ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT FACT SHEET – PROPOSED FINAL

Permit Number: AK0023213

Juneau-Douglas Wastewater Treatment Facility

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Wastewater Discharge Authorization Program

555 Cordova Street

Anchorage, AK 99501

Public Comment Period Start Date: December 5, 2014
Public Comment Period Expiration Date: January 5, 2015
Alaska Online Public Notice System

Technical Contact: Marie Klingman
Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
610 University Avenue
Fairbanks, AK 99709
(907) 451-2101
Fax: (907) 451-2187
marie.klingman@alaska.gov

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

CITY AND BOROUGH OF JUNEAU

For wastewater discharges from the

Juneau-Douglas Wastewater Treatment Facility
1540 Thane Road
Juneau, AK, 99801

The Alaska Department of Environmental Conservation (the Department or DEC) has reissued an APDES individual permit to the City and Borough of Juneau (CBJ). The permit authorizes and sets conditions on the discharge of pollutants from this facility to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility and outlines best management practices to which the facility must adhere.

This fact sheet explains the nature of potential discharges from the Juneau-Douglas 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 of Water
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501

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 410 Willoughby Avenue, Suite 310 Juneau, AK 99801 (907) 465-5180	Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 610 University Avenue Fairbanks, AK 99709 (907) 451-2100
Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 555 Cordova Street Anchorage, AK 99501 (907) 269-2685	

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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:	Juneau-Douglas Wastewater Treatment Facility
APDES Permit Number:	AK0023213
Facility Location:	1540 Thane Road, Juneau, AK 99801
Mailing Address:	2009 Radcliffe Road, Juneau, AK 99801
Facility Contact:	Mr. Kirk Duncan, Public Works Director (907)586-5254

The map in Appendix A to the Fact Sheet shows the location of the treatment plant and the discharge location.

2.0 FACILITY INFORMATION

The Juneau-Douglas Wastewater Treatment Facility (JD WWTF) collects and treats primarily domestic wastewater from downtown Juneau, West Juneau, and the City of Douglas. The collection system consists of a combination separate and combined sewer system, and is the only combined sewer system in the State of Alaska. The combined sewer system contains three sewer outfalls. See Section 9.4 for details on the combined sewer overflows (CSO). The City and Borough of Juneau (CBJ) is in the process of separating the storm water system from the sewer system, and according to CBJ's 2013 Annual CSO Report, the last CSO discharge event occurred in 2005.

Secondary treatment is provided by an activated sludge biological process, with an average monthly design flow rate of 2.76 million gallons per day (mgd). The treatment process includes grit removal, comminution, aeration (dual basins) secondary clarification (dual tanks), sludge digestion and ultra-violet (UV) disinfection. Waste sludge is dewatered and shipped out of state for disposal.

The secondary treated effluent is discharged into Gastineau Channel through a 300 foot long outfall and diffuser system at a depth of 30 feet (ft) below mean lower low water.

Table 1 summarizes monthly average plant performance from January 2011 through December 2013.

Table 1. Average Plant Performance

Parameter	Monthly Average 2011-2013
Flow	1.07 mgd
5-day Biochemical Oxygen Demand (BOD_5)	8.6 milligrams per liter (mg/L)
BOD_5	89 pounds per day (lbs/day)
BOD_5 percent removal	96.6 percent (%)
Total suspended solids (TSS)	12 mg/L
TSS	118 lbs/day
TSS percent removal	93.4 %
Fecal coliform (FC) bacteria	22 FC per 100 milliliters (mL)
pH	6.6 - 7.3 standard units (s.u.)
Temperature	14.9 degrees Celsius (ºC)
Dissolved oxygen (DO)	4.3-7.4 mg/L

3.0 BACKGROUND

The National Pollutant Discharge Elimination System (NPDES) permit for the JD WWTF was initially issued by the Environmental Protection Agency (EPA) under a four-year term in October 1974 and was later modified in May 1975. EPA reissued the permit again in 1985 and 2001. The 2001 permit expired on December 26, 2006.

Under the Administrative Procedures Act and state regulations at 18 ACC 83.155(c), a federally issued NPDES permit may be administratively extended (i.e., continues in force and effect), provided that the permittee submits a timely and complete application for a new permit prior to the expiration of the current permit. A timely application for a new permit was submitted by CBJ on June 27, 2006; therefore, the 2001 permit issued by EPA is administratively extended until such time a new permit is reissued. In October 2008, the Alaska Department of Environmental Conservation (the Department or DEC) received approval to administer the NPDES Program in the State of Alaska.

4.0 COMPLIANCE HISTORY

Discharge Monitoring Reports (DMRs) from January 2002 to December 2013 were reviewed to determine the facility's compliance with effluent limits as well as discharge from the three CSOs. Effluent violations between January 2002 and December 2008 include two for DO, four for FC bacteria, one for pH, and 20 for TSS. There were no reported BOD_5 effluent violations between January 2002 and December 2008. In 2009 CBJ reported a total of 33 effluent violations, in 2010 a total of 26 effluent violations, in 2011 a total of 21 effluent violations, in 2012 CBJ did not report any effluent violations, and in 2013 CBJ reported a total of 5 effluent violations. Appendix F of this fact sheet provides details on the nature of the reported permit effluent limit exceedances from January 2009 through December 2013. There were no reported discharges from the CSOs between 2009 and 2013 (the last discharge from a CSO was in 2005; see Section 9.4 for more information).

EPA proposed a penalty against CBJ in 2004 alleging that they had failed to submit a Long-Term Control Plan (LTCP) to address CSOs. In August 2006, EPA transmitted a Request for Information and Compliance Order to CBJ and requested they submit a LTCP. In October 2006, CBJ submitted a LTCP that EPA stated did not meet the recommendations in EPA's *Guidance for Long-Term Control Plan;* however, EPA stated that the LTCP was adequate because CBJ intended on separating its sewer system. Subsequently, EPA determined that CBJ had met the terms of the Compliance Order and terminated the Order.

In November 2010, DEC conducted an inspection of JD WWTF. As a result of the inspection, in March 2011, DEC issued CBJ a Notice of Violation (NOV) due to effluent violations as well as CBJ's inability to provide requested permit required documents such as receiving water annual reports, operation and maintenance plans (OMP), DMRs, and sampling records.

On September 15, 2014, DEC conducted another inspection of JD WWTF and noted that the facility had made great strides at coming into compliance. DEC further noted the review of the facility's Quality Assurance Project Plan (QAPP), OMP, CSO LTCP, Best Management Project Plan, NPDES permit, last three years of DMRs, and analytical results and chain of custodies. The inspection report did not identify any missing records, only that the calibration records contained missing entries between January and April 2014. DEC did not note any violations; however, DEC did note as an area of concern, deteriorating catwalks over the aeration basins. CBJ has plans to replace the catwalks.

5.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

5.1 Basis for Permit Limits

The Clean Water Act requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBELs) or water quality-based effluent limits (WQBELs). TBELs are

set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the Water Quality Standards (WQS) of a waterbody are met and may be more stringent than TBELs. Both TBELs (Federal Code of Regulations (CFR) 40 CFR 133 adopted by reference in 18 AAC 83.010) and WQBELs are included in the permit. A detailed discussion of the basis for the effluent limits contained in AK0023213 is provided in Appendix B.

5.2 Basis for Influent, Effluent, and Receiving Water Monitoring

In accordance with Alaska Statutes (AS) 46.03.101(d), the Department may specify in a permit the terms and conditions under which waste material may be disposed. Monitoring in permits is required to determine compliance with effluent limits. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limits are required and/or to monitor effluent impact on receiving waterbody quality. The permittee is responsible for conducting the monitoring and for reporting results on DMRs or on the application for renewal, as appropriate, to the Department. Sections 5.3 through 5.8 summarize monitoring requirements DEC has determined necessary to implement in the permit.

5.3 Monitoring Requirements

The permit requires monitoring of the effluent for flow, BOD_5, TSS, FC bacteria, enterococci bacteria, ammonia, copper, pH, DO, temperature, and whole effluent toxicity (WET) to determine compliance with the effluent limitations and/or for use in future reasonable potential analyses (RPA). The permit also requires monitoring of the influent for BOD_5 and TSS to calculate monthly removal rates for these parameters.

Monitoring frequencies are based on the nature and effect of a pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance.

Table 2 contains influent and effluent monitoring requirements. Table 3 contains parameters for which effluent limits or monitoring requirements have changed since the previous permit.

5.4 Enterococci Bacteria

Enterococci bacteria are indicator organisms of harmful pathogens in marine water and are a better indicator of acute gastrointestinal illness than FC bacteria. In 1986, EPA published Ambient Water Quality Criteria for Bacteria that contained their recommended bacteria water quality criteria for primary contact recreational users from gastrointestinal illness. The Beaches Environmental Assessment and Coastal Health Act of 2000 requires states and territories with coastal recreation waters to adopt bacteria criteria into their WQS that are as protective as EPA's 1986 published bacteria criteria by April 10, 2004. Alaska did not adopt the enterococci bacteria into the 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 is required in the permit at the point of discharge from JD WWTF and in the event of a CSO diversion. At the end of the five year permit cycle, DEC will evaluate the monitoring data and assess the need for applying enterococci limits in the next reissuance of the permit.

5.5 Copper

Alaska WQS at 18 AAC 70.020(23) states that the concentration of substances in water may not exceed the numeric criteria for aquatic life for marine water shown in the Alaska Water Quality Criteria Manual. The acute aquatic life copper concentration (total recoverable) may not exceed 5.8 micrograms per liter (µg/L) and the chronic aquatic life copper concentration (total recoverable) may not exceed 3.7 µg/L. The previous permit required quarterly copper sampling; however, as per the previous permit, because sample results did not exceed 75 µg/L, monitoring for copper was discontinued after two years. Because copper monitoring has been discontinued since 2004, monitoring data from priority pollutant

scans submitted between 2011 and 2013, representing current treatment plant performance, were evaluated for RP. The RPA for copper was based on three effluent samples that led to a large reasonable potential multiplier (RPM), maximum expected concentration (MEC), and RP to exceed WQ criteria at the end of pipe. (See Section 6.5 for more details). Because there is RP for copper to exceed WQ criteria at the end of the pipe, this permit requires monitoring of the effluent for copper. Quarterly monitoring is required for the life of the permit to more closely monitor the copper concentration in the effluent and to obtain a larger data set for use in the next RPA.

5.6 Whole Effluent Toxicity Monitoring

Alaska WQS at 18 AAC 70.030 requires that an effluent discharged to a water may not impart chronic toxicity to aquatic organisms, expressed as 1.0 chronic toxic unit (TUc), at the point of discharge, or if the Department authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone.

WET tests are laboratory tests that measure the total toxic effect of an effluent on living organisms. WET tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. There are two different durations of toxicity test: acute and chronic. Acute toxicity tests measure survival over a 96-hour exposure. Chronic toxicity tests measure reductions in survival, growth, and reproduction over a 7-day exposure. State regulation 18 AAC 83.335 recommends chronic testing for facilities with dilution factors less than 100:1 at the boundary of the mixing zone, acute testing for facilities with dilution factors greater than 1000:1 at the boundary of the mixing zone, and either acute or chronic for dilution factors between 100:1 and 1000:1 at the boundary of the mixing zone.

The previous permit required that CBJ conduct toxicity tests using the following organisms: for the larval development test, a bivalve species, either *Crassostrea gigas* (pacific oyster) or *Mytilus galloprovincialis* (blue mussel) and for purposes of the sperm fertilization test, and depending on the availability, an echinoderm, either *Strongylocentrotus purpuratus* (purple sea urchin) or *Dendraster excentricus* (sand dollar). Four tests per species were required. The organisms were tested at the following effluent concentrations: 15, 8.0, 3.8, 2.0, 1.0 and 0% (control), with 3.8% effluent corresponding to the instream waste concentration at the boundary of the mixing zone.

The results indicated that for all tested organisms, there was no observable effect at a 15% effluent concentration. In addition, the IC_{25} for all tested species was >15%. (See Appendix B of the permit for a definition of IC_{25}.)

In order to reassess the toxicity of JD WWTF, and ensure compliance with 18 AAC 83.335, effluent monitoring for WET is required in the permit. WET monitoring conducted as a requirement in this permit will also satisfy the WET monitoring requirements found in Application Form 2A, that must be completed when reapplying for coverage.

The test dilution series as well as the TUc trigger has been adjusted in this permit from 15, 8.0, 3.8, 2.0, and 1.0% effluent to 20, 10, 5.0, 2.5, and 1.25% effluent and from 26 TUc to 20 TUc to reflect the new chronic mixing zone dilution factor.

The permit also requires accelerated WET testing if toxicity is greater than 20 TUc in any test. Six biweekly WET tests (every two weeks) over a 12-week period is required. If toxicity is greater than 20 TUc in any of the accelerated tests, the permittee must initiate a Toxicity Reduction Evaluation (TRE). A TRE is required so that the specific cause of the toxicity can be identified and mitigated (See Section 1.3.5 of the permit for further details.)

5.7 Combined Sewer Overflows

EPA's CSO Policy, adopted by reference at 18 AAC 83.010(h) contains both technology and WQ-based permit monitoring requirements for Post-Phase II CSOs. During Phase I, a facility is expected to develop a LTCP and achieve an interim level of control. During Phase II, the facility is required to

implement the controls identified in the LTCP. A Post-Phase II CSO permit is one in which the CSO controls have been implemented. CBJ has implemented CSO controls; therefore, the JD WWTF permit contains the Post-Phase II CSO technology and WQ-based permit monitoring requirements found in EPA's CSO Policy.

The technology-based requirements found in the permit consist of nine minimum controls that can reduce CSOs and their effects on waterbodies. The CSO WQ-based requirements prohibit the discharge of any pollutant at a level that causes or contributes to an instream excursion above numeric or narrative criteria adopted as part of Alaska WQ Standards at 18 AAC 70. CSO WQ-based requirements also limit the number of annual overflow events not receiving minimum treatment and establishes numeric WQ-based minimum treatment levels for FC bacteria and TRC.

A copy of EPA's CSO Policy is available at:
http://water.epa.gov/polwaste/npdes/cso/upload/owm0111.pdf.

Table 2. Outfall 001: Effluent Limits and Monitoring Requirements

Effluent Limits						Monitoring Requirements		
Parameter	**Units**	**Average Monthly Limit**	**Average Weekly Limit**	**Maximum Daily Limit**	**Minimum Daily Limit**	**Sample Location**	**Sample Frequency**	**Sample Type**
Flow	mgd	2.76	not applicable (N/A)	6.0	N/A	effluent	continuous	recording
BOD_5	mg/L	30	45	60	N/A	influent and effluent [b]	1/month	24-hour composite [c]
	lbs/day [a]	690	1,035	1,380				
TSS	mg/L	30	45	60	N/A	influent and effluent [b]	1/month	24-hour composite [c]
	lbs/day [a]	690	1,035	1,380				
BOD_5 minimum percent removal: 85%			TSS minimum percent removal: 85%			influent and effluent	1/month	calculated [d]
FC Bacteria [e]	FC/100 mL	200	400	800	N/A	effluent	1/week	grab
Enterococci Bacteria	count/100 mL	N/A	N/A	report	N/A	effluent	1/month [f]	grab
Total Ammonia, as Nitrogen	mg/L	14	21	30	N/A	effluent	1/month	24-hour composite [c]
Copper, total recoverable	µg/L	N/A	N/A	report	N/A	effluent	1/quarter	24-hour composite [c]
pH	s.u.	N/A	N/A	8.5	6.5	effluent	5/week	grab
DO	mg/L	N/A	N/A	17	2.0	effluent	5/week	grab
Temperature	˚ C	N/A	N/A	report	N/A	effluent	5/week	grab
WET	TUc	N/A	N/A	report	N/A	See Permit Section 1.3 for WET requirements		

Footnotes:

a. lbs/day = concentration (mg/L) x flow (mgd) x 8.34 (conversion factor). Influent and effluent samples must be taken over approximately the same time period.
b. Limits apply to effluent. Report average monthly influent concentration.
c. See Appendix C of the permit for a definition.
d. Minimum % Removal = [(monthly average influent concentration in mg/L - monthly average effluent concentration in mg/L) / (monthly average influent concentration in mg/L)] x 100. The monthly average percent removal must be calculated using the arithmetic mean of the influent value and the arithmetic mean of the effluent value for that month.
e. All FC 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 quantities. For example the geometric mean of 100, 200, and 300 is (100 x 200 x 300)1/3= 181.7.
f. Sampling required once per month only during the time period May-Sept. Sampling should be conducted at same time as FC bacteria sampling.

Table 3. Effluent and Monitoring Requirement Changes from Prior Permit

Parameter	Units	Average Monthly Limit		Average Weekly Limit		Maximum Daily Limit		Sample Frequency	
		2001 Permit	2015 Permit	2001 Permit	2015 Permit	2001 Permit	2015 Permit	2001 Permit	2015 Permit
FC Bacteria	FC/100 mL	400	200	800	400	1,200	800	1/week	no change
Enterococci Bacteria	count/100 mL	N/A	N/A	N/A	N/A	N/A	report	N/A	1/month (May-Sept)
Total Ammonia, as Nitrogen	mg/L	report	14 mg/L	N/A	21 mg/L	report	30 mg/L	2/year	1/month
Copper, total recoverable	µg/L	report	no change	N/A	N/A	report	no change	1/quarter*	1/quarter (for the term of the permit)
pH	s.u.	N/A	N/A	N/A	N/A	6.0 (minimum) 8.5 (maximum)	6.5 (minimum) no change (maximum)	5/week	no change
DO	mg/L	N/A	N/A	N/A	N/A	2.0 (minimum) 17 (maximum)	no change	1/week	5/week
WET	TUc	N/A	N/A	N/A	N/A	26 TUc (trigger)	20 TUc (trigger)	quarterly for one year until a total of four tests per species has occurred	annually
*After two years, if no sample results exceed 75µg/L, this monitoring may be discontinued.									

5.8 Receiving Waterbody Monitoring Requirements

The permit establishes two receiving waterbody monitoring stations in Gastineau Channel. The boundary of the mixing zone station (MXZ) must be established either at the southeast boundary of the chronic mixing zone during an ebb tide (receding or outgoing tide) or at the northwest boundary of the chronic mixing zone during a flood tide (rising or incoming tide). The ambient station (AMB) representing ambient conditions in Gastineau Channel, must be established in a location outside the influence of the facility's discharge, greater than 83 meters (m) from the end of the outfall diffuser. The monitoring station locations must receive written approval from DEC.

This permit reestablishes the FC bacteria boundary of mixing zone monitoring requirements that were included in the prior permit. Enterococci bacteria boundary of mixing zone monitoring is also required, and will be compared with the concurrent sampling of effluent FC bacteria.

Ambient monitoring for ammonia is required for use in the next RPA. Because criteria for ammonia in marine water are dependent on the pH, temperature, and salinity of the receiving water, pH, temperature, and salinity receiving water measurements shall also be required whenever ammonia is sampled. The collection of the ambient samples will also provide useful data for future mixing zone modeling.

Table 4 contains boundary of mixing zone monitoring requirements and Table 5 contains ambient receiving waterbody monitoring requirements.

Table 4. Station MXZ: Boundary of Mixing Zone Monitoring Requirements

Parameter	Units	Sampling Frequency	Sample Type
FC Bacteria [a]	FC/100 mL	1/month [b,c]	grab
Enterococci Bacteria	counts/100 mL	2/year [c,d,e]	grab

Footnotes:

a. FC 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 quantities. For example the geometric mean of 100, 200, and 300 is (100 x 200 x 300)1/3= 181.7.
b. Sampling required once per month during May, June, July, Aug, Sept, and Oct and two more times during Nov through April. See Permit Section 1.5.4.
c. Monitoring results must be submitted to DEC with the DMR for the month following sample collection.
d. Twice per year consists of one sample taken in the summer months (June 1– Sept 30), and one in the winter (Oct 1- May 31).
e. Sampling only required during the months May-Sept. Sampling should occur at the same time as FC bacteria sampling.

Table 5. Station AMB: Ambient Station Monitoring Requirements

Parameter	Units	Sampling Frequency	Sample Type
Total Ammonia as Nitrogen [a]	mg/L	2/year [b,c]	grab
pH [a]	s.u.	2/year [b,c]	grab
Temperature [a]	°C	2/year [b,c]	grab
Salinity [a]	grams/kilogram	2/year [b,c]	grab

Footnotes:

a. Ambient station ammonia, pH, temperature, and salinity samples should be take concurrently with the boundary of the mixing zone ammonia sample.
b. Twice per year consists of one sample taken in the summer months (June 1– Sept 30), and one in the winter (Oct 1- May 31).
c. Monitoring results must be submitted to DEC with the DMR for the month following sample collection.

6.0 RECEIVING WATERBODY

6.1 Description of Receiving Waterbody

Gastineau Channel is a long narrow tidal inlet with depths ranging from 240 ft at the entrance to exposed tidal flats at the northwestern end. No major freshwater tributaries discharge to the channel. The circulation is driven by tides, with a mean range of 13.8 ft and a diurnal range of 16.4 ft. Peak ebb and flood tide current speeds can reach two knots.

6.2 Outfall Location

The treated effluent from JD WWTF is discharged at 58° 17’ 2” North latitude and 134° 23’ 13” West longitude, to Gastineau Channel.

6.3 Water Quality Standards

Regulations in 18 AAC 70 require that the conditions in permits ensure compliance with the Alaska 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 beneficial uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the beneficial use classification of each waterbody. The antidegradation policy ensures that the beneficial uses and existing water quality are maintained.

Waterbodies in Alaska are designated for all uses unless the water has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some waterbodies in Alaska can also have site–specific water quality criterion per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b). Gastineau Channel has not been reclassified pursuant to 18 AAC 70.230, nor does it have site-specific water quality criteria pursuant to 18 AAC 70.235. Therefore, existing uses and designated uses are the same and Gastineau Channel must be protected for all marine designated use classes listed in 18 AAC 70.020(a)(2). These marine designated uses consist 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.

6.4 Water Quality Status of Receiving Water

Any part of a waterbody for which the water quality does not or is not expected to meet applicable WQS is defined as a “water quality limited segment” and placed on the state’s impaired waterbody list. Gastineau Channel is not included on the *Alaska’s Final 2010 Integrated Water Quality Monitoring and Assessment Report*, July 15, 2010.

6.5 Mixing Zone Analysis

Under 18 AAC 70.240, as amended through June 26, 2003, the Department may authorize a mixing zone in a permit. A chronic mixing zone is sized to protect the ecology of the waterbody as a whole, while an acute mixing zone is sized to prevent lethality to passing organisms. DEC modeled the acute and chronic mixing zones and calculated dilution factors using CORMIX modeling software. Inputs included the maximum expected effluent concentrations and the acute and chronic WQ criteria of parameters that demonstrated RP (See Appendix B for details on the RPA), as well as any site-specific discharge and ambient data.

Based on the maximum expected effluent concentrations and chronic WQ criteria, ammonia required the most dilution of the parameters that demonstrated RP to exceed WQ criteria; therefore, ammonia determined the chronic mixing zone size. All other parameters needing a chronic mixing zone to meet their respective water quality criterion fit within the chronic mixing zone. The water quality criteria for ammonia, copper, DO, FC bacteria, and WET may be exceeded within the authorized chronic mixing

zone. The chronic mixing zone for this discharge has a dilution of 20.3:1 and is defined as a circle, with a radius of 83 m, centered on the outfall line and over the diffuser and extends from the seafloor to the surface. All chronic aquatic life criteria will be met and apply at and beyond the boundary of the chronic mixing zone.

There is a smaller, initial, acute mixing zone surrounding the outfall and contained within the larger chronic mixing zone for the parameters ammonia and copper. The acute mixing zone for this discharge has a dilution of 2.6:1 and is defined as a circle with a radius of 9 m, centered on the outfall line and over the diffuser. According to EPA (1991) and 18 AAC 70.255, lethality to passing organisms would not be expected if an organism passing through the plume along the path of maximum exposure is not exposed to concentrations exceeding the acute criteria when averaged over a one hour time period. Furthermore, the travel time of an organism drifting through the acute mixing zone must be less than approximately 15 minutes if a one hour exposure is not to exceed the acute criterion. The Department determined that the travel time of an organism drifting through the acute mixing zone to be approximately two minutes; therefore, there will be no lethality to organisms passing through the acute mixing zone.

Based on the maximum expected effluent concentrations and acute WQ criteria, copper required the most dilution of the parameters that demonstrated RP to exceed acute WQ criteria. However, the RPA for copper would be only based on three samples, which results in a large maximum expected concentration of 43.4 mg/L as a result of the large RPM that is used with very small datasets. DEC compared the MEC of 43.4 mg/L to the maximum observed concentration of 9.9 mg/L and concluded that the MEC of 43.4 mg/L derived from a very small dataset would in essence allow for the discharge of a disproportionally higher copper concentration than observed in the effluent. Therefore, the Department is using ammonia's acute dilution factor in the sizing of the initial, acute mixing zone for this permit cycle. Meanwhile, DEC is reinstating the previous permit's quarterly monitoring frequency for copper in order to obtain a larger data set for use in the next RPA and mixing zone analysis.

In addition to ammonia, copper, which also needs an acute mixing zone to meet WQ criteria, fits into the acute mixing zone. Acute aquatic life criteria will be met and apply at and beyond the boundary of this smaller initial mixing zone surrounding the outfall.

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

The following summarizes this analysis:

Size

In accordance with 18 AAC 70.255, the mixing zone must be as small as practicable. In order to ensure that the mixing zone is as small as practicable, DEC used CORMIX, a mixing zone modeling software program, to model the chronic and acute mixing zones.

Because 18 AAC 70.245(b)(5) requires the Department to consider the characteristics of the effluent after treatment of the wastewater, DEC reviewed the last three years of effluent water quality data from January 2011 through December 2013 as well as monthly monitoring logs that CBJ submitted with their DMRs to determine which parameters had RP to exceed WQ criteria, and then which of the parameters required the most dilution to meet WQ criteria for the chronic and acute mixing zones. Ammonia required the most dilution for both the chronic and acute mixing zones (see above discussion). Therefore, ammonia was modeled in CORMIX to determine the smallest practicable mixing zone sizes.

The maximum expected concentration for ammonia, corresponding acute and chronic WQ criterion, and ambient concentrations (in the absence of actual data, DEC uses 15% of the most stringent WQ criterion to establish an ambient concentration) were entered into CORMIX. Accordingly, DEC used 15% of the most stringent WQ criterion for the ambient ammonia concentration. Ambient data for temperature, pH,

and salinity was derived from DEC's Commercial Passenger Environmental Compliance Program Juneau Harbor WQ Sampling[1], and ambient copper data was derived from the Alaska-Juneau (AJ) Mine Project Seawater Monitoring Program. Other data required for the mixing zone modeling included: the input of receiving water characteristics at the outfall such as the depth the receiving water at the outfall, the ambient velocity, wind velocity, and outfall and diffuser specifications, such as the size, direction, and number of ports. Based on the inputs, CORMIX predicted the distance at which ammonia would meet WQ criteria as well as the corresponding dilution at that point.

Table 6 summarizes basic CORMIX inputs that were used to model the chronic and acute mixing zones for ammonia.

Table 6. Summary of CORMIX Inputs

Parameter Modeled	**Maximum Expected Concentration**	**Ambient Concentration**	**Chronic Water Quality Criterion**	**Acute Water Quality Criterion**
Ammonia	29.5 mg/L	0.25 mg/L	1.7 mg/L	5.8 mg/L
Outfall and Receiving Waterbody Characteristics				
Outfall Type	Submerged Multiport Diffuser Discharge			
Outfall Length	90 m			
Diffuser Length	9.14 m (with 4 openings, 4 risers)			
Diffuser Type	alternating perpendicular			
Port Diameter	0.254 m			
Depth at Discharge	9.14 m			
Ambient Velocity	0.1 knots low tidal current 0.9 knots high tidal current			
Wind Velocity	2 knots			
Effluent Characteristics				
Flow Rate	2.76 mgd			
Temperature	14.9 º C			

Technology

In accordance with 18 AAC 70.240(a)(3), the most effective technological and economical methods should be used to disperse, treat, remove, and reduce pollutants. Secondary treatment is provided by an

[1] ADEC Commercial Passenger Vessel Environmental Compliance Program. Juneau Harbor water quality sampling, unpublished data, 2013.

activated sludge biological process. The treatment process includes grit removal, comminution, aeration (dual basins) secondary clarification (dual tanks), and sludge digestion. Effluent is disinfected with UV light prior to discharge into Gastineau Channel.

Existing Use

In accordance with 18 AAC 70.245, the mixing zone has been appropriately sized to fully protect the existing uses of Gastineau Channel. The waterbody's existing uses have been maintained and protected under the terms of the previous permit, which included a very similar mixing zone authorization. The mixing zone authorization does not propose any modifications that would result in changes to existing uses.

Human Consumption

In accordance with 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 is no indication that the pollutants discharged have produced objectionable color, taste, or odor in aquatic resources harvested for human consumption. Additionally, the discharge has not precluded or limited established processing activities or commercial, sport, personal use, or subsistence fish and shellfish harvesting.

Spawning Areas

In accordance with 18 AAC 70.255(h), the mixing zone may not be authorized in a known spawning area for anadromous fish or resident fish spawning redds for Arctic grayling, northern pike, rainbow trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, king, and sockeye salmon. The 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 JD WWTF. See Section 10.2 for more information on EFH.

Human Health

In accordance with 18 AAC 70.250 and 18 AAC 70.255, the mixing zone must be protective of human health. An analysis of the effluent data that was included with JD WWTF discharge application and the results of the RPA conducted on pollutants of concern indicate that the level of treatment at JD WWTF is protective of human health. The effluent data was then used in conjunction with applicable WQ Criteria, which serve the purpose of protecting human and aquatic life, to size the mixing zone to ensure all WQ Criteria are met in the waterbody at the boundary of the mixing zone.

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. CORMIX modeling conducted for this discharge to the Gastineau Channel incorporated the most stringent water quality criterion in the model for protection of the growth and propagation of fish, shellfish, other aquatic life, and wildlife, and all water quality criteria will be met at the boundary of the authorized mixing 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) maintains an interactive endangered species map at http://alaskafisheries.noaa.gov/mapping/esa/. DEC reviewed this map for threatened and endangered species near JD WWTF outfall. The map showed that the endangered humpback whale (*Megaptera novaengliae)* and the threatened eastern Steller sea lion

(*Eumetopias jubatus)* do occur in Gastineau Channel. EPA, however, determined during the previous permit issuance in 2001, that these species would not be affected by JD WWTF discharge.

On October 8, 2014 DEC contacted the United States Fish and Wildlife Service (USFWS) and NMFS and requested them to identify any threatened or endangered species under their jurisdiction in the vicinity of the JD WWTF outfall. This fact sheet and permit will also be submitted to USFWS and NMFS for review during the public notice period. See Section 10.1 of the fact sheet for more information regarding endangered species.

7.0 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 limitations in this permit reissuance are consistent with 18 AAC 83.480. The permit effluent limitations, standards, and conditions in AK0023213 are as stringent as in the previously issued permit and are consistent with 18 AAC 83.480. Accordingly, no backsliding analysis is required for this permit reissuance.

8.0 ANTIDEGRADATION

Section 303(d)(4) of the CWA states that, for waterbodies where the water quality meets or exceeds the level necessary to support the waterbody's designated uses, WQBELs may be revised as long as the revision is consistent with the State's antidegradation policy. The Antidegradation Policy of the WQS (18 AAC 70.015) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. This section analyzes and provides rationale for 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, 2010. Using these procedures and policy, the Department determines whether a waterbody, or portion of a waterbody, 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 Gastineau Channel 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. In addition, little other baseline receiving water data exists. Accordingly, this antidegradation analysis conservatively assumes that the discharge is to a Tier 2 waterbody.

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 Department's findings follow:

- ***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.***

JD WWTF provides a vital service for residents and visitors to Juneau, the capital of the State of Alaska, by collecting, treating, and disposing of domestic wastewater from government offices, individual households, schools, medical facilities, and supporting businesses from the City of Juneau, West Juneau, and the City of Douglas. With approximately 2,038 service connections, JD WWTF is the second largest WWTF servicing the Juneau area. (Mendenhall WWTF is the largest, with 4,598 service connections, and the Auke Bay WWTF is the smallest with 169 service connections.) It can be reasonably expected that the yearly legislative session,

seasonal tourists, and outlying Juneau area residents recreating and conducting business in the downtown Juneau area increases the flow through these service connections and thus the need for the wastewater treatment services provided by JD WWTF. Ultimately, by providing wastewater treatment services, JD WWTF contributes not only to the local economic and social development of Juneau, but to the overall economic and social development of the State of Alaska as well.

DEC determined that the permitted activities are necessary to accommodate important economic and social development and the anticipated minor lowering of water quality is necessary for these purposes and that the finding is met.

- ***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.***

Section 1.2.1 of the permit requires that the discharge shall not cause a violation of the WQS at 18 AAC 70 except if excursions are authorized in accordance with provisions in 18 AAC 70.200 – 70.270 (e.g., variance, mixing zone, etc.). As a result of the facility's RP to exceed WQ criteria for ammonia, copper, DO, FC bacteria, and WET, a mixing zone is authorized in JD WWTF's permit in accordance with 18 AAC 70.240. The resulting effluent end-of pipe limitations and monitoring requirements in the permit (See Table 2) protect WQS, and therefore, will not violate the water quality criteria found at 18 AAC 70.020.

There are no site-specific criteria associated with 18 AAC 70.235.

Alaska WQS at 18 AAC 70.030 requires that an effluent discharged to a waterbody may not impart chronic toxicity to aquatic organisms, expressed as 1.0 TUc, at the point of discharge, or if the Department authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone.

The Department has authorized a chronic mixing zone for this permit with a dilution of 20.3, and subsequently assigned a chronic toxicity trigger based on the minimum effluent dilution achieved in the mixing zone of 20 TUc. If the WET trigger is met, JD WWTF will not violate the WET limit in 18 AAC 70.030.

DEC determined that the reduction in water quality will not violate the criteria of 18 AAC 70.020. 18 AAC 70.235, or 18 AAC 70.030 and that the finding is met.

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

The WQS serve the specific purpose of protecting the existing uses of the receiving waterbody. Gastineau Channel is protected for all designated uses (See Section 6.3 of this fact sheet); 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 for JD WWTF effluent. This will ensure that the resulting water quality at and beyond the boundary of the authorized mixing zone will fully protect all designated uses of the receiving waterbody.

DEC determined that the discharge from JD WWTF will be adequate to fully protect existing uses of the water and that the finding is met.

- ***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.***

JD WWTF utilizes a variety of measures to prevent, control and treat the pollution that may be generated as a result of the facility's wastewater treatment operations. JD WWTF Operation and Maintenance Plan (OMP) establishes standard operational procedures and regular maintenance schedules for the prevention, control, and treatment of all wastes and other substances discharged from the facility. The permitted CSOs must comply with specific minimum controls including the maximization of flow to the WWTF for treatment and the

implementation of a pollution prevention program. (See Section 1.6.1 of the permit). The permit also requires accelerated WET testing if toxicity is greater than 20 TUc in any test. If toxicity is greater than 20 TUc in any of the accelerated tests, the permittee must initiate a TRE. The TRE is required so that the specific cause of the toxicity can be identified and mitigated (See Section 1.3.5 of the permit.) Section 3.0 of the permit requires that pollutants removed in the course of treatment such as screenings and grit be disposed of in accordance with Alaska Solid Waste Management Regulations at 18 AAC 60. In addition, and new to this permit, is the requirement that JD WWTF develop a Facility Plan to evaluate the adequacy of current treatment and disposal systems as well as future treatment and infrastructure needs (See Section 2.4 of the permit).

DEC determined that the methods of pollution prevention, control, and treatment to be most effective and reasonable for applying to all wastes and substances discharged from JD WWTF, are the practices and requirements set out in the permit and that the finding is met.

- ***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 salutatory and regulatory treatment requirements" are defined in 18 AAC 70.990(30) (as amended June 26, 2003) and in the Implementation Methods. Accordingly, there are three parts to the definition, which are:

- (A) any federal technology-based effluent limitation guidelines (ELG) identified in 40 CFR § 125.3 and 40 CFR § 122.29, as amended through August 15, 1997, adopted by reference at 18 AAC 83.010(c)(9);
- (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 ELGs including "For POTWs, effluent limitations based upon…Secondary Treatment" at 40 CFR § 125.3(a)(1) defined at 40 CFR § 133.102, adopted by reference at 18 AAC 83.010(e), which are incorporated in this permit.

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 permit includes stipulations that meet the intent of 18 AAC 70.990.

The third part includes any more stringent treatment required by state law, including 18 AAC 70 and 18 AAC 72. Neither the regulations in 18 AAC 15 and 18 AAC 72 nor another state law that the Department is aware of impose more stringent requirements than those found in 18 AAC 70.

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 JD WWTF meets the highest applicable statutory and regulatory requirements and that this finding is met.

9.0 OTHER PERMIT CONDITIONS

9.1 Quality Assurance Project Plan

The permittee is required to develop procedures to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to update the QAPP within 180 days of the effective date of the final permit. Additionally, the permittee must submit a letter to the Department within 180 days of the effective date of the permit stating that the plan has been implemented within the required time frame. The QAPP shall consist of standard operating procedures

the permittee must follow for collecting, handling, storing and shipping samples; laboratory analysis; and data reporting. The plan shall be retained on site and made available to the Department upon request.

9.2 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 limitations, monitoring requirements, and all other permit requirements at all times. The permittee is required to review and update the OMP that was required under the previous permit within 180 days of the effective date of the reissued permit. The plan shall be reviewed annually, be updated as necessary, be retained on site, and made available to the Department upon request.

9.3 Facility Plan

The permit requires the permittee to develop a Facility Plan that evaluates the existing condition and performance, as well as the near and long term needs of JD WWTF. The plan is required to ensure that the permittee will continue to comply with permit limits as the facility ages and if the design flow capacity is exceeded.

9.4 Combined Sewer Overflow

JD WWTF collection system originally contained six CSO diversion structures that were manually operated and opened by an operator in the field in response to high tide and precipitation events. As a result of capital improvements over the past 30 years, three of the CSOs have been eliminated. The three remaining diversions are located at the High School, City Hall and in Douglas. (See Table 5 of the permit for locations.) None of the remaining diversions referenced in the preceding sentence have been opened since 2005. Consequently, JD WWTF has not incurred any CSO-related bypasses of secondary treatment due to high combined influent flows and the CSO is considered to be controlled.

It is anticipated that CBJ will continue its efforts to separate the storm and sewer system to further reduce the likelihood of CSO diversions. In the 2013 Annual CSO Summary Report, CBJ reported continued efforts to identify and correct infiltration and inflow problems in order to reduce the flow of ground and storm water into the JD collection system. CBJ has implemented building codes that prohibit the connection of storm drain connections such as sump pumps, area drains, and roof leaders to the sewer system. They also conduct periodic sewer system inspections with smoke, dye, and cameras to ensure that that there are no new storm drain connections made to the sewer system. The 2014 LTCP also states that CBJ has 11 projects on its Capital Improvement Program list that will further separate the storm and sanitary sewers.

Should the need arise to open a diversion structure, the permit contains monitoring requirements and minimum controls that are consistent with EPA's CSO Policy, adopted by reference at 18 AAC 83.010(h). The CSO Policy requires a LTCP and nine minimum controls in CSO permits. One of the minimum controls in the CSO Policy and permit requires public notification of CSO occurrences and impacts. As such, CBJ has an active public education program and notifies the public of CSO events via periodic notices on utility bills, the local newspaper, and on CBJ website. The new permit, also consistent with the CSO Policy, requires the implementation and effective operation and maintenance of the CSO controls identified in the LTCP that CBJ developed as a condition of the prior permit. As mentioned above, given the lack of CSO events over the course of the previous decade, implementation of the LTCP has resulted in the control of CSOs.

The permit, also consistent with the CSO Policy, contains reporting requirements. CBJ is required to submit an annual report to document any CSO discharges and compliance with technology and WQ-based requirements.

9.5 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.

10.0 OTHER LEGAL REQUIREMENTS

10.1 Ocean Discharge Criteria

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

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 baseline.

A review of the baseline line maps revealed that JD WWTF outfall terminus is positioned landward of the baseline of the territorial sea; therefore, Section 403 of the CWA does not apply to the permit, and an ODCE is not required to be completed for this permit reissuance.

10.2 Endangered Species Act

NMFS is responsible for administration of the Endangered Species Act (ESA) for listed cetaceans, seals, sea lions, sea turtles, anadromous fish, marine fish, marine plants, and corals. All other species (including polar bears, walrus, and sea otters) are administered by the USFWS.

Section 7 of the ESA requires a federal agency to consult with the USFWS and NMFS to determine whether their authorized actions may harm threatened and endangered species or their habitats. As a state agency, DEC is not required to consult with USFWS or NMFS regarding permitting actions; however, DEC interacts voluntarily with these federal agencies to obtain listings of threatened and endangered species and critical habitat. DEC contacted USFWS and NMFS on October 8, 2014 and requested them to identify any threatened or endangered species under their jurisdiction in the vicinity of JD WWTF outfall.

NMFS maintains an interactive endangered species map at http://alaskafisheries.noaa.gov/mapping/esa/. DEC reviewed this map for threatened and endangered species near JD WWTF outfall. The map showed that the endangered humpback whale (*Megaptera novaengliae)* and the threatened eastern Steller sea lion (*Eumetopias jubatus)* do occur in Gastineau Channel. EPA, however, determined during the last permit issuance in 2001, that these species would not be affected by JD WWTF discharge.

10.3 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 NMFS when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH.

EPA provided NMFS a copy of the draft permit and fact sheet following EPA's tentative determination that the issuance of the 2001 permit would not affect any EFH species in the vicinity of JD WWTF discharge and that therefore, no federal to federal consultation was required. As a state agency, DEC is not required to consult with NMFS regarding permitting actions; however, DEC interacts voluntarily with NMFS. On October 8, 2014 DEC contacted and requested NMFS to identify any EFH under their jurisdiction in the vicinity of JD WWTF.

In addition, the Alaska Department of Fish and Game (ADF&G) maintains regulatory and interactive maps that identify anadromous streams, fish passage, and fish inventory at: http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=maps.maps. DEC reviewed the maps on ADF&G's website and did not identify any EFH in the vicinity of JD WWTF outfall that would be adversely affected by the facility's discharge.

10.4 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.

10.4.1 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.

10.4.2 Federal Requirements

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

A POTW is required to apply for an EPA biosolids permit. The permittee should ensure that a biosolids permit application has been submitted to EPA. In addition, the permittee is required to submit a biosolids permit application to EPA for the use or disposal of sewage sludge at least 180 days before this APDES permit expires in accordance with 40 CFR §§122.21(c)(2) and 122.21(q) [See also 18 AAC 83.110(c) and 18 AAC 83.310, respectively]. The application form is NPDES Form 2S and can be found on EPA's website, www.epa.gov, under NPDES forms. A completed NPDES Form 2S should be submitted to:
U.S. Environmental Protection Agency, Region 10, NPDES Permits Unit OWW-130, Attention: Biosolids Contact, 1200 Sixth Avenue, Suite 900, Seattle, WA 98101-3140. The EPA Region 10 telephone number is 1-800-424-4372.

Information about EPA's biosolids program and CWA Part 503 is available at www.epa.gov and either search for 'biosolids' or go to the EPA Region 10 website link and search for 'NPDES Permits'.

10.5 Permit Expiration

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

11.0 REFERENCES

ADEC (Alaska Department of Environmental Conservation). 2003. 18 AAC 70 Water Quality Standards, as amended through June 26, 2003.

ADEC. 2010. Alaska water quality criteria manual for toxics and other deleterious organic and inorganic substances, as amended through December 12, 2008.

ADEC. 2010. Interim antidegradation methods, Effective July 14, 2010.

ADEC. 2010. Alaska's final 2010 integrated water quality monitoring and assessment report, July 15, 2010.

ADEC. 2012. 18 AAC 70 Water quality standards, as amended through April 8, 2012.

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

Denton, D.L., J.M. Miller, and R.A. Stuber. 2010. EPA Regions 8, 9, and 10 toxicity training tool. January 2010. San Francisco.

Echo Bay Alaska, Inc. 1991. AJ mine project seawater monitoring program: Seawater monitoring data May 1989 through March 1991. Anchorage.

EPA (Environmental Protection Agency).1991. Technical support document for water quality-based toxics control. EPA/505/2-90-001.

EPA. 1995. Short-Term Methods for estimating the chronic toxicity of effluents and receiving waters to west coast marine and estuarine organisms. EPA/600/R-95-136.

EPA. 1995. Combined Sewer Overflows Guidance for Permit Writers. EPA/832/B-95-008.

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. 2004. Recommended standards for wastewater facilities, 2004 edition. Albany.

APPENDIX A. FACILITY INFORMATION

Figure 1. Juneau-Douglas Wastewater Treatment Facility Location

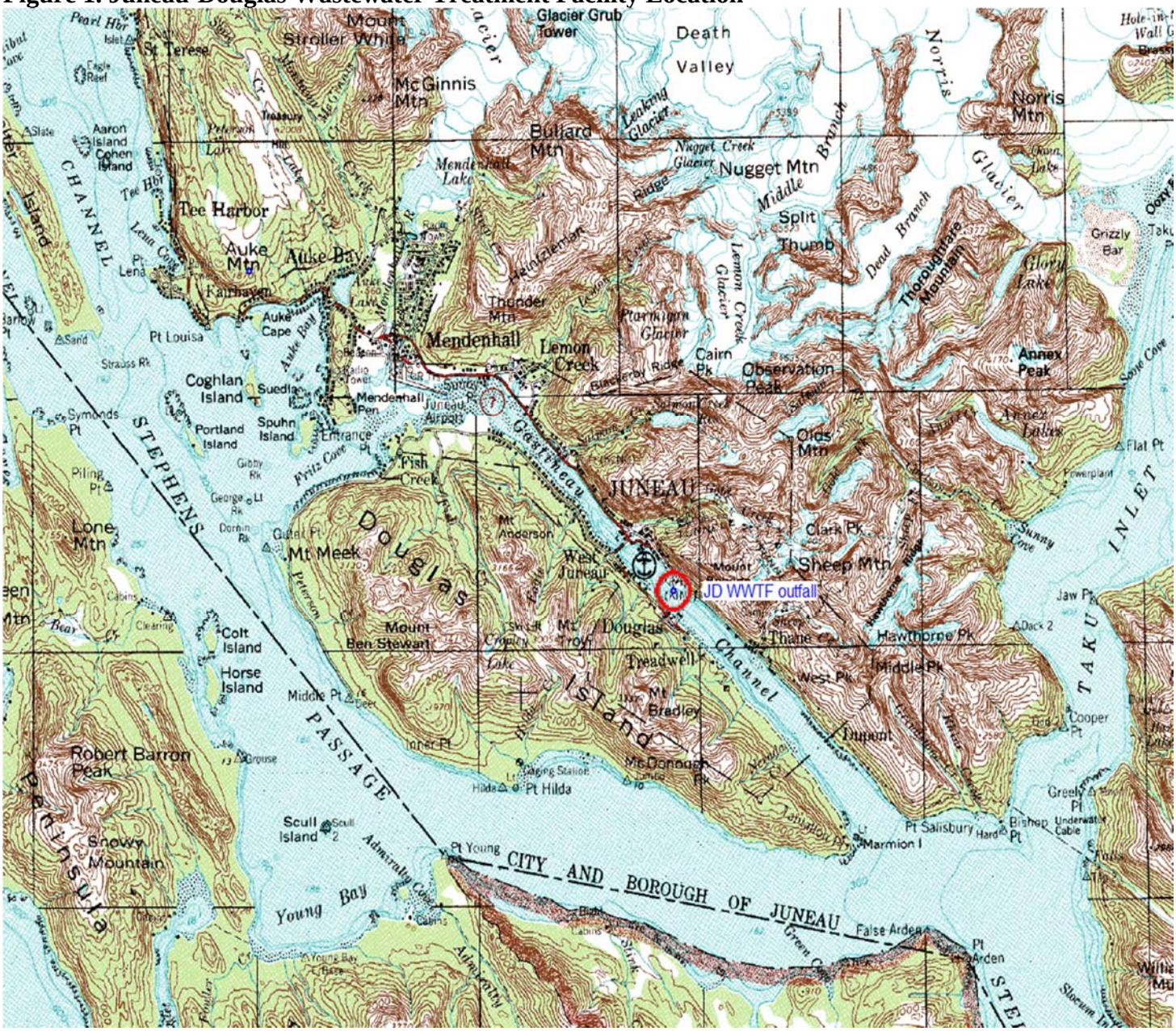
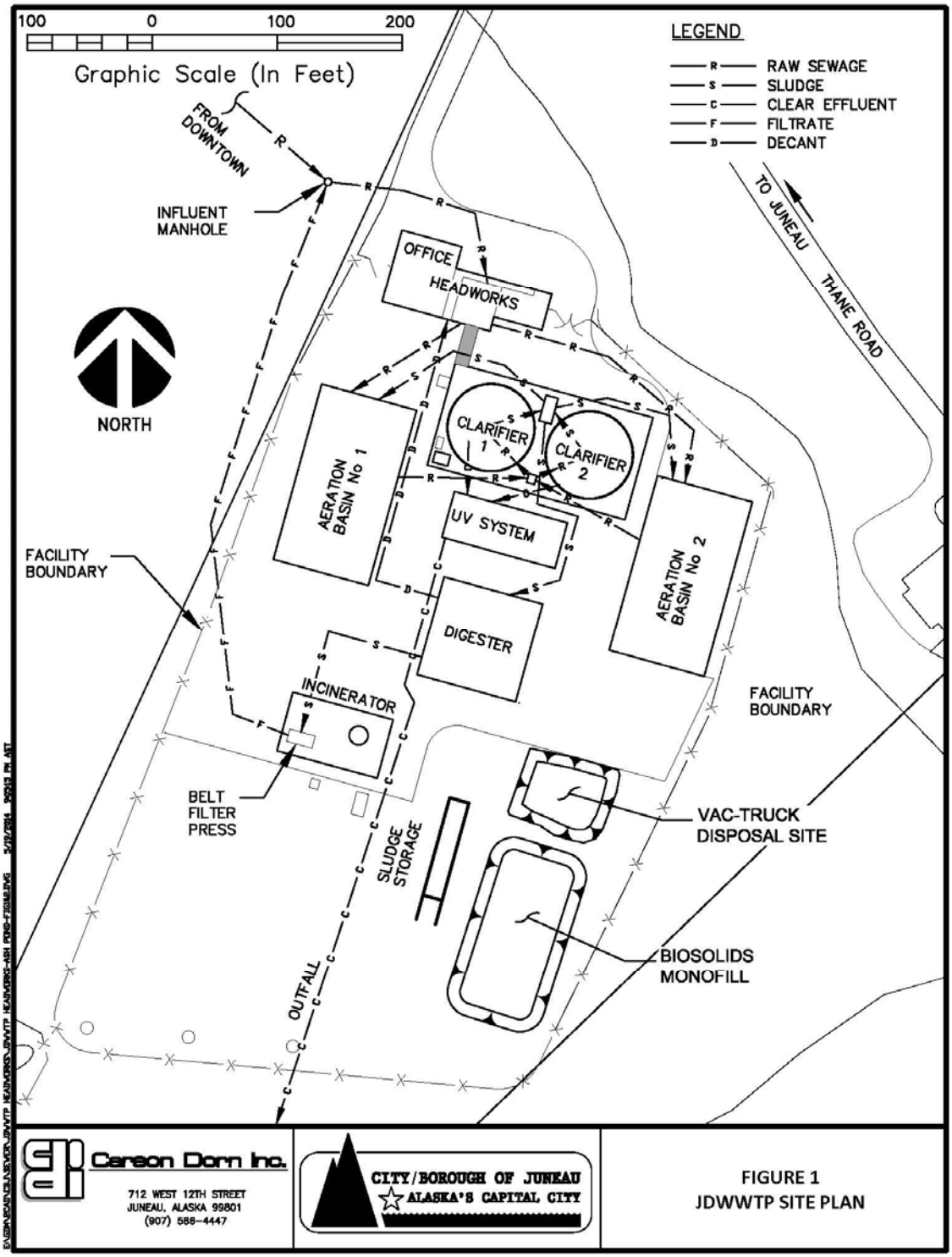


Figure 2. Juneau-Douglas Wastewater Treatment Facility Process Flow Diagram



APPENDIX B. BASIS FOR EFFLUENT LIMITATIONS

B.1 Statutory and Regulatory Basis

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

The regulations require the permitting authority to make this evaluation using procedures that account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water body. The limits must be stringent enough to ensure that WQS are met and must be consistent with any available wasteload allocation (WLA).

The Clean Water Act (CWA) requires a Publicly Owned Treatment Works (POTWs) to meet effluent limits based on available wastewater treatment technology, specifically, secondary treatment effluent limits. The Alaska Department of Environmental Conservation (the Department or DEC) may find, by analyzing the effect of an effluent discharge on the receiving waterbody, that secondary treatment effluent limits are not sufficiently stringent to meet water quality WQS. In such cases, the Department is required to develop more stringent water quality-based effluent limits (WQBELs), which are designed to ensure that the WQS of the receiving waterbody are met.

Secondary treatment effluent limits for POTWs do not limit every parameter that may be present in the effluent. Limits have only been developed for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. Effluent from a POTW may contain other pollutants, such as bacteria, 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 (TBELs) 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 (WQ) criterion for the waterbody. If a pollutant causes or contributes to an exceedance of a WQ criterion, a WQBEL for the pollutant must be established in the permit. Table B-1 summarizes the basis for effluent limits contained in the permit. Further details for each effluent limit follows in this section.

Table B-1. Basis for Effluent Limits

EFFLUENT PARAMETER	UNITS	EFFLUENT LIMITS					
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Average Monthly Percent Removal	Minimum Daily Limit	Basis for Limit
Flow	million gallons per day (mgd)	2.76	---	6.0	---	---	18 AAC 72.255
pH	standard units (s.u.)	---	---	8.5	---	6.5	18 AAC 70.020(b)(18)(A)(i) 18 AAC 70.020(b)(18)(C)
Dissolved Oxygen (DO)	milligrams per liter (mg/L)	---	---	17	---	2.0	18 AAC 83.480
BOD_5	mg/L	30	45	60	85 % [b] (minimum)	---	18 AAC 83.010(e)
	pounds per day (lbs/day) [a]	---	---	---			
TSS	mg/L	30	45	60	85% [b] (minimum)	---	18 AAC 83.010(e)
	lbs/day [a]	---	---	---			
Fecal Coliform (FC) Bacteria [c]	FC/100 mL	200	400	800	---	---	18 AAC 83.480
Total Ammonia, as Nitrogen	mg/L	14	21	30	---	---	18 AAC 83.435(6)(d) 18 AAC 83.530(d) AS 46.03.101(d)

Footnotes:

a. lbs/day = concentration (mg/L) x average monthly flow (mgd) x 8.34 (conversion factor). Influent and effluent samples must be taken over approximately the same time period.

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

c. All FC 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 quantities. For example the geometric mean of 100, 200, and 300 is (100 x 200 x 300)1/3= 181.7.per liter)

B.2 Secondary Treatment Effluent Limitations

The CWA requires a POTW to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977. The Department has adopted the "secondary treatment" effluent limits, 18 AAC 83.010(e), which are found in 40 CFR §133.102. The technology-based effluent limits apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. In addition to the federal secondary treatment regulations in 40 CFR Part 133.102, the State of Alaska requires maximum daily limitations of 60 mg/L for BOD_5 and TSS in its definition of secondary treatment found in its waste disposal regulations (18 AAC 72.990); however, the waste disposal regulations do not specify the percent removal requirements that are required by 40 CFR 133, so the more stringent 40 CFR 133 requirements are applied. The secondary treatment effluent limits are listed in Table B-2.

Table B-2. Secondary Treatment Effluent Limits

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

B.3 Water Quality – Based Effluent Limits

WQBELs included in Alaska Pollutant Discharge Elimination System (APDES) permits are derived from WQS. APDES regulation18 AAC 83.435(a)(2) requires that permits include WQBELs that can achieve water quality standard established under CWA §303, including state narrative criteria for water quality. The WQS are composed of use classifications, numeric and/or narrative water quality criteria and an antidegradation policy (See Section 7.0, Antidegradation). The use classification system designates the beneficial uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the beneficial use classification of each waterbody. Existing uses are those uses actually attained in a waterbody on or after November 28, 1975, whether or not they are included in the WQS [40 CFR § 131.3(e)]. Designated uses are those uses specified in water quality standards for each waterbody or segment whether or not they are being attained [40 CFR § 131.3(f)].

Waterbodies in Alaska are designated for all uses unless the waterbody has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some waterbodies in Alaska may also have site–specific water quality criteria per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b).

Permit AK0023213 authorizes discharges of secondary treated domestic wastewater to marine water. The designated uses for marine water that have not been reclassified are: water supply for aquaculture, seafood processing, and industrial; contact and secondary

recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life.

B.4 Reasonable Potential Analysis

The Department used the process described in the Technical Support Document (TSD) for Water Quality-Based Toxics Control (Environmental Protection Agency, 1991) and DEC's guidance, APDES *Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 30, 2014) to evaluate the Juneau-Douglas Wastewater Treatment Facility (JD WWTF) effluent.

Discharge monitoring reports (DMRs) from January 2011 through December 2013, supplemental monitoring logs that the City and Borough of Juneau submitted with their DMRs, monitoring data from DEC's 2013 Commercial Passenger Environmental Compliance Program[1], and the JD WWTF discharge application priority pollutant scan results (priority pollutants are chemical pollutants that EPA regulates and for which EPA has published analytical test methods) were reviewed to identify pollutants of concern (POC).

POC are those pollutants that already have a TBEL or WQBEL for a particular pollutant, pollutants with a total maximum load WLA or watershed analysis, pollutants identified as present in the effluent through monitoring, or those pollutants that are likely to be present in the effluent based on the nature of the operation.

The Department identified the following as POC in the JD WWTF effluent: FC Bacteria (present in the effluent above WQ criteria), Enterococci Bacteria (likely to be present in the effluent based on the domestic nature of the effluent), DO (present in the effluent in levels lower that WQ criteria), ammonia and copper (both present in the effluent in levels above WQ criteria).

When evaluating the effluent to determine if WQBELs based on chemical-specific numeric criteria are needed, the Department projects the receiving waterbody concentration downstream of where the effluent enters the receiving waterbody for each pollutant of concern. The chemical-specific concentration of the effluent and receiving waterbody and, if appropriate, the dilution available from the receiving waterbody, are factors used to project the receiving waterbody concentration. If the projected concentration of the receiving waterbody exceeds the numeric criterion for a limited parameter, then there is RP that the discharge may cause or contribute to an excursion above the applicable WQ criterion. Appendix C contains more details on the RPA conducted for this permit.

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

B.5 Procedure for Deriving Water Quality-Based Effluent Limits

The first step in developing a WQBEL is to develop a WLA for the pollutant. A WLA is the concentration or loading of a pollutant that the permittee may discharge without causing

or contributing to an exceedance of WQ criteria or a total maximum daily load in the receiving waterbody.

In cases where a mixing zone is not authorized, either because the receiving waterbody already exceeds the criterion, the receiving waterbody flow is too low to provide dilution, or for some other reason one is not authorized, the criterion becomes the WLA.

Establishing the criterion as the WLA ensures that the permittee will not cause or contribute to an exceedance of the criterion.

The WQS at 18 AAC 70.020(a) designates classes of water for beneficial uses of water supply, water recreation, and of growth and propagation of fish, shellfish, other aquatic life, and wildlife. JD WWTF must adhere to the most stringent of the standards for these designated uses because Gastineau Channel is protected for all uses.

B.6 Effluent Limits in JD WWTF Permit

B.6.1 *Dissolved Oxygen*

Aerobic microorganisms require DO in order to metabolize organic wastes into inorganic byproducts and reproduce. The 2004 Recommended Standards for Wastewater Facilities recommends a minimum concentration of 2.0 mg/L of DO in the mixed liquor aeration tank in design requirements for a mechanical aeration system.

JD WWTF consists of an activated sludge process with mechanical aeration. As such, a minimum DO concentration is required to ensure a healthy microorganism population and the successful treatment of biological wastes.

A DO minimum effluent concentration of 2.0 mg/L was established in the prior permit as a controllable minimum concentration for JD WWTF activated sludge process. Monitoring data submitted by the City and Borough of Juneau (CBJ) in which the facility sampled five times per week in 2013, indicates that current plant performance exceeds the 2.0 mg/L minimum concentration with an average minimum effluent DO concentration of 4.8 mg/L.

Alaska WQS at 18 AAC 70.020(b)(15)(A) states that surface marine DO concentrations for aquaculture, contact recreation, secondary recreation, the harvesting for consumption of raw mollusks or other raw aquatic life, and the growth and propagation of fish, shellfish, other aquatic life, and wildlife, must be not be less than 6 mg/L for a depth of one meter except when natural conditions cause this value to be depressed, and that in no case may DO levels exceed 17 mg/L.

DEC compared the monitoring results that CBJ submitted for 2013 to the marine DO WQ criteria of a minimum concentration of 6.0 mg/L and a maximum concentration of 17 mg/L, and concluded, that JD WWTF cannot consistently meet the minimum DO WQ criterion of 6.0 mg/L at the point of discharge. Therefore, the DO minimum concentration of 2.0 mg/L of the prior permit shall be retained for this permit reissuance as an effluent minimum concentration, and DO WQ criteria will apply at the boundary of the authorized mixing zone.

DEC, in its CWA Section 401 Certification of the 2001 National Pollutant Discharge Elimination System (NPDES) permit, also required a DO maximum daily limit (MDL) of 17 mg/L. Consistent with the conditions of 18 AAC 83.480 (reissued permits) that require

permit effluent limits, standards, or conditions to be at least as stringent as the final effluent limits, standards, or conditions in the previous permit, and JD WWTF's performance data, the maximum daily effluent limit (17 mg/L) of the previous permit is applied as the DO MDL for this permit reissuance.

The permit increases DO monitoring from 1/week to 5/week in order to more accurately assess effluent DO concentrations in the next permit cycle.

B.6.2 *Fecal Coliform Bacteria*

Alaska WQS at 18 AAC 70.020(b)(14)(D) states that based on a 5-tube dilution test, the FC median most probable number (MPN) for the harvesting for consumption of raw mollusks or other raw aquatic life may not exceed 14 FC/100 mL, and not more than 10% of the samples may exceed a FC median MPN of 43 FC/100 mL.

As mentioned above, in 2001 the Department issued a CWA Section 401 Certification for the NPDES JD WWTF discharge permit. The Certification included effluent limits for FC bacteria. The Certification required that the effluent discharged from the JD WWTF not exceed a monthly average limit (AML) of 400 FC/100 mL, an average weekly limit (AWL) of 800 FC/100 mL, and a MDL of 1200 FC/100 mL. These limits are dependent on the use of specific technological processes, and were applied because the facility used ultra-violet light for disinfection.

During the development of this permit reissuance, the Department reviewed the FC bacteria monitoring results submitted on discharge monitoring reports from January 2011 to December 2013. In these three years, the facility's performance demonstrated that the effluent could consistently meet FC bacteria effluent limits that are required at the vast majority of secondary treatment facilities statewide (AML 200 FC/100 mL, AWL 400 FC/100 mL, MDL 800 FC/100 mL).

The limits of an AML of 200 FC/100 mL, an AWL of 400 FC/100 mL were each exceeded only once in three years, and JD WWTF never exceed the MDL of 800 FC/100 mL. The average reported maximum daily concentration over three years was 80 FC/100 mL.

FC bacteria can be reasonably expected to exceed WQ criteria (See Appendix C.3). A mixing zone is required to meet the WQ criteria of 14 FC/100 mL AML and 43 FC/100 mL MDL. At a maximum expected FC bacteria concentration of 800 FC/100 mL, FC bacteria requires a dilution factor of 18.6. Because ammonia requires more dilution (20.3) to meet WQ criteria than FC bacteria, ammonia drives the chronic mixing zone, and FC bacteria is included in the chronic mixing zone sized for ammonia.

DEC multiplied the chronic mixing zone dilution factor by the FC bacteria WQ criteria and obtained an AML of 284 FC/100 mL and a MDL of 873 FC/100 mL. DEC then compared these limits with the previously discussed AML of 200 FC/100 mL and the MDL of 800 FC/100 mL and selected the more stringent limits for the permit. An AWL of 400 FC/100 mL is selected as there is not a comparable FC WQ criterion. The selected limits are protective of WQ criteria at the boundary of the mixing zone.

Therefore, based on the facility's consistent ability to produce an effluent capable of meeting the FC bacteria concentration limits required of the vast majority of secondary treatment facilities throughout the state, and compliance with the State's definition of

disinfection at 18 AAC 72.990(21)(A)(B), the FC bacteria limits are reduced in this permit to an AML of 200 FC/100 mL, an AWL of 400 FC/100 mL, and a MDL of 800 FC/100 mL.

Monitoring of FC bacteria concentrations will be required at the boundary of the chronic mixing zone. The monitoring results will be assessed for compliance with Alaska WQ criteria at 18 AAC 70.020(b)(14)(D).

B.6.3 *Total Ammonia, as Nitrogen*

Total ammonia is the sum of ionized (NH_4^+) and un-ionized ammonia (NH_3). Temperature, pH, and salinity affect which form, NH_4^+ or NH_3 is present. NH_3 is more toxic to aquatic organisms than NH_4^+ and predominates with higher temperature and pH. NH_3 is less toxic with increased salinity.

Biological wastewater treatment processes reduce the amount of total nitrogen in domestic wastewater; however, without advanced treatment, wastewater effluent may still contain elevated levels of ammonia nitrogen. Excess ammonia as nitrogen in the environment can lead to DO depletion, eutrophication, and toxicity to aquatic organisms.

The prior permit required CBJ to monitor ammonia twice per year. CBJ elected to monitor more frequently and submitted their monitoring logs with their DMRs. The review of data from January 2011- December 2013 indicated a range of results from no ammonia detected to a maximum observed concentration of 25 mg/L. The average ammonia concentration of 73 reported results was 11 mg/L.

Because CBJ did not monitor Gastineau Channel for ambient pH, temperature, and salinity, DEC used pH, temperature, and salinity data collected by DEC's 2013 Commercial Passenger Environmental Compliance Program[1] to establish an acute criterion of 11.5 mg/L and a chronic of criterion 1.7 mg/L for JD WWTF. CBJ's ammonia monitoring results indicated exceedances for both acute and chronic WQ criteria; ammonia was therefore selected for RPA. The resulting RPA indicated that there is RP for ammonia to exceed WQ criteria at the end of pipe.

Because there is RP for ammonia to exceed WQ criteria at the end of the pipe, and because ammonia is the driving parameter in the authorized mixing zone, WQBELs were developed for ammonia (MDL 30 mg/L, AML 14 mg/L) that are protective of WQ criteria at the boundary of the mixing zone.

18 AAC 83.530(d) requires effluent limits from a continuously discharging POTW to be stated as average weekly and average monthly limits unless impracticable. Secondary treatment standards at 18 AAC 83.605 establishes AWLs as being 1.5 times the AML. Following this precedent, the AWL for ammonia is derived by multiplying ammonia's AML of 14 mg/L 1.5 times to obtain an AWL of 21 mg/L.

Furthermore, Alaska Statutes (AS) 46.03.101(d), states that the Department may specify in a permit the terms and conditions under which waste material may be disposed. Accordingly, monitoring in the permit is increased from twice per year to once per month to more closely monitor ammonia concentrations in the effluent.

See Appendix C for details on RP determination and Appendix D for details on permit limit derivation.

B.6.4 *pH*

Alaska WQS at 18 AAC 70.020(b)(18)(A)(i) (aquaculture) and 18 AAC 70.020(b)(18)(C) (Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife) states that the pH water quality criteria may not be less than 6.5 or greater than 8.5 s.u..

DEC reviewed the monthly pH effluent monitoring results from JD WWTF between January 2011 and December 2013. During this time period, the average reported minimum pH level was 6.6 s.u., while the average maximum reported pH level was 7.3 s.u. Because the facility has consistently demonstrated compliance with the marine pH WQ criteria, the Department has determined that a mixing zone for pH is no longer required, and compliance with the pH marine WQ criteria will be required at the point of discharge from the facility.

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

To determine if there is RP for the discharge to cause or contribute to an exceedance of WQ criteria for a given pollutant, the Department compares the maximum projected receiving waterbody concentration to the criteria for that pollutant. RP to exceed exists if the projected receiving waterbody concentration exceeds WQ criteria, and a water quality-based effluent limit must be included in the permit

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

This section discusses how the maximum projected receiving waterbody concentration is determined.

C.1 Mass Balance

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

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

Where,

C_d = Receiving waterbody concentration downstream of the effluent discharge

C_e = Maximum projected effluent concentration

C_u = 85th percentile measured receiving waterbody ambient concentration

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

Q_u = Receiving waterbody flow

Q_d = Receiving waterbody flow rate = Qe + Qu

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 waterbody. If a mixing zone based on a percentage of the critical flow in the receiving waterbody is authorized based on the assumption of incomplete mixing with the receiving waterbody, the equation becomes:

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

Where,

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

Where mixing is rapid and complete, MZ is equal to 1 and equation 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 waterbody concentration, and

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

In other words, if a mixing zone is not authorized (either because the stream already exceeds water quality (WQ) criteria or the Department does not allow one), the Department considers only the concentration of the pollutant in the effluent regardless of the upstream flow and concentration. If the concentration of the pollutant in the effluent is less than the WQ criteria, the discharge cannot cause or contribute to a WQ 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):

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

After the D simplification, this becomes:

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

C.2 Maximum Projected Effluent Concentration

To calculate the maximum projected effluent concentration, the Department used the procedure described in Section 3.3 of the *TSD*, "*Determining the Need for Permit Limits with Effluent Monitoring Data*." In this procedure, the 99th percentile of the effluent data is the maximum projected effluent concentration which is used in the calculation of the maximum projected receiving waterbody concentration.

Since there are a limited number of data points available, the 99th percentile is calculated by multiplying the maximum observed effluent concentration (MOC) by a reasonable potential multiplier (RPM). The RPM is the ratio of the 99th percentile concentration to the MOC and accounts for the statistical uncertainty in the effluent data. The RPM is calculated from the coefficient of variation (CV) of the data and the number of data points. The CV is defined as the ratio of the standard deviation of the data set to the mean. When fewer than 10 data points are available, the *TSD* 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.

DEC used ProUCL, a statistical software program, to determine that the monitoring data submitted for ammonia follows a normal distribution. Therefore, the RPM equation in Section 2.4.2.1 of the *APDES Permits Reasonable Potential Analysis and Effluent Limits Development Guide* is used to determine the RPM for ammonia.

$$RPM = \frac{\mu_n + z_{99}\,\sigma}{\mu_n + p_n\,\sigma} \qquad \text{(Equation C-7)}$$

Where,

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

μ_n = mean calculated by ProUCL = 10.83

σ = the standard deviation calculated by ProUCL = 7.454

p_n = the z − statistic at the 95th percent confidence level of $(1 - 0.95)^{\frac{1}{n}} = 1.751$

n = number of valid data samples = 73

RPM = 1.2

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

$$\text{MEC} = (\text{RPM})(\text{MOC})$$

MOC = 25 milligrams per liter (mg/L)

In the case of ammonia,

MEC = (1.2)(25) = 30 mg/L

Comparison with WQ criteria for ammonia

In order to determine if RP exists for this discharge to violate WQ criteria, the highest projected concentrations at the boundary of the mixing zone is compared with acute and chronic WQ criteria. For example:

Acute: 11.5 mg/L = 11.5 mg/L (acute criterion)

NO, there is not RP to violate acute criterion

Chronic: 1.7 mg/L = 1.7 mg/L (chronic criterion)

NO, there is not RP to violate chronic criterion

Table C-1 summarizes the data, multipliers, and criteria used to determine RP to exceed WQ criteria at the end of the pipe and at the boundary of the chronic mixing zone.

Table C-1: Reasonable Potential Calculation and Determination

Parameter	MOC	Number of Samples	Upstream Concentration	CV	RPM	MEC	Maximum Projected Receiving Waterbody Concentration [a]	Most Stringent Criterion	Boundary of Mixing Zone RP?
Total Ammonia as Nitrogen (mg/L)	25	73	0.26	0.7	1.2	29.51	1.70	1.7 (chronic)	No
Copper, total recoverable (micrograms per liter (µg/L)	9.92	3	0.90	0.6	4.4	43.41	2.99	3.7 (chronic)	No

Footnote:
a. Calculated using CORMIX dilution factor of 20.3

C.3 Fecal Coliform Bacteria Reasonable Potential Determination

The prior Juneau-Douglas Wastewater Treatment Facility (JD WWTF) permit limits were 400 FC/100 milliliters (mL) average monthly limit (AML), 800 FC/100 mL average weekly limit (AWL), and 1,200 FC/100 mL maximum daily limit (MDL). DEC reviewed discharge monitoring results from 2011-2013 (See Appendix B.6.2) and compared them with the State's definition of disinfection at 18 AAC 72.990(21)(A)(B) and the FC bacteria effluent limits established in the vast majority of WWTFs that have FC bacteria mixing zones throughout Alaska. (200 FC/100mL AML, 400 FC/100 mL AWL, and 800 FC/100 mL MDL). The monitoring results demonstrate that JD WWTF can consistently meet the more stringent FC bacteria effluent limits; however the facility does not consistently comply with FC bacteria Alaska Water Quality Standards (14 FC/100 mL AML or 43 FC/100 mL MDL). Therefore, it can be reasonably expected that JD WWTF will have RP to exceed WQ criteria for FC bacteria.

APPENDIX D. SELECTION OF EFFLUENT LIMITS

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

When DEC authorizes a mixing zone, parameters are identified in the mixing zone that will require dilution to meet WQ criteria. If there are TBELs for an identified parameter in the mixing zone, TBELs apply at the end of the pipe, and WQ criteria for that parameter, apply at the boundary of the mixing zone. If the reasonable potential analysis (RPA) requires the development of water-quality based effluent limits (WQBELs) for specific parameters in order to protect aquatic life at the boundary of the mixing zone, WQBELs are applied as end-of-pipe effluent limits. Those parameters that are not identified in the authorized mixing zone, must meet applicable WQ criteria at the end of pipe.

In the absence of WQ criteria for a particular pollutant, such as for 5-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS), TBELs are applied as end-of pipe effluent limits.

In the case of the Juneau-Douglas Wastewater Treatment Facility (JD WWTF), ammonia demonstrated RP to exceed at the end of pipe and required the most dilution to meet WQ criteria at the boundary of the authorized mixing zone. Therefore, the Department developed WQBELs for ammonia.

D.1 Effluent Limit Calculation

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

D.1.1 Mixing Zone-based WLA

When the state authorizes a mixing zone for the discharge, the WLA is calculated using the available dilution, background concentrations and WQ criteria of the pollutant.

Since acute aquatic life and chronic aquatic life standards apply over different time frames and may have different mixing zones, it is not possible to compare the WLAs directly to determine which standard is the most stringent. The acute criteria are applied as a one-hour average and may have a smaller mixing zone, while the chronic criteria are applied as a four-day average and may have a larger mixing zone. To allow for comparison, long-term average (LTA) loads are calculated from both the acute and chronic WLAs. The most stringent LTA is used to calculate the permit limits.

D.1.2 "End-of-Pipe" WLAs

In many cases, there is no dilution available, either because the receiving waterbody exceeds the criteria or because the state does not authorize a mixing zone for a particular pollutant. When there is no dilution available, the criterion becomes the WLA. Establishing the criterion as the

WLA ensures that the permittee's discharge does not contribute to an exceedance of the criterion. As with the mixing-zone based WLA, the acute and chronic criteria must be converted to LTAs and compared to determine which one is more stringent. The more stringent LTA is then used to develop permit limits.

D.1.3 Permit Limit Derivation

Once the appropriate LTA has been calculated, the Department applies the statistical approach described in Chapter 5 of the TSD to calculate the maximum daily limit (MDL) and average monthly limit (AML). This approach takes into account effluent variability (using the coefficient of variation (CV)), sampling frequency, and the difference in time frames between the AML and MDL.

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

The following is a summary of the steps to derive WQBELs from WQ criteria for pollutants that have reasonable potential to exceed WQ criteria. These steps are found in the Department's Reasonable Potential Analysis and Effluent Limitation Guidance and the guidance's accompanying Excel Reasonable Potential Analysis Tool. The guidance and tool were used to calculate the MDL and AML for ammonia in the JD WWTF permit.

Step 1- Determine the WLA

The acute and chronic aquatic life criteria are converted to acute and chronic waste load allocations using the following equations:

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

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

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

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

$Q_s = Critical\ Upstream\ Flow$

$Q_d = Critical\ Discharge\ Flow$

$C_s = Critical\ Upstream\ Concentration$

$WLA_{a,c} = Wasteload\ Allocation\ (acute, chronic, or\ human\ health)$

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

For ammonia,

$D_a = 2.6$

$D_c = 20.3$

$C_s = 0.255$ (15% of the most stringent ammonia WQC)

$WLA_a = 29.51 mg/L$

$WLA_c = 29.59\, mg/L$

$WQC_a = 11.5\, mg/L$

$WQC_c = 1.7\, mg/L$

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

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

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

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

Where:

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

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

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

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

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

$CV = coefficient\ of variation$

For ammonia:

$LTA_a = 8.42\, mg/L$

$LTA_c = 14.37\, mg/L$

Step 3 – Choosing the More Limiting LTA

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

Step 4 - Calculate the Permit Limits

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

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

Where:

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

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

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

$$CV = coefficient\ of variation$$

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

Where:

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

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

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

$$CV = coefficient\ of variation$$

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

For ammonia:

$$MDL = 30\ mg/L$$

$$AML = 14\ mg/L$$

D.2 Mass-Based Limits

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

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

D.3 Flow

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

D.4 Effluent Limit Summary

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

Table D-1. Summary of Effluent Limitations

Parameter	Fact Sheet Reference
BOD_5	Appendix B-Section B.2
TSS	Appendix B- Section B.2
Dissolved Oxygen	Appendix B-Section B.6.1
Fecal Coliform Bacteria	Appendix B-Section B.6.2
Total Ammonia, as Nitrogen	Appendix B- Section B.6.3
pH	Appendix B- Section B.6.4

APPENDIX E. MIXING ZONE ANALYSIS CHECKLIST

The purpose of the Mixing Zone Checklist is to guide the permit writer through the mixing zone regulatory requirements to determine if all the mixing zone criteria at 18 AAC 70.240 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. See Section 6.5 of the Fact Sheet for the Juneau-Douglas Wastewater Treatment Facility mixing zone analysis.

Criteria	Description	Resources	Regulation
Size	Is the mixing zone as small as practicable? **Yes**	•Technical Support Document for Water Quality Based Toxics Control • DEC's RPA Guidance • EPA Permit Writers' Manual	18 AAC 70.240 (a)(2) 18 AAC 70.245 (b)(1) - (b)(7) 18 AAC 70.255(e) (3) 18 AAC 70.255 (d)
Technology	Were the most effective technological and economical methods used to disperse, treat, remove, and reduce pollutants? **Yes**		18 AAC 70.240 (a)(3)
Low Flow Design	**For river, streams, and other flowing fresh waters.** - Determine low flow calculations or documentation for the applicable parameters.		18 AAC 70.255(f)

Criteria	Description	Resources	Regulation
Existing use	Does the mixing zone…		
	(1) partially or completely eliminate an existing use of the waterbody outside the mixing zone? **No** **If yes, mixing zone prohibited.**		18 AAC 70.245(a)(1)
	(2) impair overall biological integrity of the waterbody? **No** **If yes, mixing zone prohibited.**		18 AAC 70.245(a)(2)
	(3) provide for adequate flushing of the waterbody to ensure full protection of uses of the waterbody outside the proposed mixing zone? **Yes** **If no, then mixing zone prohibited.**		18 AAC 70.250(a)(3)
	(4) cause an environmental effect or damage to the ecosystem that the department considers to be so adverse that a mixing zone is not appropriate? **No** **If yes, then mixing zone prohibited.**		18 AAC 70.250(a)(4)
Human consumption	Does the mixing zone…		
	(1) produce objectionable color, taste, or odor in aquatic resources harvested for human consumption? **No** **If yes, mixing zone may be reduced in size or prohibited.**		18 AAC 70.250(b)(2)
	(2) preclude or limit established processing activities of commercial, sport, personal use, or subsistence shellfish harvesting? **No** **If yes, mixing zone may be reduced in size or prohibited.**		18 AAC 70.250(b)(3)

Criteria	Description	Resources	Regulation
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? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255 (h)
Human Health	Does the mixing zone…		
	(1) contain bioaccumulating, bioconcentrating, or persistent chemical above natural or significantly adverse levels? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250 (a)(1)
	(2) contain chemicals expected to cause carcinogenic, mutagenic, teratogenic, or otherwise harmful effects to human health? **No** **If yes, mixing zone prohibited.**		
	(3) Create a public health hazard through encroachment on water supply or through contact recreation? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250(a)(1)(C)
	(4) meet human health and aquatic life quality criteria at the boundary of the mixing zone? **Yes** **If no, mixing zone prohibited.**		18 AAC 70.255 (b),(c)
	(5) occur in a location where the department determines that a public health hazard reasonably could be expected? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(e)(3)(B)

Criteria	Description	Resources	Regulation
Aquatic Life	Does the mixing zone…		
	(1) create a significant adverse effect to anadromous, resident, or shellfish spawning or rearing? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250(a)(2)(A-C)
	(2) form a barrier to migratory species? **No** **If yes, mixing zone prohibited.**		
	(3) fail to provide a zone of passage? **No** **If yes, mixing zone prohibited.**		
	(4) result in undesirable or nuisance aquatic life? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250(b)(1)
	(5) result in permanent or irreparable displacement of indigenous organisms? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(g)(1)
	(6) result in a reduction in fish or shellfish population levels? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(g)(2)
	(7) prevent lethality to passing organisms by reducing the size of the acute zone? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(b)(1)
	(8) cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(b)(2)

Criteria	Description	Resources	Regulation
Endangered Species	Are there threatened or endangered species (T/E spp) at the location of the mixing zone?**No** If yes, are there likely to be adverse effects to T/E spp based on comments received from USFWS or NOAA. **Not applicable** If yes, will conservation measures be included in the permit to avoid adverse effects? **Not applicable** **If no, mixing zone prohibited.**		Program Description, 6.4.1 #5 18 AAC 70.250(a)(2)(D)

*Based on the 2003 Alaska Water Quality Standards 18 AAC 70.240 through 18 AAC 70.270.

APPENDIX F. JUNEAU-DOUGLAS WWTF EFFLUENT LIMIT VIOLATIONS 2009-2013

Monitoring Period	Parameter	Value Type	Reported Value	Permit Limit
2009				
January	Fecal Coliform (FC) Bacteria	maximum daily limit (MDL)	1,500 FC/100 milliliters (mL)	1,200 FC/100 mL
	Total Suspended Solids (TSS)	average monthly limit (AML)	39.6 mg/L	30 mg/L
			1,154.7 lbs/day	690 lbs/day
		average weekly limit (AWL)	192.1 milligrams per liter (mg/L)	45 mg/L
			3,336.5 pounds per day (lbs/day)	1,035 lbs/day
		MDL	750 mg/L	60 mg/L
			11,595.6 lbs/day	1,380 lbs/day
		minimum percent (%) removal	76.4%	85% minimum removal
February	No reported effluent violations			
March	TSS	AML	47 mg/L	30 mg/L
			890 lbs/day	690 lbs/day
		AWL	103.4 mg/L	45 mg/L
			3,935.1 lbs/day	1,035 lbs/day
		MDL	329 mg/L	60 mg/L
			15,587 lbs/day	1,380 lbs/day
		minimum % removal	77.7%	85% minimum removal
April	pH	daily minimum	5.7 standard units (s.u.)	6 s.u.
	TSS	MDL	76 mg/L	60 mg/L

Monitoring Period	Parameter	Value Type	Reported Value	Permit Limit
May	FC Bacteria	AWL	1,010 FC/100 mL	800 FC/100 mL
	pH	daily minimum	5.9 s.u.	6 s.u.
	TSS	AML	33 mg/L	30 mg/L
		AWL	52.1 mg/L	45 mg/L
		MDL	70 mg/L	60 mg/L
June	pH	daily minimum	5.9 s.u.	6 s.u.
July	No reported effluent violations			
August	No reported effluent violations			
September	No reported effluent violations			
October	TSS	MDL	184 mg/L	60 mg/L
			3,023 lbs/day	1,380 lbs/day
November	FC Bacteria	AWL	1,117 FC/100 mL	800 FC/100 mL
		MDL	1,300 FC/100 mL	1,200 FC/100 mL
December	5-Day Biochemical Oxygen Demand (BOD_5)	AWL	77 mg/L	45 mg/L
		MDL	141 mg/L	60 mg/L
	TSS	AML	32 mg/L	30 mg/L
		AWL	91.3 mg/L	45 mg/L
		MDL	188 mg/L	60 mg/L
		minimum % removal	84.5 %	85%
2010				
January	No reported effluent violations			
February	BOD_5	AWL	50 mg/L	45 mg/L
	TSS	AML	88 mg/L	30 mg/L
		AWL	185 mg/L	45 mg/L
		MDL	129 mg/L	60 mg/L

Monitoring Period	Parameter	Value Type	Reported Value	Permit Limit
March	BOD_5	minimum % removal	82 %	85%
April	BOD_5	AML	66 mg/L	30 mg/L
		AWL	185 mg/L	45 mg/L
		MDL	185 mg/L	60 mg/L
		minimum % removal	68 %	85%
	TSS	AML	93 mg/L	30 mg/L
		AWL	200 mg/L	45 mg/L
			1,171 lbs/day	1,035 lbs/day
		MDL	185 mg/L	60 mg/L
			1,816.5 lbs/day	1,380 lbs/day
		minimum % removal	66.9 %	85%
May	pH	daily minimum	5.8 s.u.	6 s.u.
June	BOD_5	AWL	66 mg/L	45 mg/L
		MDL	66 mg/L	60 mg/L
	TSS	AML	33 mg/L	30 mg/L
		AWL	135 mg/L	45 mg/L
			1,559.4 lbs/day	1,035 lbs/day
		MDL	135 mg/L	60 mg/L
			1,559.4 lbs/day	1,380 lbs/day
July	No reported effluent violations			
August	No reported effluent violations			
September	No reported effluent violations			
October	FC Bacteria	AML	1,230 FC/100 mL	400 FC/100 mL
		MDL	1,230 FC/100 mL	1,200 FC/100 mL
November	TSS	minimum % removal	78.6 %	85%
December	No reported effluent violations			

Monitoring Period	Parameter	Value Type	Reported Value	Permit Limit
2011				
January	No reported effluent violations			
February	No reported effluent violations			
March	BOD_5	AML	39.4 mg/L	30 mg/L
		AWL	146 mg/L	45 mg/L
		MDL	146 mg/L	60 mg/L
		minimum % removal	80.7 %	85%
	TSS	AML	57 mg/L	30 mg/L
		AWL	162 mg/L	45 mg/L
		MDL	162 mg/L	60 mg/L
		minimum % removal	81.2 %	85%
April	BOD_5	AML	44 mg/L	30 mg/L
		AWL	176 mg/L	45 mg/L
			3,205 lbs/day	1,035 lbs/day
		MDL	178 mg/L	60 mg/L
			3,205 lbs/day	1,380 lbs/day
		minimum % removal	75 %	85%
	TSS	AML	60 mg/L	30 mg/L
			933 lbs/day	690 lbs/day
		AWL	252 mg/L	45 mg/L
			4,538 lbs/day	1,035 lbs/day
		MDL	252 mg/L	60 mg/L
			4,538 lbs/day	1,380 lbs/day
		minimum % removal	75 %	85%
2012 No reported effluent violations				

Monitoring Period	Parameter	Value Type	Reported Value	Permit Limit
2013				
January	No reported effluent violations			
February	No reported effluent violations			
March	No reported effluent violations			
April	pH	daily minimum	4.4 s.u.	6 s.u.
May	No reported effluent violations			
June	No reported effluent violations			
July	No reported effluent violations			
August	TSS	AWL	152 mg/L	45 mg/L
September	TSS	AWL	62 mg/L	45 mg/L
		MDL	120 mg/L	60 mg/L
			1,805 lbs/day	1,380 lbs/day
October	No reported effluent violations			
November	No reported effluent violations			
December	No reported effluent violations			