permit Writers' Manual	18 AAC 70.240 (a)(2) 18 AAC 70.245 (b)(1) - (b)(7) 18 AAC 70.255(e) (3) 18 AAC 70.255 (d)	Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
Technology	Were the most effective technological and economical methods used to disperse, treat, remove, and reduce pollutants? **If yes**, describe methods used in Fact Sheet at Section 5.3 Mixing Zone Analysis. Attach additional documents if necessary.		18 AAC 70.240 (a)(3)	Y
Low Flow Design	**For river, streams, and other flowing fresh waters.** - Determine low flow calculations or documentation for the applicable parameters. Justify in Fact Sheet	N/A	18 AAC 70.255(f)	
Existing use	Does the mixing zone…			
	(1) partially or completely eliminate an existing use of the water body outside the mixing zone? **If yes, mixing zone prohibited.**		18 AAC 70.245(a)(1)	Y
	(2) impair overall biological integrity of the water body? **If yes, mixing zone prohibited.**		18 AAC 70.245(a)(2)	Y
	(3) provide for adequate flushing of the water body to ensure full protection of uses of the water body outside the proposed mixing zone? **If no, then mixing zone prohibited.**		18 AAC 70.250(a)(3)	Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
	(4) cause an environmental effect or damage to the ecosystem that the department considers to be so adverse that a mixing zone is not appropriate? **If yes, then mixing zone prohibited.**		18 AAC 70.250(a)(4)	Y
Human consumption	Does the mixing zone…			
	(1) produce objectionable color, taste, or odor in aquatic resources harvested for human consumption? **If yes, mixing zone may be reduced in size or prohibited.**		18 AAC 70.250(b)(2)	Y
	(2) preclude or limit established processing activities of commercial, sport, personal use, or subsistence shellfish harvesting? **If yes, mixing zone may be reduced in size or prohibited.**		18 AAC 70.250(b)(3)	Y
Spawning Areas	Does the mixing zone…			
	(1) discharge in a spawning area for anadromous fish or Arctic grayling, northern pike, rainbow trout, lake trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, king, and sockeye salmon? **If yes, mixing zone prohibited.**		18 AAC 70.255 (h)	Y
Human Health	Does the mixing zone…			

Criteria	Description	Resources	Regulation	MZ Approved Y/N
	(1) contain bioaccumulating, bioconcentrating, or persistent chemical above natural or significantly adverse levels? **If yes, mixing zone prohibited.**		18 AAC 70.250 (a)(1)	Y
	(2) contain chemicals expected to cause carcinogenic, mutagenic, tetragenic, or otherwise harmful effects to human health? **If yes, mixing zone prohibited.**			Y
	(3) Create a public health hazard through encroachment on water supply or through contact recreation? **If yes, mixing zone prohibited.**		18 AAC 70.250(a)(1)(C)	Y
	(4) meet human health and aquatic life quality criteria at the boundary of the mixing zone? **If no, mixing zone prohibited.**		18 AAC 70.255 (b),(c)	Y
	(5) occur in a location where the department determines that a public health hazard reasonably could be expected? **If yes, mixing zone prohibited.**		18 AAC 70.255(e)(3)(B)	Y
Aquatic Life	Does the mixing zone…			
	(1) create a significant adverse effect to anadromous, resident, or shellfish spawning or rearing? **If yes, mixing zone prohibited.**		18 AAC 70.250(a)(2)(A-C)	Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
	(2) form a barrier to migratory species? **If yes, mixing zone prohibited.**			Y
	(3) fail to provide a zone of passage? **If yes, mixing zone prohibited.**			Y
	(4) result in undesirable or nuisance aquatic life? **If yes, mixing zone prohibited.**		18 AAC 70.250(b)(1)	Y
	(5) result in permanent or irreparable displacement of indigenous organisms? **If yes, mixing zone prohibited.**		18 AAC 70.255(g)(1)	Y
	(6) result in a reduction in fish or shellfish population levels? **If yes, mixing zone prohibited.**		18 AAC 70.255(g)(2)	Y
	(7) prevent lethality to passing organisms by reducing the size of the acute zone? **If yes, mixing zone prohibited.**		18 AAC 70.255(b)(1)	Y
	(8) cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone? **If yes, mixing zone prohibited.**		18 AAC 70.255(b)(2)	Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
Endangered Species	Are there threatened or endangered species (T/E spp) at the location of the mixing zone?If yes, are there likely to be adverse effects to T/E spp based on comments received from USFWS or NOAA. If yes, will conservation measures be included in the permit to avoid adverse effects? **If yes, explain conservation measures in Fact Sheet. If no, mixing zone prohibited.**		Program Description, 6.4.1 #5 18 AAC 70.250(a)(2)(D)	Y