# Fact Sheet

The U.S. Environmental Protection Agency (EPA)

Proposes to Reissue a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA) to:

**City of Skagway**

**Wastewater Treatment Plant**

The Alaska Department of Environmental Conservation (ADEC)

Announces Notice of EPA's Request for and Proposes to Issue a Clean Water Act (CWA) § 401 Certification for the:

**NPDES Permit for the City of Skagway Wastewater Treatment Plant**

Public Comment Start Date: July 28, 2023

Public Comment Expiration Date: September 13, 2023


| | |
|---|---|
| Technical Contact (EPA, NPDES Permit): | Cyndi Grafe<br>208-378-5775<br>(within Alaska, Idaho, Oregon and Washington)<br>Grafe.Cyndi@epa.gov |
| Technical Contact (ADEC, § 401 certification): | Marie Klingman<br>907-451-2101<br>marie.klingman@alaska.gov |

## EPA Proposes to reissue the NPDES Permit

EPA proposes to reissue the NPDES permit for the facility referenced above. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant 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.

This Fact Sheet includes:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limits and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

## ADEC Issues Notice of application for and Proposes to Issue the Clean Water Act § 401 Certification

Any applicant for a federal license or permit to conduct an activity that might result in a discharge into navigable waters, in accordance with Section 401 of the Clean Water Act (CWA) of 1977 (PL95-217), also must apply for and obtain certification from the Alaska Department of Environmental Conservation (ADEC) that the discharge will comply with the CWA, the Alaska Water Quality Standards, and other applicable State laws. EPA is requesting final CWA 401 certification from ADEC during the public comment period.

ADEC is proposing to issue the CWA § 401 certification in Appendix I and Appendix J.

## Clean Water Act § 401(a)(2) Review

Section 401(a)(2) of the CWA requires that, upon receipt of an application and state certification pursuant to Section 401(a)(1), EPA as the permitting authority, shall notify a neighboring State or Tribe with Treatment as a State (TAS) when EPA determines that the discharge may affect the quality of the neighboring State/tribe's waters (33 U.S.C. 1341(a)(2)). There are no neighboring states or tribes with TAS within 150 miles of the facility. Therefore, EPA has determined that no neighboring states or tribes will be impacted by the discharge from this facility.

## Public Comment

*NPDES Permit*

EPA requests that all comments on EPA's draft permit and tentative 301(h) decision or requests for a public hearing be submitted via email to Cyndi Grafe (Grafe.Cyndi@epa.gov). If you are unable to submit comments via email, please call 208-378-5775.

Persons wishing to comment on or request a public hearing for the draft permit for this facility may do so in writing by the expiration date of the public comment period. A request for a public hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for public hearings must be in writing and should be submitted to the EPA as described in Public Comments section of the Public Notice.

After the Public Notice expires, and all comments on the draft permit and tentative 301(h) decision have been considered, EPA Region 10 will make a final decision regarding 301(h) eligibility and permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, the tentative 301(h) decision will be finalized, and the permit will become effective upon issuance. If substantive comments are received, EPA will address the comments prior to taking final action on the 301(h) decision and permit. The permit will become effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days pursuant to 40 CFR 124.19.

*CWA § 401 Certification*

To comment or request a public hearing on the notice of application or the proposed CWA § 401 certification, submit comments electronically to Marie Klingman at marie.klingman@alaska.gov on or before the public notice expiration date listed above.

**DOCUMENTS ARE AVAILABLE FOR REVIEW**

*NPDES Permit*

The draft permit, this Fact Sheet, the 301(h) Tentative Decision Document (301(h) TD), and the Public Notice can also be found by visiting the Region 10 website at

https://www.epa.gov/npdes-permits/about-region-10s-npdes-permit-program.

The draft Administrative Record for this action contains any documents listed in the References section. The draft Administrative Record or documents from it are available electronically upon request by contacting Cyndi Grafe.

For technical questions regarding the draft permit, this Fact Sheet or 301(h) TD, contact Cyndi Grafe at 208-378-5775 or Grafe.Cyndi@epa.gov. Services can be made available to persons with disabilities by contacting Audrey Washington at (206) 553-0523.

*CWA § 401 Certification*

The public notice for the notice of application for and draft Clean Water Act § 401 Certification can also be found by visiting the Region 10 website at: https://www.epa.gov/npdes-permits/about-region-10s-npdes-permit-program.

For technical questions regarding the draft 401 certification, contact Marie Klingman at (907) 451-2101 or marie.klingman@alaska.gov.

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## Acronyms

| | |
|---|---|
| 1Q10 | 1 day, 10 year low flow |
| 7Q10 | 7 day, 10 year low flow |
| 30B3 | Biologically-based design flow intended to ensure an excursion frequency of less than once every three years, for a 30-day average flow. |
| Act | Clean Water Act |
| AML | Average Monthly Limit |
| AWL | Average Weekly Limit |
| $BOD_5$ | Biochemical oxygen demand, five-day |
| °C | Degrees Celsius |
| $CBOD_5$ | Carbonaceous biological demand, five-day |
| CFR | Code of Federal Regulations |
| CV | Coefficient of Variation |
| CWA | Clean Water Act |
| DMR | Discharge Monitoring Report |
| DO | Dissolved oxygen |
| EFH | Essential Fish Habitat |
| EPA | U.S. Environmental Protection Agency |
| ESA | Endangered Species Act |
| FR | Federal Register |
| gpd | Gallons per day |
| ICIS | Integrated Compliance Information System |
| lbs/day | Pounds per day |
| LOEC | Lowest Observed Effect Concentration |
| mg/L | Milligrams per liter |
| mL | Milliliters |
| ML | Minimum Level |
| µg/L | Micrograms per liter |
| mgd | Million gallons per day |
| MLLW | Mean Lower Low Water |
| MPN | Most Probable Number |
| N | Nitrogen |
| NOAA | National Oceanic and Atmospheric Administration |
| NOEC | No Observable Effect Concentration |
| NPDES | National Pollutant Discharge Elimination System |
| NTU | Nephelometric Turbidity Units |
| O&M | Operations and maintenance |
| POTW | Publicly owned treatment works |

| | |
|---|---|
| QAP | Quality assurance plan |
| RP | Reasonable Potential |
| RPM | Reasonable Potential Multiplier |
| RWC | Receiving Water Concentration |
| SS | Suspended Solids |
| s.u. | Standard Units |
| TD | 301(h) Technical Decision Document |
| TMDL | Total Maximum Daily Load |
| TRC | Total Residual Chlorine |
| TRE/TIE | Toxicity Reduction and Identification Evaluation |
| TSD | Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001) |
| TSS | Total suspended solids |
| $TU_a$ | Toxic Unit-Acute |
| $TU_c$ | Toxic Unit-Chronic |
| USFWS | U.S. Fish and Wildlife Service |
| WD | Water Division |
| WET | Whole Effluent Toxicity |
| WQBEL | Water quality-based effluent limit |
| WQS | Water Quality Standards |
| WWTP | Wastewater treatment plant |

# I. BACKGROUND INFORMATION

## A. GENERAL INFORMATION

This Fact Sheet provides information on the draft NPDES permit for the following entity:

**Table 1. General Facility Information**

| | |
|---|---|
| NPDES Permit #: | AK0020010 |
| Applicant: | City of Skagway<br>Wastewater Treatment Plant |
| Type of Ownership | Publicly Owned Treatment Works |
| Physical Address: | Point and Main Street<br>Skagway, Alaska 99840 |
| Mailing Address: | P.O. Box 415<br>Skagway, Alaska 99840 |
| Facility Contact: | Tyson Ames<br>t.ames@skagway.org |
| Operator Name: | Andy Miles<br>a.miles@skagway.org |
| Facility Location: | Lat: 59.454020; Long: -135.322670 (corner of Point and Main St.) |
| Receiving Water | Taiya Inlet |
| Facility Outfall | Lat: 59.448523, Long: -135.32658 (midpoint of diffuser) |

## B. MODIFICATION OF SECONDARY TREATMENT REQUIREMENTS

The City of Skagway (the City, the applicant, Skagway, or the permittee) has requested a modification under Section 301(h) of the CWA of the secondary treatment requirements contained in section 301(b)(1)(B) of the CWA to discharge wastewater receiving less than secondary treatment from the Skagway wastewater treatment plant (WWTP) into Taiya Inlet. The effluent quality attainable by secondary treatment is defined in the regulations at 40 CFR Part 133 in terms of biochemical oxygen demand ($BOD_5$), total suspended solids (TSS), and pH. Skagway has requested a 301(h) modification of the secondary treatment requirements for $BOD_5$, TSS, and pH.

Upon review of the application materials and available data, EPA has tentatively determined that the Skagway WWTP meets the nine statutory requirements of Section 301(h) of the CWA and the implementing regulations at 40 CFR Part 125, Subpart G, and is proposing to reissue a 301(h)-modified NPDES permit to the facility. EPA has prepared a Tentative Decision document (301(h) TDD), which presents the findings and conclusions of the Region as to whether the applicant's proposed discharge complies with the criteria set forth in Section 301(h) of the CWA, as implemented by regulations at 40 CFR Part 125, Subpart G.

## C. PERMIT HISTORY

The City was first issued an NPDES permit for its WWTP on July 10, 1974. The permit was modified by EPA on November 3, 1975, and again on September 21, 1978. The permit expired on March 3, 1979.

EPA approved the City of Skagway's first request for modification of secondary treatment requirements and issued its first CWA Section 301(h)-modified NPDES permit on September 6, 1983. The most recent NPDES permit for the City of Skagway WWTP was issued on August 6, 2002, became effective on October 1, 2002, and expired on September 7, 2007 (hereafter referred to as the 2002 permit). The permittee submitted an NPDES application for permit issuance on June 20, 2007. EPA determined that the application was timely and complete. Therefore, pursuant to 40 CFR 122.6, the 2002 permit has been administratively continued and remains fully effective and enforceable.

## D. TRIBAL CONSULTATION

EPA consults on a government-to-government basis with federally recognized tribal governments when EPA actions and decisions may affect tribal interests. Meaningful tribal consultation is an integral component of the federal government's general trust relationship with federally recognized tribes. The federal government recognizes the right of each tribe to self-government, with sovereign powers over their members and their territory. Executive Order 13175 (November 2000) entitled "Consultation and Coordination with Indian Tribal Governments" requires federal agencies to have an accountable process to assure meaningful and timely input by tribal officials in the development of regulatory policies on matters that have tribal implications and to strengthen the government-to-government relationship with Indian tribes. In May 2011, EPA issued the "EPA Policy on Consultation and Coordination with Indian Tribes," which established national guidelines and institutional controls for consultation.

The Skagway WWTP is located within the territory of the Skagway Traditional Council, a federally recognized tribe for Skagway Tlingit and Haida Indians, Alaska Natives, and American Indians in the Skagway Traditional Council service area. EPA notified the Skagway Traditional Council of its work on this draft permit in August 2020 and January 2021. EPA also held an informational webinar for the Skagway Traditional Council and other tribes on April 14 and April 18, 2022. EPA shared the preliminary draft permit, draft fact sheet, and draft 301(h) TDD with the Skagway Traditional Council on May 30, 2023. EPA will invite the Skagway Traditional Council to participate in formal government-to-government consultation on the draft permit during the public notice period.

# II. FACILITY INFORMATION

## A. TREATMENT PLANT DESCRIPTION

### Service Area

The City of Skagway owns and operates the WWTP located in Skagway, Alaska. The collection system has no combined sewers. The facility serves a resident population of approximately 850 people and a seasonal tourism population. In 2019, the City's tourism population from April through October was approximately 980,000. There are no major industries discharging to the facility.

### Treatment Process

Skagway WWTP's influent is primarily residential and infiltrated stormwater with a peak effluent flow rate of 0.465 million gallons per day (mgd). The maximum monthly design flow is 0.63 million gallons per day (mgd). However, the actual average daily discharge from August 1996 through April 2001 was approximately 0.325 mgd.[1] The existing outfall (001) discharges to Taiya Inlet approximately 1000 feet offshore at a depth of 55 feet below mean lower low water (MLLW). The outfall location is 59° 26' 54.8" N, 135° 19' 36.6" W (59.448556, 135.326833).

Raw sewage enters the WWTP and is pumped over an inclined 0.06-inch mesh screen where solids are automatically removed and bagged for disposal at the municipal landfill. Screened sewage then flows into an aerated grit chamber. Aeration basin wastewater flows to clarifiers where the wastewater is settled and skimmed. The settled material is collected and goes through an aerobic digester, mixed with a polymer where it is dewatered into a sludge cake, and disposed. Clarified water crosses two weirs and discharges to Taiya Inlet through Outfall 001. In addition, Skagway WWTP periodically chlorinates the clarified water between April and September to remove bacteria, when bacteria levels in the wastestream are higher. When the facility chlorinates, they use calcium hypochlorite tablets then dechlorinate in a contact chamber with calcium thiosulfate after crossing the two weirs and discharging to Taiya Inlet through Outfall 001.

From 2009 to 2010, the City upgraded its plant adding screens and updating its clarifiers. A schematic of the wastewater treatment process and a map showing the location of the treatment facility and discharge are included in Appendix A. Because the design flow is 0.63 mgd and less than 1 mgd, the facility is considered a minor facility.

## B. OUTFALL DESCRIPTION

The facility outfall is a 12-inch steel sewer line which extends 410 feet from shore at approximately 55 feet below MLLW. The pipe ends in an eight-port diffuser. The diffuser is 25 feet in length and the diameter of each port is 3 inches. The diffuser terminates 60 feet below MLLW.

## C. EFFLUENT CHARACTERIZATION

To characterize the effluent, EPA evaluated the facility's application form, discharge monitoring report (DMR) data (2016-2021), and additional data provided by the Skagway WWTP. The effluent quality is summarized in Table 2. Data are provided in Appendix B of this fact sheet.

**Table 2. Effluent Characterization**

| Parameter | Minimum | Maximum | Notes |
|---|---|---|---|
| 5-day Biochemical Oxygen Demand ($BOD_5$), (monthly avg), mg/L | 19 | 193 | 1 |
| $BOD_5$ (monthly avg), lbs/day | 43 | 512 | |
| $BOD_5$ (daily max), mg/L | 19 | 300 | 1 |

[1] In accordance with 40 CFR125.58(c), the facility is a "small applicant."

| Parameter | Minimum | Maximum | Notes |
|---|---|---|---|
| $BOD_5$ (daily max), lbs/day | 43 | 776 | |
| $BOD_5$ (monthly avg percent removal), % | 30 | 88 | 1 |
| Total Suspended Solids (TSS), (monthly avg), mg/L<br>TSS (monthly avg), lbs/day | 9<br>19 | 106<br>294 | 1 |
| TSS (daily max), mg/L<br>TSS (daily max), lbs/day | 11<br>24 | 132<br>341 | 1 |
| TSS (monthly avg percent removal), % | 33 | 97 | 1 |
| Total Residual TRC (TRC),(monthly avg), µg/L<br>TRC (monthly avg), lbs/day | 3<br>0.006 | 208<br>0.40 | 1 |
| TRC (daily max), µg/L<br>TRC (daily max), lbs/day | 10<br>0.026 | 400<br>0.804 | 1 |
| Fecal coliform (monthly avg), #/100/mL<br>Fecal coliform (daily max), #/100/mL | 100<br>100 | 870,000<br>870,000 | 1 |
| Copper, Total Recoverable (monthly avg), µg/L<br>Copper, Total Recoverable (monthly avg), lbs/day | 0.021<br>0.0057 | 3.4<br>0.39 | 1<br>Calculations appear to be incorrect for 4/10/21 to 10/1021 for copper loading. |
| Copper, Total Recoverable (daily max), µg/L<br>Copper, Total Recoverable (daily max), lbs/day | 3.4<br>0.0057 | 100<br>0.39 | 1 |
| Flow (monthly avg), mgd<br>Flow (daily max), mgd | 0.15<br>0.23 | 0.37<br>0.91 | 1 |
| Dissolved oxygen (daily min), mg/L<br>Dissolved oxygen (daily max), mg/L | 3.7<br>6.0 | 10.9<br>17 | 1 |
| pH (min), standard units<br>pH (max), standard units | 6.5<br>6.7 | 7.1<br>7.6 | 1 |
| Temperature (monthly avg), ºC<br>Temperature (daily max), ºC | 6.5<br>6.8 | 47*<br>19 | 1<br>*Max monthly avg temperature appears to be an error and may be in ºF. Value would be 17ºC. |
| Lead[2], µg/L | 2.9 | 2.9 | 2 |
| Zinc[2], µg/L | 57 | 57 | 2 |
| Chloroform[2], µg/L | 1.4 | 1.4 | 2 |
| 1,4-Dichlorobenzene[2], µg/L | 0.84 | 0.84 | 2 |
| Diethylphthalate[2], µg/L | 6.8 | 6.8 | 2 |
| Toluene[2], µg/L | 2.2 | 2.2 | 2 |
| Phenol[2], µg/L | 16 | 16 | 2 |
| Bis (2-ethylhexyl phthalate)[2], µg/L | 19 | 19 | 2 |

| Parameter | Minimum | Maximum | Notes |
|---|---|---|---|
| Source:<br>1. Discharge monthly reports (DMR) from 12/31/2016 - 10/31/21<br>2. Priority Pollutant Scan, 2007 | | | |

## D. COMPLIANCE HISTORY

A summary of effluent violations from December 2016 to September 2021 is provided in Table 3D. Effluent violations of the monthly average $BOD_5$ limits occur year-round with six instances occurring from May 1 through September 30 and six instances from October 1 through April 30. There were effluent violations of the maximum daily limit for $BOD_5$ with two instances from May 1 through September 30 and six instances from October 1 through April 30. The six instances where effluent violations occurred between October 1 through April 30 for the monthly average and daily maximum limits for $BOD_5$ occurred on the same dates. Skagway WWTP also had single violations of the chlorine and flow limits.

Additional compliance information for this facility, including compliance with other environmental statutes, is available on Enforcement and Compliance History Online (ECHO). The ECHO web address for this facility is: https://echo.epa.gov/detailed-facility-report?fid=110010622978#history110010622978.

**Table 3. Summary of Effluent Violations (December 2016 – September 2021)**

| Parameter | Limit Type | Units | Number of Instances |
|---|---|---|---|
| $BOD_5$ (5/1 – 9/30) | Average Monthly | mg/L | 6 |
| $BOD_5$ (10/1 – 4/30) | | | 6 |
| $BOD_5$ (5/1 – 9/30) | Daily Maximum | mg/L | 2 |
| $BOD_5$ (10/1 – 4/30) | | | 6 |
| TRC | Average Monthly | µg/L | 1 |
| TRC | Daily Maximum | lb/day | 1 |
| Flow | Daily Maximum | mgd | 1 |
| Source: DMR from 12/31/2016 - 10/31/21; Information accessed in ECHO on April 11, 2023. | | | |

EPA conducted an inspection of the facility in 2019. The inspection encompassed the wastewater treatment process, records review, operation and maintenance, and the collection system. Overall, the results of the inspection showed similar violations as shown above.

# III. RECEIVING WATER

In drafting permit conditions, EPA must analyze the effect of the facility's discharge on the receiving water. The details of that analysis are provided in the 301(h) TDD and in the Water

Quality-Based Effluent Limits (WQBEL) section of this Fact Sheet. This section summarizes characteristics of the receiving water that impact that analysis.

The facility discharges to Skagway Harbor in the northern part of Taiya Inlet in the City of Skagway, Alaska. Taiya Inlet is located in the upper Lynn Canal. For a more detailed description of the receiving waters please refer to section 6 of the 301(h) TDD.

## A. WATER QUALITY STANDARDS (WQS)

Section 301(b)(1)(C) of the CWA requires the development of limits in permits necessary to meet WQS. 40 CFR 122.4(d) requires that the conditions in NPDES permits ensure compliance with the WQS of all affected States. A state's WQS are composed of use classifications, numeric and/or narrative water quality criteria and an anti-degradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve, such as drinking water supply, contact recreation, and aquatic life. The numeric and narrative water quality criteria are the criteria deemed necessary to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

Waterbodies in Alaska are designated for all uses unless the water has been reclassified under 18 Alaska Administrative Code (AAC) 70.230 as listed under 18 AAC 70.230(e). The receiving water for this discharge, Taiya Inlet, has not been reclassified, nor have site-specific water quality criteria been established. Therefore, Taiya Inlet must be protected for all marine use classes as per 18 AAC 70.020(a)(2) and 18 AAC 70.050. The designated use classes for marine water include (A) water supply (aquaculture, seafood processing, and industrial), (B) water recreation (contact and secondary), (C) growth and propagation of fish, shellfish, other aquatic life, and wildlife, and (D) harvesting for consumption of raw mollusks or other raw aquatic life.

## B. RECEIVING WATER QUALITY

The Skagway WWTP collected water quality data in Taiya Inlet in accordance with the 2002 permit for the following parameters: temperature, conductivity, total dissolved solids, pH, dissolved oxygen (DO), turbidity and salinity ("2002-2005 Taiya Inlet Data"). Skagway WWTP collected data at five stations: at the outfall (Station 1), at the eastern and western edges of the 2002 permit's zone of initial dilution (ZID), which is 42 meters (139 feet) from the outfall (Stations 2 and 4), and 200 meters east and west of the 2002 permit's ZID (Stations 3 and 5). (See Appendix H.) The 2002 permit's ZID is centered over the outfall diffuser with a radius of 140 feet in length and depth. Data were collected at surface, mid-level, and bottom depths at each station in October 2002, July 2004, August 2004, and June 2005. For each sampling event, the facility collected multiple samples at the surface and at the mid-depths of 9.14 meters. For each sampling event, one bottom depth sample was collected at each station -18.3 meters deep at Stations 1, 2, and 3 and 15.2 meters deep at Stations 4 and 5. The full data set is in Appendix B. Table 4 includes the values averaged by depth at each station and sampling event.

From April through August 2021, the Aquatic Restoration and Research Institute (ARRI) conducted a survey for ADEC on water quality data in the vicinity of the Skagway WWTP for temperature, salinity, pH, DO, fecal coliform, enterococcus, ammonia, copper, nickel and zinc. Cruise ships were not operating in 2021. However, the 2021 values for temperature,

salinity, pH and DO are similar to data collected by ARRI in 2020, when cruise ships were actively operating in the area (ARRI, 2022). Therefore, the 2021 ARRI data are believed to be representative of Taiya Inlet conditions. In addition, the 2021 ARRI data were similar to data from the 2002-2005 Taiya Inlet Data. The water quality data in Taiya Inlet from the 2021 ARRI report and the permittee are summarized below in Table 5 and Appendix B.

**Table 4.** 2002-2005 Taiya Inlet Data (Averaged by depth)

| 10/28/2002 | Temp C | Cond mS/cm | TDS g/l | Salinty ppt | D.O mg/l | pH S.U. | Turb. NTU | Depth |
|---|---|---|---|---|---|---|---|---|
| Site 1 | 7.51 | 21.72 | 21.20 | 20.21 | 11.44 | 7.95 | 0.58 | surface |
| | 7.51 | 30.93 | 30.19 | 29.79 | 9.25 | 7.89 | 0.58 | mid |
| | 7.37 | 31.21 | 30.59 | 30.22 | 8.99 | 7.89 | 0.50 | bottom |
| Site 2 | 7.56 | 23.38 | 22.78 | 21.90 | 10.32 | 7.91 | 0.72 | surface |
| | 7.50 | 30.97 | 30.24 | 29.84 | 8.11 | 7.88 | 0.70 | mid |
| | 7.42 | 31.15 | 30.48 | 30.10 | 7.67 | 7.88 | 0.70 | bottom |
| Site 4 | 7.55 | 21.69 | 21.15 | 20.16 | 11.98 | 7.97 | 0.72 | surface |
| | 7.51 | 30.90 | 30.17 | 29.77 | 9.50 | 7.89 | 0.60 | mid |
| | 7.36 | 31.22 | 30.60 | 30.23 | 9.25 | 7.89 | 0.60 | bottom |
| Site 5 | 7.61 | 24.63 | 23.97 | 23.16 | 11.63 | 7.94 | 0.65 | surface |
| | 7.48 | 30.94 | 30.22 | 29.82 | 9.70 | 7.90 | 0.58 | mid |
| | 7.41 | 31.02 | 30.37 | 29.98 | 9.41 | 7.90 | 1.00 | bottom |

| 7/19/2004 | Temp C | Cond mS/cm | TDS g/l | Salinty ppt | D.O mg/l | pH S.U. | Turb. NTU | Depth |
|---|---|---|---|---|---|---|---|---|
| Site 1 | 11.28 | 11.22 | 10.01 | 9.21 | 2.13 | 7.95 | 20.97 | surface |
| | 6.40 | 29.06 | 29.33 | 28.76 | 1.42 | 7.72 | 21.30 | mid |
| | 5.66 | 29.94 | 30.86 | 30.34 | 1.19 | 7.66 | 21.40 | bottom |
| Site 2 | 12.02 | 10.54 | 9.18 | 8.27 | 6.42 | 7.71 | 20.50 | surface |
| | 6.27 | 28.88 | 29.25 | 28.66 | 3.60 | 7.63 | 18.75 | mid |
| | 5.19 | 29.62 | 30.97 | 30.40 | 3.12 | 7.57 | 45.10 | bottom |
| Site 3 | 11.48 | 11.69 | 10.31 | 9.39 | 2.29 | 7.96 | 23.10 | surface |
| | 6.14 | 29.17 | 29.67 | 29.09 | 1.61 | 7.70 | 19.11 | mid |
| | 4.90 | 29.79 | 31.43 | 30.86 | 1.24 | 7.59 | 17.40 | bottom |
| Site 4 | 11.60 | 10.28 | 9.00 | 8.06 | 3.38 | 7.96 | 22.69 | surface |
| | 7.24 | 26.55 | 26.39 | 25.71 | 2.27 | 7.77 | 18.81 | mid |
| | 5.58 | 30.04 | 31.04 | 30.52 | 1.68 | 7.66 | 28.50 | bottom |
| Site 5 | 11.34 | 13.97 | 12.58 | 11.66 | 3.32 | 7.93 | 20.75 | surface |
| | 5.87 | 15.56 | 14.90 | 14.10 | 2.51 | 7.87 | 25.96 | mid |
| | 10.95 | 4.87 | 4.33 | 3.66 | 2.40 | 7.98 | 31.60 | bottom |

| 8/23/2004 | Temp C | Cond mS/cm | TDS g/l | Salinty ppt | D.O mg/l | pH S.U. | Turb. NTU | Depth |
|---|---|---|---|---|---|---|---|---|
| Site 1 | 8.45 | 27.73 | 26.39 | 25.75 | 9.16 | 7.73 | 1.40 | surface |
| | 7.39 | 29.54 | 29.04 | 28.54 | 8.86 | 7.67 | 1.05 | mid |
| | 8.81 | 26.95 | 25.35 | 24.66 | 9.82 | 7.78 | 2.40 | bottom |
| Site 2 | 8.70 | 26.68 | 25.23 | 24.53 | 12.00 | 7.81 | 2.80 | surface |
| | 6.90 | 31.03 | 30.83 | 30.43 | 10.40 | 7.66 | 0.20 | mid |
| | 6.50 | 31.52 | 31.69 | 31.33 | 10.20 | 7.63 | 0.40 | bottom |
| Site 3 | 8.99 | 26.66 | 25.08 | 24.38 | 12.42 | 7.83 | 2.55 | surface |
| | 6.81 | 31.19 | 31.07 | 30.69 | 10.57 | 7.67 | 0.13 | mid |
| | 6.57 | 31.53 | 31.63 | 31.28 | 10.30 | 7.64 | 0.20 | bottom |
| Site 4 | 7.98 | 28.93 | 27.91 | 27.36 | 9.40 | 7.72 | 1.52 | surface |
| | 6.89 | 31.03 | 30.84 | 30.45 | 9.01 | 7.64 | 0.30 | mid |
| | 6.55 | 31.36 | 31.48 | 31.11 | 9.16 | 7.62 | 1.40 | bottom |
| Site 5 | 8.68 | 27.03 | 25.56 | 24.89 | 11.38 | 7.79 | 2.32 | surface |
| | 6.87 | 31.03 | 30.85 | 30.46 | 10.21 | 7.65 | 1.45 | mid |
| | 6.47 | 31.42 | 31.61 | 31.25 | 9.95 | 7.62 | 3.30 | bottom |

| 6/29/2005 | Temp C | Cond mS/cm | TDS g/l | Salinty ppt | D.O mg/l | pH S.U. | Turb. NTU | Depth |
|---|---|---|---|---|---|---|---|---|
| Site 1 | 9.13 | 21.98 | 20.71 | 19.90 | 10.06 | 7.67 | -999.90 | surface |
| | 7.07 | 29.56 | 29.12 | 28.59 | 6.97 | 7.73 | -999.90 | mid |
| | 10.79 | 8.45 | 7.54 | 6.63 | 12.68 | 7.90 | -999.90 | bottom |
| Site 2 | 8.67 | 22.45 | 21.50 | 20.75 | 11.59 | 7.84 | -999.90 | surface |
| | 7.06 | 29.71 | 29.39 | 28.88 | 11.20 | 7.79 | -999.90 | mid |
| | 6.12 | 30.86 | 31.37 | 30.94 | 11.22 | 7.74 | -999.90 | bottom |
| Site 3 | 9.83 | 17.59 | 16.53 | 15.71 | 12.86 | 7.93 | -999.90 | surface |
| | 6.78 | 29.97 | 29.89 | 29.40 | 11.97 | 7.81 | -999.90 | mid |
| | 6.00 | 30.94 | 31.57 | 31.14 | 11.81 | 7.76 | -999.90 | bottom |
| Site 4 | 9.63 | 18.66 | 17.55 | 16.72 | 12.98 | 7.94 | -999.90 | surface |
| | 6.80 | 30.05 | 29.95 | 29.47 | 12.09 | 7.81 | -999.90 | mid |
| | 6.04 | 30.93 | 31.52 | 31.10 | 11.92 | 7.76 | -999.90 | bottom |
| Site 5 | 9.65 | 18.17 | 17.09 | 16.25 | 12.67 | 7.94 | -999.90 | surface |
| | 7.22 | 29.57 | 29.11 | 28.59 | 11.90 | 7.81 | -999.90 | mid |
| | 6.07 | 30.94 | 31.49 | 31.07 | 12.00 | 7.76 | -999.90 | bottom |

**Table 5. Receiving Water Quality Data**

| Parameter | Units | Percentile | Value | Source |
|---|---|---|---|---|
| Temperature | °C | 95th | 12 | 1 |
| Conductivity | mS/cm | 5th - 95th | 8.5 - 31 | 1 |
| Total Dissolved Solids | g/L | 5th – 95th | 7.3 - 31 | 1 |
| pH | Standard units | 5th – 95th | 7.6 – 8.0 | 1 |
| Dissolved Oxygen | mg/L | 5th – 95th | 1.7-13 | 1 |
| Turbidity | NTU | Average | 8.9 | 1 |
| Salinity | Ppt | 5th – 95th | 6.4 – 31 | 1 |
| Fecal Coliform | CFU | Max Geometric Mean | 1.0 | 2 |
| Enterococcus | MPN/100 mL | Maximum | 3.5 | 2 |
| Ammonia | mg/L | Maximum | 0.067 | 2 |
| Copper | µg/L | Maximum | 0.46 | 2 |
| Nickel | µg/L | Maximum | 0.34 | 2 |
| Zinc | µg/L | Maximum | 2.04 | 2 |

Source:
1. 2002-2005 Taiya Inlet Data, Permit Application
2. ARRI, 2022. Water Quality Measures in Alaska's Ports and Shipping Lanes, 2021 Annual Report

### 1. General Characteristics

Taiya Inlet is a deep fjord with an average depth of 1500 feet (457 meters). Taiya Inlet supports a classic fjord type of two layer circulation with a large saline lower layer and a very thin upper brackish layer. A small mass transfer between the lower and upper layers may be expected since the net flow out a fjord mostly occurs in the upper layers. The circulation of the inlet is dependent on tides and freshwater flow into the inlet. Freshwater from the Taiya and Skagway rivers mixes with the ocean waters to create estuarine conditions in the Taiya Inlet. The Taiya and Skagway rivers have the highest flows into Taiya Inlet in the summer when snowmelt occurs. The permit application indicates that Taiya Inlet is a stratified fjord during summer months and a well-mixed fjord during winter months. There are no obstructions to impede circulation near the outfall.

The current application and the 1996 Fact Sheet describe the currents and flushing in Taiya Inlet. No new information has been gathered since the last permit issuance.

### 2. Water Quality Limited Waters

There are no water quality impairments identified in Taiya Inlet on the State of Alaska's 2022 Integrated Report (ADEC, 2022).

## IV. EFFLUENT LIMITATIONS AND MONITORING

The draft permit includes several changes to the effluent limitations. The changes are summarized in Table 6 below.

**Table 6.** Changes in Effluent Limits

| Parameter | Effluent Limit Change | Basis |
|---|---|---|
| TSS | More stringent maximum daily and average monthly limits | EPA is proposing more stringent effluent limits to reflect facility performance. The proposed limits are at a level of performance which the facility has consistently achieved. |
| $BOD_5$ and TSS | Removing maximum daily limit/including average weekly limit | 40 CFR 122.45(d)(2) requires effluent limitations for continuous discharges from POTWs be expressed as average weekly and average monthly discharge limitations, unless impracticable. The 2002 permit contained average monthly and maximum daily effluent limits for $BOD_5$ and TSS. The draft permit proposes to remove the maximum daily effluent limits and instead impose average weekly limits. The inclusion of maximum daily limits instead of average weekly limits meets an exception to the prohibition on backsliding as described in Section IV.A.4. |
| Fecal Coliform | More stringent maximum daily and average monthly limits | Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet WQS. Section 301(h)(9) of the CWA and 40 CFR 125.62 require 301(h) discharges to meet state WQS and federal CWA 304(a) criteria at the boundary of the ZID. The draft permit contains fecal coliform limits that EPA anticipates the State of Alaska will include as a condition of the 401 certification. These limits will ensure Alaska's most protective WQS are met at the boundary of the chronic mixing zone. |

| Parameter | Effluent Limit Change | Basis |
|---|---|---|
| Enterococcus | New effluent limits | Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet WQS. Section 301(h)(9) and 40 CFR 125.62 require 301(h)-modified discharges to meet all applicable state water quality standards and federal CWA Section 304(a) criteria at the boundary of the ZID. When the 2002 permit was issued, no WQS was in effect for enterococcus. In 2017, EPA approved Alaska's WQS for enterococcus. EPA has determined the modified discharge has reasonable potential to cause or contribute to a violation of the WQS for enterococcus. The draft permit contains a WQBEL for enterococcus developed using the dilution achieved at the boundary of the chronic mixing zone. |
| Total Residual Chlorine (TRC) and Copper | More stringent limits | Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet WQS. Section 301(h)(9) and 40 CFR 125.62 require 301(h)-modified discharges to meet all applicable state water quality standards and federal CWA Section 304(a) criteria at the boundary of the ZID and at the boundary of the acute and chronic mixing zones. Using DMR data from 2016-2021 EPA determined the modified discharge has reasonable potential to cause or contribute to an exceedance of the WQS for chlorine and copper and is including the calculated limits so the facility meets WQS. |
| pH | More stringent limits | EPA is proposing more stringent pH limits to meet Alaska water quality standards. The proposed limits are at a level of performance which the facility has consistently achieved. |

Table 7 below presents the existing effluent limits and monitoring requirements in the 2002 permit. Table 8 below presents the effluent limits and monitoring requirements proposed in the draft permit.

**Table 7. 2002 permit - Effluent Limits and Monitoring Requirements**

| Parameter | Units | Effluent Limitations | | | Monitoring Requirements | | |
|---|---|---|---|---|---|---|---|
| | | Average Monthly Limit | Average Weekly Limit | Max Daily Limit | Sample Location | Sample Frequency | Sample Type |
| $BOD_5$, May 1 – September 30 | mg/L | 140 | -- | 200 | Influent and Effluent | 2/month | 24-hour composite |
| $BOD_5$, May 1 – September 30 | lbs/day | 740 | -- | 1050 | Effluent | -- | Calculation |
| $BOD_5$, October 1 – April 30 | mg/L | 80 | -- | 100 | Influent and Effluent | 2/month | 24-hour composite |
| $BOD_5$, October 1 – April 30 | lbs/day | 420 | -- | 530 | Effluent | -- | Calculation |
| $BOD_5$, % removal[1] | % | Minimum 30% removal | | | Effluent | 1/month | Calculation |
| TSS, May 1 – September 30 | mg/L | 140 | -- | 200 | Influent and Effluent | 2/month | 24-hour composite |
| TSS, May 1 – September 30 | lbs/day | 740 | -- | 1050 | Effluent | -- | calculation |
| TSS, October 1 – April 30 | mg/L | 70 | -- | 88 | Influent and Effluent | 2/month | 24-hour composite |
| TSS, October 1 – April 30 | lbs/day | 370 | -- | 460 | Effluent | -- | calculation |
| TSS, % removal[1] | % | Minimum 30% removal | | | Effluent | 1/month | Calculation |
| Total flow | mgd | 0.53 | -- | 0.63 | Influent or effluent | Continuous | Recorder |
| Fecal Coliform Bacteria | #/100 mL | $1.0 \times 10^6$ | -- | $1.5 \times 10^6$ | Effluent | 1/month | Grab |
| Total Copper | µg/L | 150 | -- | 210 | Effluent | 1/month | 24-hour composite |
| Total Copper | lbs/day | 0.8 | -- | 1.1 | Effluent | -- | Calculation |

| Parameter | Units | Effluent Limitations | | | Monitoring Requirements | | |
|---|---|---|---|---|---|---|---|
| | | Average Monthly Limit | Average Weekly Limit | Max Daily Limit | Sample Location | Sample Frequency | Sample Type |
| Total Residual Chlorine[2] | µg/L | 120 | -- | 240 | Effluent | 1/week | 24-hour composite |
| Total Residual Chlorine | lbs/day | 0.6 | -- | 1.3 | Effluent | -- | Calculation |
| pH | s.u. | Between 6.0 and 9.0 | | | Effluent | 1/week | Grab |
| Dissolved oxygen | mg/L | Between 2.0 mg/L and 17 mg/L | | | Effluent | 1/week | Grab |
| Temperature | °C | -- | | | Effluent | 1/week | Grab |
| Chronic Whole Effluent Toxicity (WET) | $TU_c$ | -- | | | Effluent | 1/permit term[3] | 24-hour composite |
| Toxic Pollutants Scan | -- | -- | | | Effluent | 1/permit term[4] | Priority pollutant scan |

1 – Influent and effluent sampling is required. Samples shall be collected during the same 24-hour period. The percent $BOD_5$ and TSS removal shall be reported on each monthly DMR.
2 – Monitoring is only required during period when disinfection process is in use.
3 – Monitoring required during the first year of the permit. Monitoring shall be performed during the summer season, May 1 through September 30.
4 - Monitoring is only required during the 4th year of the permit. Monitoring shall be performed during the summer season, May 1 through September 30.

**Table 8.** Draft Permit - Effluent Limits and Monitoring Requirements

| Parameter | Units | Effluent Limitations | | | Monitoring Requirements | | |
|---|---|---|---|---|---|---|---|
| | | Average Monthly | Average Weekly | Maximum Daily | Sample Location | Sample Frequency | Sample Type |
| **Parameters with Effluent Limits** | | | | | | | |
| Total Flow | Mgd | 0.53 | -- | 0.63 | Influent or Effluent | Continuous | Recorded |
| Biochemical Oxygen Demand ($BOD_5$), May 1 – September 30 | mg/L | 140 | **200** | -- | Influent and Effluent | 2/month | 24-hour composite |
| | lbs/day | 740 | **1050** | -- | -- | -- | Calculation[1] |
| $BOD_5$, October 1 – April 30 | mg/L | 80 | **100** | -- | Influent and Effluent | 2/month | 24-hour composite |
| | lbs/day | 420 | **530** | -- | -- | -- | Calculation[1] |
| $BOD_5$ Percent Removal | % | 30 (minimum) | -- | -- | -- | 1/month | Calculation[2] |

| Parameter | Units | Effluent Limitations | | | Monitoring Requirements | | |
|---|---|---|---|---|---|---|---|
| | | Average Monthly | Average Weekly | Maximum Daily | Sample Location | Sample Frequency | Sample Type |
| **Total Suspended Solids (TSS), May 1 – September 30** | **mg/L** | **67** | **129** | **--** | **Influent and Effluent** | **2/month** | **Calculation[1]** |
| | **lbs/day** | **352** | **678** | **--** | **--** | **--** | |
| **TSS, October 1 – April 30** | **mg/L** | **30** | **45** | **--** | **Influent and Effluent** | **2/month** | **Calculation[1]** |
| | **lbs/day** | **158** | **236** | | **--** | **--** | |
| TSS Percent Removal | % | 30 (minimum) | -- | -- | -- | 1/month | Calculation[2] |
| **Fecal coliform (interim limit)[3,4,5]** | **CFU/ 100 ml** | **445,000 (geomean)** | **--** | **808,000 (instant. max)** | **Effluent** | **2/month** | **Grab** |
| **Fecal coliform (final limit) [3,4,5]** | **CFU/ 100 ml** | **200 (geomean)** | **400 (geomean)** | **800 (instant. max)** | **Effluent** | **2/month** | **Grab** |
| **Enterococcus** | **CFU/ 100 ml** | **Report** | **--** | **Report** | **Effluent** | **2/month** | **Grab** |
| **Enterococcus[3,5] (final limit)** | **CFU/ 100 ml** | **980 (geomean)** | **--** | **3640 (instant. max)** | **Effluent** | **2/month** | **Grab** |
| **Total Copper** | **µg/L** | **18** | **--** | **45** | **Effluent** | **2/month** | **24-hour composite** |
| | **lbs/day** | **0.095** | **--** | **0.24** | **--** | **--** | **Calculation[1]** |
| **Total Residual Chlorine[5]** | **µg/L** | **71** | **--** | **208** | **Effluent** | **1/week** | **24-hour composite** |
| | **lbs/day** | **0.37** | **--** | **1.1** | **--** | **--** | **Calculation[1]** |
| **pH** | **std units** | **Between 6.5 – 8.5** | | | **Effluent** | **1/week** | **Grab** |
| DO | mg/L | Between 2.0 mg/L and 17.0 mg/L | | | Effluent | 1/week | Grab |
| **Report Parameters** | | | | | | | |
| Temperature | °C | Report | -- | Report | Effluent | 1/week | Grab |
| **Ammonia** | **mg/L** | **Report** | **--** | **Report** | **Effluent** | **1/quarter** | **Grab** |
| Chronic Whole Effluent Toxicity (WET)[6] | Toxicity Units (TU) | Report | -- | Report | Effluent | **2/year** | 24-hour composite |
| **Per- and Polyfluoroalkyl Substances (PFAS) [7]** | **ng/L** | **Report** | **--** | **Report** | **Influent and effluent** | **Quarterly[8]** | **24-hour composite** |
| | **mg/kg dry weight** | **--** | **--** | **Report** | **Sludge** | **Quarterly[8]** | **Grab** |
| Permit Application | -- | | | | Effluent | **1/year** | -- |

| Parameter | Units | Effluent Limitations | | | Monitoring Requirements | | |
|---|---|---|---|---|---|---|---|
| | | Average Monthly | Average Weekly | Maximum Daily | Sample Location | Sample Frequency | Sample Type |
| Effluent Testing Data[9] | | | | | | | |
| Toxics and Pesticides Scan[10] | -- | | | | Effluent | See Permit Part II.D.1 | Grab |

**Notes**

1. Loading (in lbs/day) is calculated by multiplying the concentration (in mg/L) by the corresponding flow (in mgd) for the day of sampling and a conversion factor of 8.34. For more information on calculating, averaging, and reporting loads and concentrations see the *NPDES Self-Monitoring System User Guide* (EPA 833-B-85-100, March 1985).
2. Percent Removal. The monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values for that month using the following equation:
   (average monthly influent concentration – average monthly effluent concentration) ÷ average monthly influent concentration x 100. Influent and effluent samples must be taken over approximately the same time period.
3. A five-tube decimal dilution test is required. See 18 AAC 70.020(b)(14)(D).
4. Compliance schedules – Interim limits are in effect until the end of the compliance schedule. Final limits for fecal coliform and enterococcus become effective at the end of the compliance schedule. See Permit Parts II.C, II.D., and II.E.
5. Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation. See Permit Parts I.B.3. and III.G.
6. Chronic WET testing – See Permit Part I.C.
7. See Part I.B.8.
8. Monitoring for PFAS chemicals is required for 2 years (8 quarters), beginning at the start of the first complete quarter in the third year of the permit term.
9. Effluent Testing Data - See NPDES Permit Application Form 2A, Tables 1 and 2 for the list of pollutants to be included in this testing. The Permittee must use sufficiently sensitive analytical methods in accordance with Permit Part I.B.5
10. See Permit Part II.D.1.

## A. BASIS FOR EFFLUENT LIMITS

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBELs) or WQBELs. TBELs are set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the WQSs applicable to a waterbody are being met and may be more stringent than TBELs.

### 1. Pollutants of Concern

Pollutants of concern are those that either have TBELs or may need WQBELs. EPA identifies pollutants of concern for the discharge based on those that:

- Have a TBEL
- Have an assigned wasteload allocation (WLA) from a Total Maximum Daily Load (TMDL)
- Had an effluent limit in the previous permit
- Are present in the effluent monitoring. Monitoring data are reported in the application and DMR and any special studies
- Are expected to be in the discharge based on the nature of the discharge

The wastewater treatment process for this facility includes primary treatment, as well as limited disinfection with chlorination. Pollutants expected in the discharge from a facility with this type of treatment, include but are not limited to: $BOD_5$, TSS, bacteria, chlorine, pH, ammonia, temperature, and DO.

Based on this analysis, pollutants of concern are as follows:

- $BOD_5$
- DO
- TSS
- pH
- Temperature
- Bacteria (Fecal coliform, Enterococcus)
- Chlorine
- Ammonia
- Metals (Copper, lead, zinc)
- Other Toxics (Chloroform, toluene, phenol, bis (2-ethylhexyl phthalate))
- Per- and polyfluoroalkyl substances (PFAS)

**2. Technology-Based Effluent Limits (TBELs)**

*Federal Primary Treatment Effluent Limits*

The CWA requires POTWs to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," which POTWs were required to meet by July 1, 1977. EPA has developed and promulgated "secondary treatment" effluent limits, which are found at 40 CFR 133.102. These TBELs identify the minimum level of effluent quality attainable by application of secondary treatment in terms of $BOD_5$, TSS, and pH.

**Table 9. Secondary Treatment Standards**

| Parameter | 30-day average | 7-day average |
|---|---|---|
| $BOD_5$ | 30 mg/L | 45 mg/L (or 40 mg/L $CBOD_5$) |
| TSS | 30 mg/L | 45 mg/L |
| $BOD_5$ and TSS removal | not less than 85% | -<br>- |
| pH | within the limits of 6.0–9.0 | |

Section 301(h) of the CWA provides for a waiver from secondary treatment if the permittee meets several specific criteria, including a requirement to achieve primary treatment. Primary treatment is defined in Section 301(h) of the CWA as 30% removal of $BOD_5$ and TSS from the influent. The 2002 permit requires 30% removal of $BOD_5$ and TSS on a monthly basis and the applicant has requested to maintain these limits.

Unlike secondary treatment standards, which require POTWs to meet monthly average and weekly average concentration limits for $BOD_5$ and TSS, primary treatment does not include concentration-based treatment TBELs for $BOD_5$ and TSS. Instead, concentration-based limits, and by extension mass-based limits, are established case-by-case using state WQS and the level of treatment performance the facility is consistently able to achieve. See Section IV.A.2.a for more information on concentration and mass limits.

EPA has tentatively determined that the City of Skagway WWTP qualifies for a continuation of their waiver from secondary treatment under Section 301(h) of the CWA for $BOD_5$ and TSS. The draft permit maintains the 30% minimum percent removal limits for TSS and $BOD_5$.

*Concentration and Mass-Based Limits*

40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, except under certain conditions. 40 CFR 122.45(b) requires that effluent limits for POTWs be calculated based on the design flow of the facility. The mass based limits are expressed in pounds per day and are calculated as follows:

Mass-based limit (lbs/day) = concentration-based limit (mg/L) × design flow (mgd) × 8.34[2]

As discussed above, concentration limits for 301(h)-modified facilities are established case-by-case using state WQS and data on historical facility performance.

For this draft permit, EPA assessed influent and effluent data (2016-2021) for $BOD_5$ and TSS to establish concentration-based limits reflective of facility performance. If a resulting performance-based limit was less stringent than the limit in the 2002 permit the limit from the 2002 permit was retained in order to satisfy anti-backsliding provisions of the CWA. The resulting concentration-based limits were then used to establish mass-based limits using

[2] 8.34 is a conversion factor with units (lb ×L)/(mg × gallon×$10^6$)

the equation above. The inputs and proposed limits are in Table 10 and Appendix C.

The facility currently has seasonal limits for $BOD_5$ and TSS from May 1 through September 30 (summer) and October 1 through April 30 (winter). The Skagway WWTP requested that the summer seasonal limits be expanded to include April and October because of cruise ship tourism during that time period. CWA Section 301(h)(8) does not allow for a "new or substantially increased discharge from the point source of the pollutant into which the modification applies above that volume of discharge specified in the permit." Expanding summer seasonal limits to include April and October would increase the concentration and mass load that the facility would be allowed to discharge. Therefore, the proposed permit maintains the summer seasonal time period of May 1 through September 30.

Please note that the final proposed limits are in parenthesis after the calculated limits. These are the final limit values after accounting for significant figures and rounding.

**$BOD_5$: Average Monthly Limits (AML)**

*May 1 – September 30*

*$BOD_5$ AML (concentration)*: EPA used the 95$^{th}$ percentile of influent data from May 1 through September 30 from 2016 to 2021 and an assumed 30% removal to calculate an average monthly limit of 354 mg/L. This is less stringent than the current average monthly limit of 140 mg/L, which the Permittee has generally achieved. EPA has retained the existing average monthly limit of 140 mg/L in the draft permit from May 1 through September 30. The Permittee has demonstrated it can generally achieve this level of $BOD_5$ removal on a monthly averaging basis between May 1 and September 30. Retaining the current limits will ensure the protection of Alaska's WQS for DO while additional ambient DO data are collected during the next permit term.

*$BOD_5$ AML (Mass-Based)*:140 mg/L × 0.63 mgd× 8.34 = 736 lbs/day = **(740)**

*October 1 – April 30*

*$BOD_5$ AML (concentration)*: EPA used the 95$^{th}$ percentile of influent data from October 1 through April 30 from 2016 to 2021 and an assumed 30% removal to calculate an average monthly limit of 263 mg/L. This is less stringent than the current average monthly limit of 80 mg/L. EPA has retained the existing average monthly limit of 80 mg/L in this permit from October 1 through April 30. The Permittee has demonstrated it can generally achieve this level of $BOD_5$ removal on a monthly averaging basis between October 1 and April 30. Retaining the current limits will ensure the protection of Alaska's WQS for DO while additional ambient DO data are collected during the next permit term.

*$BOD_5$ AML (Mass-Based)*: 80 mg/L × 0.63 mgd× 8.34 = 420 lbs/day

**$BOD_5$ Average Weekly Limits (AWL)**

*May 1 – September 30*

*$BOD_5$ Average Weekly Limit (AWL) (concentration)*: EPA used the multiplier from Table 5-3 of the Amended Technical Support Document for Water Quality-based Toxics Control (EPA, 1991) and the existing average monthly limit of 140 mg/L to calculate an average weekly limit of 227 mg/L. This is less stringent than the current maximum daily limit of 200 mg/L, which the Permittee has demonstrated it can generally achieve. EPA is retaining 200 mg/L as the average weekly $BOD_5$ limit between May 1 and September 30. The Permittee has demonstrated it can generally achieve this level of $BOD_5$ removal on a weekly averaging basis. An AWL of 200 mg/L will ensure the protection of Alaska's WQS for DO while additional ambient DO data are collected during the next permit term.

*$BOD_5$ AWL (Mass-Based):* 200 mg/L × 0.63 mgd × 8.34 = 1051 lbs/day = **(1050)**

*October 1 – April 30*

*$BOD_5$ AWL (concentration)*: EPA used the multiplier from Table 5-3 of the Amended Technical Support Document for Water Quality-based Toxics Control and the existing average monthly limit of 80 mg/L to calculate a average weekly limit of 147 mg/L. This is less stringent than the current maximum daily limit of 100 mg/L, which the Permittee has demonstrated it can generally achieve. EPA is retaining 100 mg/L as the average weekly $BOD_5$ limit between October 1 and April 30. The Permittee has demonstrated it can generally achieve this level of $BOD_5$ removal on a weekly averaging basis. An AWL of 100 mg/L will ensure the protection of Alaska's WQS for DO while additional ambient DO data are collected during the next permit term.

*$BOD_5$ MDL (Mass-Based):* 100 mg/L × 0.63 mgd × 8.34 = 525 lbs/day = **(530)**

**Table 10. $BOD_5$ Inputs and Effluent Limits**

| | May 1 – September 30 | October 1 – April 30 |
|---|---|---|
| 95th Percentile of Influent Data (mg/L) | 506 | 376 |
| Final Effluent After 30% Removal (mg/L) | 354 | 263 |
| CV of Effluent Data | 0.40 | 0.66 |
| Samples per month | 2 | 2 |
| TSD Multiplier (99th/95th) | 1.62 | 1.84 |
| Average Monthly Limit (mg/L) | 140 | 80 |

| | | |
|---|---|---|
| Average Weekly Limit (mg/L) | 200 | 100 |
| Average Monthly Limit (lbs/day) | 740 | 420 |
| Average Weekly Limit (lbs/day) | 1050 | 530 |

**TSS Average Monthly Limit (AML)**

DMR data indicates that the discharge is achieving far greater TSS removal than the federal primary treatment standard of 30%. Average percent removal between 2016 and 2021 was 72%. EPA established TSS concentration limits reflective of the historical performance of the facility.

*May 1 – September 30*

*TSS AML (concentration):* Using effluent data from May 1 through September 30 from 2016 to 2021, EPA conducted a statistical analysis to calculate an average monthly TSS limit based on facility performance. The performance-based AML was 67 mg/L. This is more stringent than the current average monthly limit of 140 mg/L. EPA is proposing the calculated average monthly limit of 67 mg/L in this permit from April 1 through September 30. The Permittee has demonstrated it can consistently achieve this level of TSS removal on a monthly averaging basis.

*TSS AML (Mass-Based)*:

67 mg/L × 0.63 mgd× 8.34 = 352 lbs/day **(350 lbs/day)**

*October 1 – April 30*

*TSS AML (concentration):* Using effluent data from October 1 through April 30 from 2016 to 2021, EPA conducted a statistical analysis to calculate an average monthly TSS limit based on facility performance. The performance-based AML was 29 mg/L. This is more stringent than the current average monthly limit of 70 mg/L. EPA is proposing the calculated average monthly limit of 30 mg/L in this permit from October 1 through April 30, the secondary treatment requirement. The Permittee has demonstrated it can consistently achieve this level of TSS removal on a monthly averaging basis.

*TSS AML (Mass-Based)*:

30 mg/L × 0.63 mgd× 8.34 = 158 lbs/day

**TSS Average Weekly Limits (AWL)**

*May 1 – September 30*

*TSS AWL (concentration):* Using effluent data from May 1 through September 30 from 2016 to 2021, EPA conducted a statistical analysis to calculate an AWL for TSS based on facility performance. The performance-based AWL was 129 mg/L. This is less stringent than the current maximum daily limit of 200 mg/L, which the Permittee has demonstrated it can consistently achieve. EPA is proposing 129 mg/L as the average weekly limit in this permit from

May 1 through September 30. The facility has demonstrated it can consistently achieve this level of TSS removal on an average weekly basis.

*TSS AWL (Mass-Based)*:

129 mg/L × 0.63 mgd × 8.34 = 678 lbs/day

*October 1 – April 30*

*TSS AWL (concentration):* Using effluent data from October 1 through April 30 from 2016 to 2021, EPA conducted a statistical analysis to calculate an MDL for TSS based on facility performance. The performance-based MDL was 43 mg/L. This is less stringent than the current maximum daily limit of 88 mg/L. EPA is proposing 45 mg/L as the average weekly limit in this permit from October 1 through March 31, the secondary treatment requirement. The facility has demonstrated it can consistently achieve this level of TSS removal on an average weekly basis.

*TSS AWL (Mass-Based)*:

45 mg/L × 0.63 mgd × 8.34 = 236 lbs/day

**pH**

The TBEL for pH at 40 CFR 133.102 is between 6.0 and 9.0 standard units (s.u.). The facility has requested a 301(h) waiver for pH to be between 6.0 and 9.0, the secondary treatment TBELs for pH. Therefore, the facility's waiver request for pH does not apply, because the requested pH limits are identical to the secondary treatment TBELs.

**Antibacksliding**

CWA section 402(o) and 40 CFR 122.44 (l) generally prohibit the renewal, reissuance, or modification of an existing NPDES permit that contains effluent limits, permit conditions or standards that are less stringent than those established in the previous permit (i.e., anti-backsliding) but also provides limited exceptions to antibacksliding. For explanation of the antibacksliding exceptions refer to Chapter 7 of the Permit Writers Manual *Final Effluent Limitations and Anti-backsliding*.

EPA is proposing to remove the maximum daily $BOD_5$ and TSS limits and, instead, establish average monthly limits and average weekly limits pursuant to 40 CFR 122.45(d)(2).

40 CFR 122.45(d)(2) requires that effluent limitations for continuous discharges from POTWs be expressed as average weekly and average monthly discharge limitations, unless impracticable. 40 CFR 122.44(l)(1) states that a permit can be made less stringent if "the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification…under §122.62." Here, EPA is removing the maximum daily limits for $BOD_5$ and TSS. Since EPA is including both average monthly and average weekly limits, daily maximum limits are no longer necessary and the permit is as stringent as

it was previously. However, even assuming that removal of the maximum daily limits results in less stringent effluent limits, EPA can remove the limits.

### 3. Water Quality-Based Effluent Limits (WQBELs)

*Statutory and Regulatory Basis*

Section 301(b)(1)(C) of the CWA requires the development of limits in permits necessary to meet all applicable WQS. Discharges to state or tribal waters must also comply with conditions imposed by the state or tribe as part of the CWA 401 certification of the permit. See 33 U.S.C. 1341. 40 CFR 122.44(d)(1), which implements Section 301(b)(1)(C) of the CWA, requires that permits include limits for all pollutants or parameters that are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state or tribal WQS, including narrative criteria for water quality. Effluent limits must also meet the applicable water quality requirements of affected States other than the State in which the discharge originates, which may include downstream States. 40 CFR 122.4(d) and 122.44(d)(4), see also 33 U.S.C. 1341(a)(2). These requirements are applicable to all NPDES permits.

For 301(h)-modified dischargers, WQBELs must consider the following separate regulatory provisions which overlap to some extent with the provisions discussed above.

Section 301(h)(9) of the CWA, and its implementing regulations at 40 CFR 125.62(a), require 301(h)-modified discharges to meet all applicable state WQS as well as water quality criteria established under Section 304(a)(1) of the CWA after initial mixing in the waters surrounding or adjacent to the discharge point. See 33 U.S.C. 1311(h)(9).

Section 301(h)(1) of the CWA, and its implementing regulations at 40 CFR 125.61, require that there must be a water quality standard applicable to each pollutant for which the 301(h) modification is requested (i.e., $BOD_5$ and TSS, or surrogates) and the applicant must demonstrate the proposed discharge will comply with these standards after initial mixing. 33 U.S.C. 1311(h)(1).

In addition, effluent limits must be stringent enough to ensure that WQS are met and must be consistent with any available WLA for the discharge in an approved TMDL. 40 CFR 122.44. There are no approved TMDLs that specify WLAs for this discharge; therefore, the WQBELs are calculated directly from the applicable WQS.

Alaska's WQS can be found at 18 AAC 70 (ADEC 2020) and the Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008). As discussed in Section III.A of this Fact Sheet, Alaska's WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an antidegradation policy. The use classification system identifies the designated uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the designated use

classification of each waterbody and are the values used in EPA's reasonable potential analysis.

*Reasonable Potential Analysis and Need for WQBELs*
EPA used the Alaska WQS and the processes described in the Amended Section 301(h) Technical Support Document (301(h) TSD) and the Technical Support Document for Water Quality-based Toxics Control to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an excursion above any state WQS for a given pollutant, EPA compares the maximum projected receiving water concentration to the WQS for that pollutant. If the projected receiving water concentration exceeds the WQS, there is reasonable potential, and a WQBEL must be included in the permit. 40 CFR 125.62(a)(1)(iv) requires this evaluation be based upon conditions reflecting periods of maximum stratification and during other periods when discharge characteristics, water quality, biological seasons, or oceanographic conditions indicate more critical situations may exist. Such periods are commonly referred to as critical conditions.

In some cases, a dilution allowance or mixing zone is permitted within a receiving water. A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and within which certain WQS may be exceeded (EPA 2014). Under the 301(h) program this mixing area is referred to as the zone of initial dilution, or ZID, and is defined at 40 CFR 125.58(dd) as, "the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports, provided that the ZID may not be larger than allowed by mixing zone restrictions in applicable water quality standards." While the acute and chronic criteria may be exceeded within the ZID, the use and size of the ZID must be limited such that the waterbody as a whole will not be impaired, all designated uses are maintained and acutely toxic conditions are prevented.

As discussed above, Section 301(h)(9) of the CWA and 40 CFR 125.62(a) require 301(h)-modified discharges to meet the water quality criteria established under Section 304(a)(1) of the CWA after initial mixing at the edge of the ZID, unless states have adopted more stringent criterion in which case those must be met. Consistent with the recommendations in the 301(h) TSD for setting spatial boundaries for the ZID, EPA has established the spatial dimensions of the ZID to include the entire water column within 18 m (60 ft) of any point of the 7.6 m (25 ft) diffuser with an initial dilution of 56:1.

The ZID for the applicant's outfall was calculated using a discharge depth of 18m (60 ft) below MLLW and a mean tide level of 2.7 m (8.7 ft). Using the diffuser length of 7.6m (25 ft) and an average diameter of approximately 1 foot, the ZID was calculated to be a rectangle of 49m (162 ft) long

(perpendicular to shore) and 42m (138 ft) wide centered around the diffuser, with an initial dilution of 56:1 achieved at the boundary of the ZID

The ZID dimension calculations are as follows:

Width (units in feet) = 1.0 + 2 x (60 + 8.7) = 138 ft
Length (units in feet) = 25 + 2 x (60 + 8.7) = 162 ft

18 AAC 70.240 provides Alaska's mixing zone policy for point source discharges. ADEC proposes to authorize mixing zones and their associated dilution factors in its draft 401 certification (Appendix I), summarized in Table 11. All dilution factors are calculated using the design flow of 0.63 mgd to evaluate the worst case scenario for reasonable potential.

**Table 11. Mixing Zones**

| Criteria Type | Dilution Factor |
|---|---|
| Mixing Zone (acute exposure) | 16* |
| Mixing Zone (chronic exposure) | 28* |
| *ADEC's draft CWA Section 401 Certification. ADEC's draft certification defines the chronic mixing zone as a rectangular area with a length of 6.1 meters and width of 7.4 meters centered over the diffuser. The acute mixing zone is defined as a rectangular area with a length of 4.5 meters and width of 6.4 meters centered over the diffuser with the length oriented perpendicular to the diffuser.er with the length oriented perpendicular to the diffuser. | |

The reasonable potential analysis and WQBEL calculations were based on the dilution factors shown in Table 11. If ADEC revises the allowable mixing zone in its final 401 certification of this permit, the reasonable potential analysis and WQBEL calculations will be revised accordingly.

As discussed in Part IV.A.1, the pollutants of concern in the discharge are ammonia, bis (2-ethylhexyl phthalate), chlorine, chloroform, DO, enterococcus, fecal coliform, lead, pH, phenol, PFAS, temperature, toluene, TSS, turbidity, and zinc. The reasonable potential analysis for each parameter is summarized below, and the equations used to conduct the reasonable potential analysis and calculate the WQBELs are provided in Appendix D and Appendix E. The relevant water quality standards used to evaluate reasonable potential are shown in Table 12, below. Since Taiya Inlet is designated for all uses, the listed use is the one with the most protective criteria.

**Table 12. Applicable Water Quality Standards**

| Pollutant | Designated Use | Criteria | Basis |
|---|---|---|---|
| Ammonia | Aquatic life | Temperature, pH and salinity dependent<br>Taiya Inlet: Acute: 18,900 µg/L Chronic 2800 µg/L | Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008) |
| Bis (2-ethylhexyl phthalate) | Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife | 59 µg/L (human health; organisms only) | Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008) |
| Chlorine, Total Residual | Aquatic life | Acute: 13 µg/L;<br>Chronic: 7.5 µg/L | Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008) |
| Chloroform | Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife | 4,700 µg/L<br>(human health; organisms only) | National Toxics Rule, 40 CFR 131.36 |
| Copper, Dissolved | Aquatic life | Acute: 4.8 µg/L;<br>Chronic: 3.1 µg/L | Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008) |
| Deleterious organic and inorganic substances | Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife | Narrative Criteria | 18 AAC 70.020(23)(C) |
| DO | Aquaculture | ≥5 mg/L, ≤17 mg/L | 18 AAC 70.020(b)(15)(A)(i) |
| Enterococcus | Primary contact recreation | Acute: 35 CFU/100mL;<br>Chronic: 130 CFU/100mL | 18 AAC 70.020(b)(14)(b)(i) |
| Fecal coliform | Harvesting for consumption of raw mollusks or other raw aquatic life | Acute: 14 CFU/100mL;<br>Chronic: 43 CRU/100mL | 18 AAC 70.020(b)(14)(D) |
| Lead, Dissolved | Aquatic life | Acute: 210 µg/L;<br>Chronic: 8.1 µg/L | Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008) |

| Pollutant | Designated Use | Criteria | Basis |
|---|---|---|---|
| pH | Aquaculture | 6.5—8.5 s.u. | 18 AAC 70.020(b)(18)(A)(i) |
| Phenol | Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife | 4,600,000 µg/L (human health; organisms only) | Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008) |
| Residues | Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife | Narrative Criteria | 18 AAC 70.020 |
| Sediment | Contact recreation | No measurable increase in concentration of settleable solids above natural conditions, as measured by the volumetric Imhoff cone method. | 18 AAC 70.020(21)(B)(i) |
| Temperature | Seafood Processing, Aquaculture | May not exceed 15ºC and may not cause the weekly average temperature to increase more than 1ºC. The maximum rate of change may not exceed 0.5ºC per hour. Normal daily temperature cycles may not be altered in amplitude or frequency. | 18 AAC 70.020(22)(A)(i)) |
| Toluene | Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife | 200,000 µg/L (human health; organisms only) | Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008) |
| Turbidity | Aquaculture Aquatic Life | 25 NTU (aquaculture) May not reduce the depth of the compensation point for photosynthetic activity by more than 10%. May not reduce the maximum secchi disk depth by more than 10%. (aquatic life) | 18 AAC 70.020(b)(24)(A)(i) 18 AAC 70.020(b)(24)(C) |
| Whole Effluent Toxicity | Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife | 1.0 TUC | 18 AAC 70.030 |

| Pollutant | Designated Use | Criteria | Basis |
|---|---|---|---|
| Zinc, Dissolved | Aquatic life | Acute: 90 µg/L;<br>Chronic: 81 µg/L | Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008) |
| | Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife | 69,000 µg/L<br>(human health; organisms only) | |

*Reasonable Potential and WQBELs*

The reasonable potential and WQBEL for specific parameters are summarized below. The calculations are provided in Appendix E and Appendix F.

**Ammonia**

Marine ammonia criteria are based on a formula, which relies on the pH, temperature, and salinity of the receiving water, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature and decreases with salinity. Therefore, the criteria become more stringent as pH and temperature increase and less stringent as salinity increases. Appendices F and G of the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* include tables to determine acute and chronic criteria based upon these parameters.

EPA used temperature, salinity, and pH values from the receiving water from Table 2-5 of the facility's permit application ("2002-2005 Taiya Inlet Data"). To determine ammonia criteria, EPA used data in the immediate vicinity of the discharge (Station 1) from summer in 2004 and 2005. EPA used summer data, because this is the critical time period when temperatures are higher, and thus, ammonia is more toxic. EPA calculated the 95$^{th}$ percentile values of pH, temperature, and salinity at mid-level depths, nearest to where the trapping depth occurs (GLEC, 2021). The facility collected data at a middle depth of 9.14 meters, and the trapping depth occurs at 9 to 16 meters. EPA then applied pH, temperature and salinity values in Appendices F and G of the *Alaska Water Quality Criteria Manual for Toxics* (ADEC, 2008) closest to the calculated 95$^{th}$ percentile mid-depth values to determine acute and chronic ammonia criteria. Table 13 shows the input values and the ammonia criteria from the tables used to evaluate reasonable potential.

**Table 13. Ammonia Inputs and Criteria**

| Temperature (°C) | Salinity (g/kg) | pH (s.u.) | Criteria (mg/L) |
|---|---|---|---|
| 10 | 30 | 7.8 | 18.9 (acute)<br>2.8 (chronic) |

No ammonia effluent data werecollected during the last permit cycle. Therefore, the only data available to EPA was when the permit was last issued in 2002, over 20 years ago. While this 20-year old data indicates that the discharge might have reasonable potential to cause or contribute to an excursion of the ammonia water quality standard, EPA believes that the limited data set does not reflect the current discharge. Therefore, the draft permit does not include a numeric effluent limit for ammonia. Instead, the draft permit requires that the permittee monitor ammonia in effluent once per quarter and the receiving water for pH, temperature, and salinity to calculate applicable ammonia criteria and reasonable potential in the next permit cycle.

See Appendix E for reasonable potential and effluent limit calculations for ammonia.

**pH**

The Alaska WQS for the protection of aquatic life require that ambient pH may not be less than 6.5 to 8.5 standard units (s.u.) and may not vary more than 0.2 pH units outside of the naturally occurring range. Mixing zones are generally not granted for pH. Therefore, the most stringent water quality criterion must be met before the effluent is discharged to the receiving water.

EPA evaluated the Skagway WWTP effluent pH data from 2016 to 2021. The pH ranged from 6.5 to 7.6 s.u, with an average value of 7.0 s.u. A reasonable potential calculation shows that the Skagway WWTP discharge would not have reasonable potential to cause or contribute to an excursion of the water quality standard for pH at the edge of the ZID. See Appendix F for the reasonable potential calculation. The draft permit proposes pH limits of 6.5 to 8.5 s.u.

**Dissolved Oxygen (DO) and $BOD_5$**

Natural decomposition of organic material in wastewater effluent impacts DO in the receiving water at distances far outside of the regulated mixing zone. The $BOD_5$ of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water.

Alaska does not have WQS for $BOD_5$ and instead uses DO. The standard applicable to marine waters provides that, for estuarine water, the concentration of DO shall not be less than 5.0 mg/L except where natural conditions cause this value to be depressed, and in no case can DO exceed 17.0 mg/L.

Monitoring conducted by the permittee in Taiya Inlet from 2002-2005 demonstrates compliance with WQS.

Table 14 below shows DO values averaged by depth in Taiya Inlet. EPA evaluated the mid-depth values, since these correspond to DO at the trapping level depth of the discharge. DO concentrations in Taiya Inlet were higher than the 5.0 mg/L in three of four sampling events at all stations. In July 2004, DO values at the center of the ZID were below 5.0 mg/L, but reference DO

values were also below 5.0 mg/L, which indicates that DO levels were naturally below DO water quality criteria.

Table 14. Average DO levels by depth (Taiya Inlet 2002-2005 Data)

| Sampling Date | 10/28/2002 | 7/19/2004 | 8/23/2004 | 6/29/2005 | Depth |
|---|---|---|---|---|---|
| | Dissolved Oxygen mg/l | | | | |
| Station 1 (center of ZID) | 11 | 2.1 | 9.2 | 10 | surface |
| | **9.3** | **1.4** | **8.9** | **7.0** | mid |
| | 9.0 | 1.2 | 9.8 | 13 | bottom |
| Station 2 (eastern ZID boundary) | 10 | 6.4 | 12 | 12 | surface |
| | **8.1** | **3.6** | **10** | **11** | mid |
| | 7.7 | 3.1 | 10 | 11 | bottom |
| Station 3 (200m east of ZID boundary) | no data | 2.3 | 12 | 13 | surface |
| | **no data** | **1.6** | **11** | **12** | mid |
| | no data | 1.2 | 10 | 12 | bottom |
| Station 4 (western ZID boundary) | 12 | 3.4 | 9.4 | 13 | surface |
| | **9.5** | **2.3** | **9.0** | **12** | mid |
| | 9.3 | 1.7 | 9.2 | 12 | bottom |
| Site 5 (200 m west of ZID boundary) | 12 | 3.3 | 11 | 13 | surface |
| | **9.7** | **2.5** | **10** | **12** | mid |
| | 9.4 | 2.4 | 10 | 12 | bottom |

EPA also evaluated the near-field DO impacts, using 2002-2005 Taiya Inlet Data (Appendix B) and DMR data from 2016-2021. In accordance with the procedures outlined in the 301(h) TSD Sections B-11 and B-20, EPA conducted a near-field and far-field analysis to estimate the impacts on DO levels in the vicinity of the discharge. EPA used the equation at Figure 1 and the values at

Table 15 to calculate near-field impacts from the discharge at the boundary of the ZID for the periods of time that data were collected in Taiya Inlet.

**Figure 1. Near-Field Analysis Equation (301(h) TSD, Equation B-5)**

$$DO_f = DO_a + \frac{DO_e - IDOD - DO_a}{S_a} \qquad \text{B-5}$$

where:

$DO_f$ = Final dissolved oxygen concentration of receiving water at the plume trapping level, mg/L

$DO_a$ = Affected ambient dissolved oxygen concentration immediately upcurrent of the diffuser averaged over the tidal period (12.5 hours) and from the diffuser port depth to the trapping level, mg/L

$DO_e$ = Dissolved oxygen of effluent, mg/L

IDOD = Immediate dissolved oxygen demand, mg/L

$S_a$ = Initial dilution (flux-averaged).

Table 15. Near-Field DO inputs and DO depletion results

| | 10/28/2002 | 7/19/2004 | 8/23/2004 | 6/29/2005 | Comments |
|---|---|---|---|---|---|
| $DO_a$ (mg/L) | 9.3 | 1.4* | 8.9 | 7.0 | Station 1 in Taiya Inlet, 7/19/04, closest to the outfall, trapping mid-depth |
| $DO_e$ (mg/L) | 3.7 | 4.4 | 4.4 | 4.4 | Winter season – 10/1 through 3/31- minimum effluent DO for 10/28/02; Summer season – 4/1 through 9/30 - minimum effluent DO for 7/19/04, 8/23/04, and 6/29/05 |
| IDOD (mg/L) | 5 | 5 | 5 | 5 | Table B-3 in TSD, using travel time 0-100 minutes, and effluent of 200 mg/L |
| $S_a$ | 56 | 56 | 56 | 56 | ZID dilution |
| $DO_f$ (mg/L) | 9.1 | 1.4 | 8.7 | 6.9 | Calculated |
| Depleted DO ($DO_a$ - $DO_f$) | 0.19 | 0.036 | 0.17 | 0.14 | Calculated |
| *This ambient DO result is considered an anomalous outlier and is not being used in the RPA. Additional ambient DO monitoring is proposed in the draft permit. | | | | | |

The near-field DO depletion ranges from 0.036 mg/L to 0.19 mg/L. For three of the four instances, the Alaska WQS of no less than 5 mg/L and no greater than 17 mg/L are not violated. In one instance on 7/19/2004, the ambient DO is 1.4 mg/L, and therefore the DO criteria would be violated. However, as explained earlier, EPA believes the low ambient DO to be naturally occurring due to similarly low DO values in the reference areas. Therefore, this instance does not constitute a violation of Alaska WQS.

The permittee evaluated far-field effects of the effluent $BOD_5$ using the simplified oxygen depletion model from the TSD. The evaluation is provided in permit application section 3.B.2. The evaluation shows that the DO concentration at the edge of the ZID remains above the water quality criteria, when using an ambient DO concentration of 6.2 mg/L, which was the lowest DO observed at the time of the application.

EPA also evaluated the far-field effect of the effluent $BOD_5$. Using a simplified method from the 301(h) TSD, EPA calculated the $BOD_5$ at the edge of the ZID by multiplying the daily maximum limits for $BOD_5$ by 1.46 to calculate the ultimate carbonaceous BOD (CBOD) and dividing ultimate CBOD by the ZID dilution factor of 56.[3]

[3] EPA assumes that all $BOD_5$ is CBOD. This is a conservative assumption since BOD includes oxygen-demanding materials from CBOD and nitrogenous BOD.

Using the $BOD_5$ maximum daily limit of 200 mg/L from April 1 through September 30, the ultimate CBOD is 292 mg/L. The $BOD_5$ at the edge of the ZID is 5.2 mg/L in the summer. Similarly, using the $BOD_5$ maximum daily limit of 100 mg/L from October 1 through March 31, the ultimate CBOD is 146 mg/L. The $BOD_5$ at the edge of the ZID is 2.6 mg/L in the winter.

Natural background levels of $BOD_5$ typically range from 2-3 mg/L (Communication Cope to Wu 2022). Therefore, $BOD_5$ levels at the edge of the ZID of 2.6 mg/L and 5.2 mg/L would be expected to have a negligible far-field effect on DO.

The draft permit retains a minimum effluent limit for DO of 2.0 mg/L and a maximum effluent limit of 17 mg/L. The draft permit proposes a higher frequency of DO monitoring in the summer in Taiya Inlet to better characterize summer DO levels (See Table 3 of the draft permit)

Based on the above analyses and that presented in the 301(h) TDD, the discharge will not cause or contribute to a violation of Alaska WQS for DO. The bases for this conclusion is summarized below:

- DO concentrations at the center of the ZID in Taiya Inlet in June, August and September are within the Alaska DO WQS of not less than 5.0 mg/L and no greater than 17 mg/L.
- DO concentrations in Taiya Inlet at the center of the ZID in July are less than 5.0 mg/L. However, DO concentrations in the reference areas are also less than 5.0 mg/L. EPA has concluded that low DO in Taiya Inlet are a result of naturally low DO. However, the proposed permit requires monitoring in Taiya Inlet, twice every five years in the summer to better assess DO levels in Taiya Inlet.
- Average minimum and maximum DO effluent concentrations are 8.2 mg/L and 11 mg/L, respectively. These are within the Alaska DO WQS of not less than 5.0 mg/L and no greater than 17 mg/L.
- Per the 301(h) TSD, the near-field DO depletion in Taiya Inlet from the discharge is less than or equal, when rounded, to 0.2 mg/L, ranging from 0.036 mg/L to 0.19 mg/L. The far-field impact is expected to be negligible, since estimated $BOD_5$ concentrations at the edge of the ZID are near natural levels.

**Total Suspended Solids and Turbidity**

Alaska does not have WQS for TSS but uses turbidity as a surrogate. Alaska WQS applicable to the estuarine waters of Taiya Inlet provide that turbidity shall not exceed 25 nephelometric turbidity units (NTU) and shall not reduce the depth of the compensation point for photosynthetic activity by more than 10%. In addition, the turbidity shall not reduce the maximum Secchi disc depth by more than 10%.

The permittee collected turbidity data in Taiya Inlet from 2002-2004. The applicant provided turbidity data from surface water quality monitoring

conducted in October 2002, July 2004, and August 2004. They did not collect Secchi disc depth. As explained in the DO analysis above, the facility collected data from 5 sites: the center of the ZID (Site 1), the ZID boundaries (Sites 2 and 4), and reference stations (Sites 3 and 5). At each site, samples were collected at different depths.

EPA evaluated turbidity data collected in Taiya Inlet at the mid-level trapping depth during the two seasons for which the proposed TSS permit limits apply (April through September and October through March). The permit application indicates that Taiya Inlet has elevated levels of sediment in the summer months due to freshwater and sediment inputs from the Skagway River, and that studies in the Skagway River indicate high sediment levels. The 2002-2005 Taiya Inlet Data report reflects the seasonal difference in turbidity levels in Taiya Inlet.

From May through September, the 95$^{th}$ percentile turbidity at Site 1 in Taiya Inlet, closest to the discharge point, is 25 NTU, which meets Alaska's water quality criteria for turbidity of 25 NTU or less. Turbidity levels at the ZID boundary and reference sites are 20 NTU and 21 NTU, respectively. Therefore, the facility's TSS discharge is not expected to violate Alaska's water quality criteria for turbidity from May through September.

From October through April, the 95$^{th}$ percentile effluent is 11 NTU, which is significantly lower than Alaska's water quality criteria for turbidity. Turbidity levels at the ZID boundary and reference sites are 11 NTU and 2 NTU, respectively. Therefore, the facility's TSS discharge is not expected to violate Alaska's water quality criteria for turbidity from October through April.

Table 16 shows turbidity at the mid-level trapping depth in different locations in Taiya Inlet. Based on the above analyses and that presented in the Skagway WWTP 301(h) TDD, the discharge will not cause or contribute to a violation of Alaska WQS for turbidity.

**Table 16. Turbidity levels (NTU) in Taiya Inlet**

| | **(May – September)** $5^{th}$ **– 95**$^{th}$ **percentile** | **(October – April)** $5^{th}$ **– 95**$^{th}$ **percentile** |
|---|---|---|
| **Turbidity (Site 1, center of the ZID), NTU** | 0.16 – 25 (11 average) | 9.1 – 11 (10.3 average) |
| **Turbidity (Sites 2 and 4, ZID boundaries), NTU** | 0.2 – 20 (11 average) | 10.0 – 13 (7.8 average) |
| **Turbidity (Sites 3 and 5, reference stations), NTU** | 0.1 – 21 (11 average) | 1.8 – 2.5 (2.2 average) |
| Source: 2002-2005 Taiya Inlet Data, Permit Application | | |

**Residues**

The Alaska WQS require that surface waters of the State be free from floating, suspended or submerged matter of any kind in concentrations impairing designated beneficial uses. The draft permit contains a narrative limit prohibiting the discharge of such materials.

**Temperature**

Alaska's most stringent WQS for water temperature provides that temperatures may not exceed 15°C for marine uses and that the discharge may not cause the weekly average temperature to increase more than 1°C. The maimum rate of change may not exceed 0.5°C per hour. Normal daily temperature cycles may not be altered in amplitude or frequency. EPA evaluated the 2002-2005 Taiya Inlet Data and DMR data (2016-2021) to assess whether the modifided discharge will comply with Alaska WQS for temperature.

The maximum temperature recorded at the trapping depth of the discharge from the 2002-2005 Taiya Inlet Data was 10.6°C, and the maximum recorded effluent temperature between 2016 and 2021 was 18.8°C. EPA conducted a mass balance analysis using these values and calculated a final receiving water temperature of 10.8°C after initial dilution.

$$\text{Cd} = (Ce + Cu\ (Sa - 1))/Sa \ where$$

Cd = Resultant temperature at edge of mixing zone, °C

Ce = Maximum projected effluent temperature, (18.8 °C)

Cu = Background receiving water temperature, °C (10.7 °C)

Sa = dilution factor (56)

Cd = 10.8 °C

Based upon the above analysis, the proposed discharge is expected to comply with Alaska WQS for temperature after initial mixing at the edge of the ZID.

**Fecal Coliform**

Alaska's most restrictive marine criterion for fecal coliform bacteria concentrations are in areas protected for the harvesting and use of raw mollusks and other aquatic life. The criterion specifies that the geometric mean of samples shall not exceed 14 fecal coliform/100 mL, and that not more than 10 percent of the samples shall exceed 43 most probable number (MPN)/100 mL for a five-tube decimal dilution test. Because Taiya Inlet is protected for raw aquatic life consumption, this standard must be met at the edge of the ZID.

40 CFR 122.45(d)(2) requires effluent limits for continuous discharges from POTWs be expressed as average weekly and average monthly limits, unless impracticable. Additionally, the terms "average weekly discharge limitation" and "average monthly discharge limitation" are defined in 40 CFR 122.2 as being arithmetic (as opposed to geometric) averages. It is impracticable to properly implement a 30-day geometric mean criterion in a permit using monthly and weekly arithmetic average limits. The geometric mean of a given data set is equal to the arithmetic mean of that data set if and only if all of the values in that data set are equal. Otherwise, the geometric mean is always less than the arithmetic mean. In order to ensure that the effluent limits are "derived from and comply with" the geometric mean water quality criterion, as required by 40 CFR 122.44(d)(1)(vii)(A), it is necessary to express the effluent limits as a monthly geometric mean and an instantaneous maximum limit.

EPA derived WQBELs for fecal coliform by multiplying the dilution factor of 56:1 achieved at the edge of the ZID. The WQBEL calculations are shown below:

Monthly geometric mean limit = 14 CFU/100 mL x 56 = 784 CFU/100 mL

Instantaneous maximum limit = 43 CFU/100 mL x 56 = 2408 CFU/100 mL

These WQBELs will be protective of Alaska WQS for fecal coliform at the ZID boundary.

ADEC has included final fecal coliform limitations in the table below as a condition of their draft 401 certification of the reissued permit (Appendix I). Since these limits are more stringent than the WQBELs developed above, EPA has included these limits in the draft permit. If ADEC includes these limits in the final 401 certification, then EPA must include them in the permit pursuant to CWA section 401(d). If ADEC does not include these limits in the final 401 certification of this permit, the fecal coliform effluent limits will be based on the WQBELs that EPA has calculated. EPA is accepting comment on the calculated WQBELs that will be imposed if ADEC does not include the fecal coliform limits as indicated in its draft 401 certification. Comments

concerning the limits set forth in the draft 401 certification should be directed to ADEC.

These limits would become effective at the end of the compliance schedule.

Table 17. ADEC Proposed Final Fecal Coliform Limits

| Average Monthly (FC/100 mL) | Average Weekly (FC/100 mL) | Maximum Daily (FC/100 mL) |
|---|---|---|
| 200[1] | 400[1] | 800 |
| 1. 18 AAC 72.990(21) | | |

The 2002 permit contains effluent limits for fecal coliform of a monthly average limit of 1,000,000 FC/100mL and a maximum daily limit of 1,500,00 FC/100mL. The draft permit proposes more stringent limits shown in Table 17.

The Skagway WWTP does not currently have the technology necessary to meet the WQBEL for fecal coliform in the draft permit. ADEC has included a five-year schedule of compliance for Skagway in its 401 Certification to meet the final fecal coliform limits in the draft permit. EPA has included the terms of the compliance schedule in the draft permit.

The draft permit includes interim performance-based limits that apply until the end of the compliance schedule. The interim limits were derived by taking the 95$^{th}$ percentile and 99$^{th}$ percentile of fecal coliform data. The proposed interim fecal coliform limit is an average monthly limit of 445,000 cfu/100 mL and a maximum daily limit of 808,000 cfu/100 mL. (See Appendix B for water quality data.)

Section V.C., *Compliance Schedules*, of this Fact Sheet describes the compliance schedule for fecal coliform. The WQBELs developed for fecal coliform will be protective of Alaska WQS after initial mixing at the edge of the ZID and will satisfy the requirements of Section 301(h)(9) of the CWA and 40 CFR 125.63(a).

**Enterococcus**

Enterococci bacteria are indicator organisms of harmful pathogens recommended by EPA to protect primary contact recreation for marine waters. The amendment to the Clean Water Act, the Beaches Environmental Assessment and Coastal Health Act (BEACH Act) required EPA to develop new or revised CWA criteria for pathogens and pathogen indicators. States and territories with coastal recreation waters were then required to adopt enterococci bacteria criteria into their WQS. EPA approved Alaska's WQS for enterococcus in 2017. The WQS at 18 AAC 70.020(b)(14)(B)(i) for contact recreation specifies that the enterococci bacteria concentration shall not exceed 35 enterococci CFU/100mL, and not more than an 10% of the samples may exceed a concentration of 130 enterococci CFU/100mL.

The 2002 permit does not contain effluent limits for enterococcus bacteria because there was no applicable enterococcus standard in effect when the permit was issued in August 2002.

40 CFR 122.44(d)(1) requires EPA to account for existing controls on discharges when determining whether a discharge has the reasonable potential to cause or contribute to an excursion of state WQS. The WWTP currently provides only minor disinfection of its effluent during certain times of the year. The facility, therefore, still discharges high bacterial loads as observed in the available fecal coliform data. The 2002 permit did not require enterococcus monitoring, but it is reasonable to assume that the high fecal coliform loads observed are also indicative of high loads of other pathogens commonly found in WWTP effluents, including enterococcus. With the available fecal coliform data and lack of disinfection capacity at the facility, EPA has determined there is reasonable potential for the discharge to cause or contribute to a violation of Alaska WQS for enterococcus. EPA calculated WQBELs using the same procedure used for fecal coliform. The enterococcus limits are expressed in terms of a geometric mean and instantaneous limit for the same reasons as explained above in the fecal coliform section.

Monthly geometric mean limit = 35 CFU/100 mL x 56 = 1960 CFU/100 mL

Instantaneous maximum limit = 130 CFU/100 mL x 56 = 7280 CFU/100 mL

These WQBELs will be protective of Alaska WQS for enterococcus at the boundary of the chronic mixing zone.

ADEC has included enterococcus limitations in the table below as a condition of their draft 401 certification of the reissued permit (Appendix I). Since these limits are more stringent than the WQBELs developed above, EPA has included these limits in the draft permit. If ADEC includes these limits in the final 401 certification, then EPA must include them in the permit pursuant to CWA section 401(d). If ADEC does not include these limits in the final 401 certification of this permit, the enterococcus effluent limits will be based on the WQBELs that EPA has calculated. EPA is accepting comment on the calculated WQBELs that will be imposed if ADEC does not include the fecal coliform limits as indicated in its draft 401 certification. Comments concerning the limits set forth in the draft 401 certification should be directed to ADEC.

These limits would become effective at the end of the compliance schedule.

Table 18. ADEC Proposed Final Enterococcus Limits

| Average Monthly (cfu/100 mL) | Maximum Daily (cfu/100 mL) |
|---|---|
| 980 | 3640 |
| 1. Based on chronic mixing zone dilution factor of 28:1 multiplied by the enterococcus WQS | |

The Skagway WWTP does not currently have the treatment in place necessary to meet the WQBEL for enterococcus in the draft permit. ADEC has included a five-year compliance schedule in its draft 401 Certification to meet the final enterococcus limits in the draft permit (Appendix I).

EPA has included the terms of the compliance schedule in the draft permit. Because this is a new effluent limit, no interim limits are being proposed. However, EPA is requiring weekly monitoring of enterococcus to characterize enterococcus concentrations.

Section V.C. of this Fact Sheet describes the compliance schedule for enterococcus. The WQBELs developed for enterococcus will be protective of Alaska WQS after initial mixing at the edge of the ZID and will satisfy the requirements of CWA section 301(h)(9) and 40 CFR 125.63(a).

**Chlorine**

Chlorine is often used to disinfect municipal wastewater prior to discharge. The Skagway WWTP currently provides minor disinfection of its effluent in the summer, but will need to increase disinfection to achieve the final bacteria limits in the draft permit. To achieve disinfection, Skagway WWTP will likely use either UV or chlorination.

Alaska WQS establish an acute criterion of 13 µg/L, and a chronic criterion of 7.5 µg/L for the protection of aquatic life (ADEC 2008).

Using DMR data (2016-2021) and the Alaska WQS, a reasonable potential calculation showed that the discharge from the facility would have the reasonable potential to cause or contribute to a violation of the acute water quality criterion for chlorine, thus, WQBELs were calculated and included in the draft permit. Based on the dilution factors from ADEC's 401 draft certification for chlorine (16 for acute mixing zone/28 for chronic mixing zone), WQBELs for chlorine are an average monthly limit of 104 µg/L and 0.55 lbs/day, and a maximum daily limit of 208 µg/L and 1.1 lbs/day. These limits are more stringent than the limits in the 2002 permit.

ADEC has included in its draft 401 certification chlorine limits of 71 µg/L as an average monthly limit and 208 µg/L as a maximum daily limit (Appendix I). The corresponding load is 0.37 lbs/day (average monthly limit) and 1.1 lbs/day (maximum daily limit). EPA has included these limits in the draft permit. If ADEC includes these limits in the final 401 certification, then EPA must include them in the permit pursuant to CWA section 401(d). If ADEC does not include these limits in the final 401 certification of this permit, EPA will include chlorine limits of 104 µg/L and 0.55 lbs/day, and a maximum daily limit of 208 µg/L and 1.1 lbs/day. EPA is accepting comment on the EPA-calculated effluent limits. Comments concerning the limits set forth in the draft 401 certification should be directed to ADEC.

The 95$^{th}$ percentile effluent concentration from 2016-2021 for chlorine is 123 µg/L. The average chlorine effluent concentration from 2016-2021 is 31 µg/L. The range of chlorine effluent concentrations from 2016-2021 is a minimum

of 3 µg/L and a maximum of 208 µg/L. Based on these data, Skagway WWTP should be able to meet the proposed permit limits for chlorine.

**Copper**

The applicable WQS for copper are included in Table 12. Using DMR data (2016-2021) and the Alaska WQS, a reasonable potential calculation showed that the Skagway WWTP discharge has reasonable potential to cause or contribute to a violation of the acute water quality criterion for copper, thus, WQBELs have been calculated and included in the draft permit. Based on the calculation, water quality based effluent limits for copper are an average monthly limit of 36 µg/L and 0.19 lbs/day, and maximum daily limit of 93 µg/L and 0.49 lbs/day.

ADEC has included in its draft 401 certification copper limits of 18 µg/L as an average monthly limit and 45 µg/L as a maximum daily limit (Appendix I). The corresponding load is 0.095 lbs/day (average monthly limit) and 0.24 lbs/day (maximum daily limit). EPA has included these limits in the draft permit. If ADEC includes these limits in the final 401 certification, then EPA must include them in the permit pursuant to CWA section 401(d). If ADEC does not include these limits in the final 401 certification of this permit, EPA will include copper limits 36 µg/L and 0.19 lbs/day, and maximum daily limit of 93 µg/L and 0.49 lbs/day in the permit. EPA is accepting comment on the EPA calculated effluent limits. Comments concerning the limits set forth in the draft 401 certification should be directed to ADEC.

ADEC determined that Skagway WWTP should be able to meet the proposed copper limits based on effluent monitoring from the past five years. Therefore, there is no compliance schedule for copper.

**Lead, Zinc, Chloroform, Toluene, Phenol, and Bis (2-ethylhexyl phthalate)**

The applicable WQS for these pollutants are included in Table 12. Lead, chloroform, toluene, phenol, and bis (2-ethylhexyl phthalate) were detected in the effluent during a priority pollutant scan conducted in 2007, as described in Section III, Table 2. A reasonable potential calculation showed that the Skagway WWTP discharge does not have reasonable potential to cause or contribute to a violation of lead, zinc, chloroform, toluene, phenol, and Bis (2-ethylhexyl phthalate). The proposed permit does not include numeric limits. See Appendix E for reasonable potential calculations for these parameters.

**PFAS**

Alaska does not currently have a WQS for PFAS, nor is there a national WQS. However, EPA is in the process of developing Effluent Limitation Guidelines (ELGs) and water quality criteria for PFAS. EPA has released a series of guidances on PFAS and most recently issued a memo on December 5, 2022, "Addressing PFAS Discharges in NPDES Permits and Through the Pretreatment Program and Monitoring Programs."

EPA's recommendation is to obtain more comprehensive information through monitoring potential sources of PFAS, including at POTWs, and taking actions to reduce potential discharges of PFAS. To be consistent with EPA's recommendations, the permit is requiring the facility to monitor PFAS once per quarter in its effluent. This information will be used to inform the reasonable potential in the next permit cycle. Per EPA's December 5, 2022 memo, the permittee must use draft analytical method 1633 (see 40 CFR 122.21(e)(3)(ii) and 40 CFR 122.44(i)(1)(iv)(B)) and analyze each of the 40 PFAS parameters detectable by draft method 1633. The draft Adsorbable Organic Fluorine CWA wastewater method 1621 may also be used in conjunction with draft method 1633, if appropriate. EPA will assess in its next permit cycle whether pollution prevention controls are necessary at the facility, based on effluent data collected during this permit cycle.

#### 4. Anti-backsliding

Section 402(o) of the CWA and 40 CFR 122.44(l) generally prohibit the renewal, reissuance, or modification of an existing NPDES permit that contains effluent limits, permit conditions or standards that are less stringent than those established in the previous permit (i.e., anti-backsliding) but provides limited exceptions. For explanation of the antibacksliding exceptions refer to Chapter 7 of the Permit Writers' Manual *Final Effluent Limitations and Anti-backsliding*. All WQBELs in the proposed permit are at least as stringent as the effluent limits in the 2001 permit.

## B. MONITORING REQUIREMENTS

Section 308 of the CWA and 40 CFR 122.44(i) require monitoring in permits 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 impacts on receiving water quality.

The draft permit also requires the permittee to perform effluent monitoring required by the NPDES Form 2A application, so that these data will be available when the permittee applies for a renewal of its NPDES permit.

The draft permit also requires the permittee to perform effluent monitoring required by Tables A, B, and C of the NPDES Form 2A application, so that these data will be available when the permittee applies for a renewal of its NPDES permit, and EPA can assess compliance with Section 301(h) of the CWA.

The permittee is responsible for conducting the monitoring and for reporting results on DMRs or on the application for renewal, as appropriate, to EPA.

#### 1. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used for averaging if they are conducted using EPA-approved test methods (generally found in 40 CFR Part 136) or as specified in the permit.

The draft permit maintains largely the same monitoring requirements as the 2001 permit, with the exception of the proposed changes summarized in Table 19 below.

Table 19. Monitoring Changes in Permit

| **Parameter** | **Monitoring Change** | **Basis** |
|---|---|---|
| Ammonia | New effluent monitoring requirement, 1/quarter while the permit remains in effect. | Ammonia has been shown to have reasonable potential to violate Alaska WQS, based on a small data set collected over 20 years ago. The concentration of ammonia in the discharge is uncertain. Quarterly monitoring will provide data for the next permit cycle for evaluating compliance with Alaska WQS. |
| Fecal Coliform | Increase in effluent monitoring frequency from 1/month to 2/month while the permit remains in effect. | The draft permit contains new, more stringent, FC limits which the permittee will be working to achieve in accordance with the compliance schedule outlined Section II.C of the draft permit. Monitoring twice per month is more appropriate and representative than monthly monitoring and is required to ensure compliance with the FC limits and protection of Alaska WQS. |
| Enterococcus | New effluent monitoring requirement, 2/monthly while the permit remains in effect | The draft permit contains a new effluent limit for enterococcus that the permittee will be working to achieve in accordance with the compliance schedule outlined in Section II.C of the draft permit. Twice per month monitoring is necessary to ensure compliance with the limit and protection of Alaska WQS. |
| Total Copper | Increase in effluent monitoring frequency from 1/month to 2/month while the permit remains in effect. | The draft permit contains new, more stringent copper limits which the permittee will be working to achieve in accordance with the compliance schedule outlined Section II.C of the draft permit. Monitoring twice per month is more appropriate and representative than monthly monitoring and is required to ensure compliance with the copper limits and protection of Alaska WQS. |
| PFAS | New effluent monitoring requirement, 1/quarter for two years | PFAS is a pollutant of concern at wastewater treatment plants. Quarterly monitoring for two years will provide data for the next permit cycle to inform future permitting decisions, including the potential development of water quality-based effluent limits. |

| | | |
|---|---|---|
| WET | Increased in effluent monitoring frequency from 1/permit term to 2/year while the permit remains in effect | The permittee conducted a single WET test in 2003 pursuant to the terms of the 2002 permit. With only one data point collected over 19 years ago the toxicity of the current discharge is highly uncertain. To better characterize WET, the permit requires additional WET monitoring twice a year to inform the reasonable potential analysis in the next permit cycle. |
| Toxic Pollutants and Pesticides Monitoring | Increase in effluent monitoring frequency from 1/permit term to 1/year while the permit remains in effect. | The 301(h) regulations at 40 CFR 125.66(a) require applicants to submit at the time of application an analysis of their effluent for the toxic pollutants and pesticides identified in 40 CFR 401.15 and 125.58(p), respectively. |
| Surface water and biological monitoring | Increase in sampling locations; requires sampling every 5m | The draft permit increases the number of locations for monitoring to ensure more detailed characterization of the receiving water quality and biological community, since surface water monitoring and biological data were last collected in the late 1990s and early 2000s. |

Toxic Pollutants and Pesticides Monitoring

Under 40 CFR 125.66, facilities operating under 301(h)-modified permits are required to conduct a chemical analysis of their discharge for all toxics substances and pesticides identified in 40 CFR 401.15 and 125.58(p), respectively, and conduct an analysis of the possible source for any parameters detected. The draft permit requires the permittee to conduct this analysis and submit the results with their permit renewal application.

PFAS Monitoring

PFAS are a group of synthetic chemicals that have been in use since the 1940s. PFAS are found in a wide array of consumer and industrial products. Due to their widespread use and persistence in the environment, most people in the United States have been exposed to PFAS. Discharges of PFAS above certain levels may cause adverse effects to human health or aquatic life.

Since PFAS chemicals are persistent in the environment and may lead to adverse human health and environmental effects, the draft permit requires that the permittee conduct quarterly influent, effluent, and sludge sampling for PFAS chemicals for two years. The monitoring requirements for PFAS chemicals are deferred until the third and fourth years of the permit term (beginning during the first complete quarter of the third year). This will give the permittee time to plan for this new monitoring requirement (e.g., to obtain funding, train employees, and find a suitable contract laboratory).

The purpose of these monitoring and reporting requirements is to better understand potential discharges of PFAS from this facility and to inform future

permitting decisions, including the potential development of water quality-based effluent limits. EPA is authorized to require this monitoring and reporting by CWA section 308(a). The permit conditions reflect EPA's commitments in the PFAS Strategic Roadmap, which directs the Office of Water to leverage NPDES permits to reduce PFAS discharges to waterways "at the source and obtain more comprehensive information through monitoring on the sources of PFAS and quantity of PFAS discharged by these sources."

EPA notes that there is currently not an analytical method approved in 40 CFR Part 136 for PFAS. As stated in 40 CFR 122.44(i)(1)(iv)(B), in the case of pollutants or pollutant parameters for which there are no approved methods under 40 CFR Part 136 or methods are not otherwise required under 40 CFR chapter I, subchapter N or O, monitoring shall be conducted according to a test procedure specified in the permit for such pollutants or pollutant parameters. Therefore, the permit specifies that until there is an analytical method approved in 40 CFR Part 136 for PFAS, monitoring shall be conducted using Draft Method 1633.

### 2. Surface Water Monitoring

In general, surface water monitoring may be required for pollutants of concern to assess the assimilative capacity of the receiving water for the pollutant. In addition, surface water monitoring may be required for pollutants for which the water quality criteria are dependent and to collect data for TMDL development if the facility discharges to an impaired water body. Pursuant to Section 301(h)(3) of the CWA and 40 CFR 125.63(c), facilities operating under 301(h)-modified permits are required to establish and implement a water quality monitoring program to provide adequate data for evaluating compliance with WQS or federal water quality criteria and measure the presence of toxic pollutants that have been identified or reasonably may be expected to be present in the discharge.

EPA is retaining the parameters in the surface water monitoring program from the 2002 permit in the draft permit, with the addition of enterococcus. See Table 20 below.

For turbidity, dissolved oxygen, pH, salinity, temperature, and secchi disk depth, the draft permit proposes seven locations for surface water monitoring: one station at the center of the ZID at the point of discharge, four sampling stations on the corners of the ZID boundary, and two reference stations west and south-southwest of the ZID. The draft permit proposes increasing the monitoring frequency to once a year in July or August, while the permit is in effect. See Appendix H and Permit Part I.D. for the proposed sampling locations and more information.

For fecal coliform and enterococcus, the draft permit proposes eight locations for surface water monitoring: four stations on the corners of the ZID boundary, two reference stations west and south-southwest of the ZID, and two nearshore stations on either side of the discharge. The facility must obtain approval from ADEC on the locations of the nearshore stations. The draft permit proposes monthly

monitoring from May through September, while the permit is in effect. See Permit Part I.D. for more information.

**Table 20. Surface Water Monitoring in Draft Permit**

| Parameter | Sample Type | Sample Depth | Frequency | Location |
|---|---|---|---|---|
| Temperature (ºC), Salinity (ppt), Dissolved Oxygen (mg/L), pH (s.u.), Secchi Disk (feet), Turbidity (NTU) | Grab | Surface, every 5m to bottom | Annually (July or August) | Center of ZID, ZID Boundary Sites, and Reference Sites (See Permit Part I.D.2.) |
| Biological Monitoring for Benthic Infauna and Sediment Analysis[1] (See Permit Part 1.D.7) | Grab | Per method | Once every 5 years | ZID Boundary Sites and Reference Sites (See Permit Part I.D.2.) |
| Fecal Coliform[2] (#/100 mL) | Grab | Surface (or just below) | Monthly during summer | ZID Boundary Sites, Reference Sites, and Near Shore Sites (See Permit Part I.D.2.) |
| Enterococcus[2] (#/100mL) | Grab | Surface (or just below) | Monthly during summer | ZID Boundary Sites, Reference Sites, and Near Shore Sites (See Permit Part I.D.2.) |

[1]Survey must occur in the fourth year of the permit and every 5 years thereafter.

2Fecal coliform and enterococcus sampling shall coincide with effluent sampling in Part 1.B.

### 3. Biological Monitoring

Facilities operating under 301(h)-modified NPDES permits are required by 40 CFR 125.63(b) to have a biological monitoring program in place that provides adequate data to evaluate the impact of the discharge on marine biota.

EPA is retaining most of the biological monitoring program from the 2002 permit in the new draft permit in Permit Part I.D. Changes to the biological monitoring program include: sampling is required every 5 meters at each location, and additional locations must be monitored.

## 4. Whole Effluent Toxicity Testing Requirements

EPA and individual States implement three approaches to protect water quality. These approaches include chemical-specific control, toxicity testing control (i.e., whole effluent toxicity testing), and biological criteria/bioassessments (EPA 1991).

WET requirements in NPDES permits protect aquatic life from the aggregate toxic effect of a mixture of pollutants in the effluent. WET tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. The end point and results of WET tests are typically reported in acute and chronic toxic units, TUa and TUc, respectively. The TUa and TUc test results are treated the same as other reported permit parameters and used in the same manner in the TSD calculations for determining reasonable potential and establishing WQBELs for WET.

Alaska WQS at 18 AAC 70.030 require that an effluent discharged to a waterbody 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. 18 AAC 83.435 requires that a permit contain limitations on WET when a discharge has reasonable potential to cause or contribute to an exceedance of a WQS.

The permittee conducted a single WET test in 2003 pursuant to the terms of the 2002 permit. With only one data point collected 20 years ago the toxicity of the current discharge is highly uncertain. This is reflected in the large reasonable potential multiplying factor of 6.2 used in the reasonable potential analysis (Table 3-1, 1991 TSD). In order to characterize the toxicity of the effluent for the protection of Alaska WQS, the permit proposes to increase WET monitoring to two tests per year while the permit remains in effect.

A WET trigger of 28 TUc has been established which, if exceeded, will require the Permittee to implement the toxicity reduction evaluation procedures specified in Part I.C.4 of the draft Permit. If the WET trigger is not exceeded after six (6) consecutive WET tests the Permittee may reduce the frequency of WET testing to annually while the permit remains in effect. At the completion of the TIE/TRE process the Permittee must revert to testing twice per year. To assess and monitor for any seasonal variation in results, biannual testing must be conducted during different seasons and annual testing must be done on a rotating quarterly schedule, so that each annual test is conducted during a different quarter than the previous year’s test.

## 5. Electronic Submission of Discharge Monitoring Reports

The draft permit requires that the permittee submit DMR data electronically using NetDMR. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application.

Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website: https://netdmr.epa.gov. The permittee may use NetDMR after requesting and receiving permission from EPA Region 10.

Permit Part III.B.3 requires that the Permittee submit a copy of the DMR to ADEC. Currently, the permittee may submit a copy to ADEC in one of three ways: 1) a paper copy may be mailed; 2) The email address for ADEC may be added to the electronic submittal through NetDMR; or 3) The permittee may provide ADEC viewing rights through NetDMR.

### C. SLUDGE (BIOSOLIDS) REQUIREMENTS

EPA Region 10 separates wastewater and sludge permitting. EPA has authority under the CWA to issue separate sludge-only permits for the purposes of regulating biosolids. EPA may issue a sludge-only permit to each facility at a later date, as appropriate.

Until future issuance of a sludge-only permit, sludge management and disposal activities at each facility continue to be subject to the national sewage sludge standards at 40 CFR Part 503 and any requirements of the State's biosolids program. The Part 503 regulations are self-implementing, which means that facilities must comply with them whether or not a permit has been issued.

## V. OTHER PERMIT CONDITIONS

### A. TOXICS CONTROL PROGRAM

#### 1. Chemical Analysis and Source Identification

The 301(h) regulations at 40 CFR 125.66(a) require applicants to submit at the time of application an analysis of their effluent for the toxic substances and pesticides identified in 40 CFR 401.15 and, pursuant to 40 CFR 125.66(b), provide an analysis of the known or suspected sources of any detected parameters. The draft permit includes these requirements in Part II.D.1.

Pursuant to 40 CFR 125.66(b), unless required by the State of Alaska, the requirements of Permit Parts II.D.1.a and II.D.1.b shall not apply if the Permittee certifies that there are no known or suspected sources of toxic pollutants or pesticides and documents the certification with an industrial user survey as described by 40 CFR 403.8(f)(2).

#### 2. Industrial Waste Management

The 301(h) regulations at 40 CFR 125.66(b) require applicants with known or suspected sources of industrial sources of toxic pollutants to develop and implement an approved pretreatment program in accordance with 40 CFR 403. This provision does not apply to applicants that certify they have no known or suspected industrial sources of toxics in their discharge. The City has certified they have no known or suspected industrial sources of toxics in their discharge. The draft permit requires the facility to maintain and submit a list of any industrial users at the time of permit renewal application, or a new certification stating there are no known or suspected industrial sources of toxics pollutants in their discharge.

### 3. Non-Industrial Source Control Program

The 301(h) regulations at 40 CFR 125.66 require the permittee to implement a public education program designed to minimize the entrance of nonindustrial toxic pollutants and pesticides into its POTW. The draft permit requires the permittee to develop and implement a public education and outreach program designed to minimize the introduction of nonindustrial sources of toxics into the treatment plant.

## B. INTERIM BEACH ADVISORY

The permit requires a beach advisory sign be placed on the nearshore area around the outfall advising against bathing or the consumption of raw shellfish from the area. The sign must remain in place until the final WQBELs for fecal coliform and enterococcus are achieved.

## C. COMPLIANCE SCHEDULES

Compliance schedules are authorized by federal NPDES regulations at 40 CFR 122.47 and Alaska WQS at 18 AAC 70.910. Compliance schedules allow a discharger to phase in, over time, compliance with WQBELs when limits are in the permit for the first time.

The draft permit proposes compliance schedules for fecal coliform and enterococcus, because the discharge cannot immediately comply with the new effluent limits on the effective date of the permit. The draft permit proposes the following:

- Interim fecal coliform limits effective until the end of the compliance schedule when final limits become effective;
- Monitoring for enterococcus and final limits for enterococcus, which become effective at the end of the compliance schedule; and
- The compliance schedule allows 5 years for the facility to comply with the new effluent limits and includes interim milestones as set forth in Permit Part II.C.

ADEC authorizes compliance schedules in their 401 certification. EPA will amend the compliance schedule(s), if needed, after receiving final 401 certification from ADEC. For more information on the details of the compliance schedule, refer to the draft 401 certification (Appendix I) and Part II.C of the draft permit.

## D. QUALITY ASSURANCE PLAN

The Skagway WWTP is required to update the Quality Assurance Plan (QAP) within 180 days of the effective date of the permit. The QAP must consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan must be retained on site and made available to EPA and ADEC upon request.

## E. OPERATION AND MAINTENANCE PLAN

The permit requires the Skagway WWTP to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to

meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop and implement an operation and maintenance plan for their facility within 180 days of the effective date of the permit. The plan must be retained on site and made available to EPA and ADEC upon request.

## F. SANITARY SEWER OVERFLOWS AND PROPER OPERATION AND MAINTENANCE OF THE COLLECTION SYSTEM

Sanitary Sewer Overflows (SSOs) are not authorized under this permit. The permit contains language to address SSO reporting and public notice and operation and maintenance of the collection system. The permit requires that the permittee identify SSO occurrences and their causes. In addition, the permit establishes reporting, record keeping and third party notification of SSOs. Finally, the permit requires proper operation and maintenance of the collection system.

The following specific permit conditions apply:

**Immediate Reporting** – The permittee is required to notify EPA of an SSO within 24 hours of the time the permittee becomes aware of the overflow. (See 40 CFR 122.41(l)(6)),

**Written Reports** – The permittee is required to provide EPA a written report within five days of the time it became aware of any overflow that is subject to the immediate reporting provision. (See 40 CFR 122.41(l)(6)(i)).

**Third Party Notice** – The permit requires that the permittee establish a process to notify specified third parties of SSOs that may endanger health due to a likelihood of human exposure; or unanticipated bypass and upset that exceeds any effluent limit in the permit or that may endanger health due to a likelihood of human exposure. The permittee is required to develop, in consultation with appropriate authorities at the local, county, tribal and/or state level, a plan that describes how, under various overflow (and unanticipated bypass and upset) scenarios, the public, as well as other entities, would be notified of overflows that may endanger health. The plan should identify all overflows that would be reported and to whom, and the specific information that would be reported. The plan should include a description of lines of communication and the identities of responsible officials. (See 40 CFR 122.41(l)(6)).

**Record Keeping** – The permittee is required to keep records of SSOs. The permittee must retain the reports submitted to EPA and other appropriate reports that could include work orders associated with investigation of system problems related to a SSO, that describes the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the SSO. (See 40 CFR 122.41(j)).

**Proper Operation and Maintenance** – The permit requires proper operation and maintenance of the collection system. (See 40 CFR 122.41(d) and (e)). SSOs may be indicative of improper operation and maintenance of the collection system. The permittee may consider the development and implementation of a capacity, management, operation and maintenance (CMOM) program.

The permittee may refer to the Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems (EPA 305-

B-05-002). This guide identifies some of the criteria used by EPA inspectors to evaluate a collection system's management, operation and maintenance program activities. Owners/operators can review their own systems against the checklist (Chapter 3) to reduce the occurrence of sewer overflows and improve or maintain compliance.

## G. ENVIRONMENTAL JUSTICE

As part of the permit development process, EPA Region 10 conducted a screening analysis to determine whether this permit action could affect overburdened communities. "Overburdened" communities can include minority, low-income, tribal, and indigenous populations or communities that potentially experience disproportionate environmental harms and risks. EPA used a nationally consistent geospatial tool that contains demographic and environmental data for the United States at the Census block group level. This tool is used to identify permits for which enhanced outreach may be warranted.

The Skagway WWTP is not located within or near a Census block group that is potentially overburdened. The draft permit does not include any additional conditions to address environmental justice.

Regardless of whether a facility is located near a potentially overburdened community, EPA encourages permittees to review (and to consider adopting, where appropriate) Promising Practices for Permit Applicants Seeking EPA-Issued Permits: Ways To Engage Neighboring Communities (see https://www.federalregister.gov/d/2013-10945). Examples of promising practices include: thinking ahead about community's characteristics and the effects of the permit on the community, engaging the right community leaders, providing progress or status reports, inviting members of the community for tours of the facility, providing informational materials translated into different languages, setting up a hotline for community members to voice concerns or request information, follow up, etc.

For more information, please visit https://www.epa.gov/environmentaljustice and Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

## H. DESIGN CRITERIA

The permit includes design criteria requirements. This provision requires the permittee to compare influent flow and loading to the facility's design flow and loading and prepare a facility plan for maintaining compliance with NPDES permit effluent limits when the flow or loading exceeds 85% of the design criteria values for any two months in a twelve-month period.

## I. STANDARD PERMIT PROVISIONS

Permit Parts IV., V., and VI. contain standard regulatory language that must be included in all NPDES permits. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

# VI. OTHER LEGAL REQUIREMENTS

## A. ENDANGERED SPECIES ACT

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and/or the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. A review of the threatened and endangered species located in Alaska finds that there is one listed species: The Western Distinct Population Segment Stellar Sea Lions. EPA has prepared a biological evaluation and determined the discharge has the potential to affect the Western Segment Distinct Population Segment Stellar Sea Lions. Pursuant to Section 7 of the ESA, EPA will be consulting with NOAA Fisheries prior to taking final action on the permit.

## B. ESSENTIAL FISH HABITAT

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect EFH (i.e., reduce quality and/or quantity of EFH).

The EFH regulations define an adverse effect as any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

EPA has prepared an EFH assessment, which appears in Appendix G and determined that issuance of this permit will not have an adverse effect on EFH for any species.

## C. CWA 401 CERTIFICATION

Section 401 of the CWA requires the state in which the discharge originates to certify that the discharge complies with the appropriate sections of the CWA, as well as any appropriate requirements of state law. See 33 U.S.C. 1341(d). As a result of the certification, the state may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with WQS, or treatment standards established pursuant to any state law or regulation.

On May 30, 2023, EPA sent ADEC a pre-filing certification meeting request. On July 26, 2023, ADEC sent EPA a draft 401 certification of the permit (Appendix I). On July 28, 2023, EPA requested final 401 certification from ADEC. EPA cannot reissue the permit until ADEC has granted or waived certification. If ADEC denies certification, EPA cannot issue the permit.

## D. ANTIDEGRADATION

ADEC has included an antidegradation analysis of the discharge following its antidegradation policy and implementation methods outlined in 18 AAC 70.015 and 18 AAC 70.016, respectively. The antidegradation review is included in the draft CWA Section 401 Certification for this permit. Questions regarding the CWA Section 401

Certification or antidegradation review can be submitted to ADEC as set forth above (see State Certification on Page 1 of this Fact Sheet).

### E. PERMIT EXPIRATION

The permit will expire five years from the effective date.

## VII. REFERENCES


ADEC, 2008. Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances. December 2008.

ADEC, 2020. Alaska Water Quality Standards.

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EPA, 2011. *Introduction to the National Pretreatment Program*, Office of Wastewater Management, EPA 833-B-11-011, June 2011.

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EPA, 2022. Tentative Decision Document: City of Skagway Wastewater Treatment Plant (AK0020010). May 2022.

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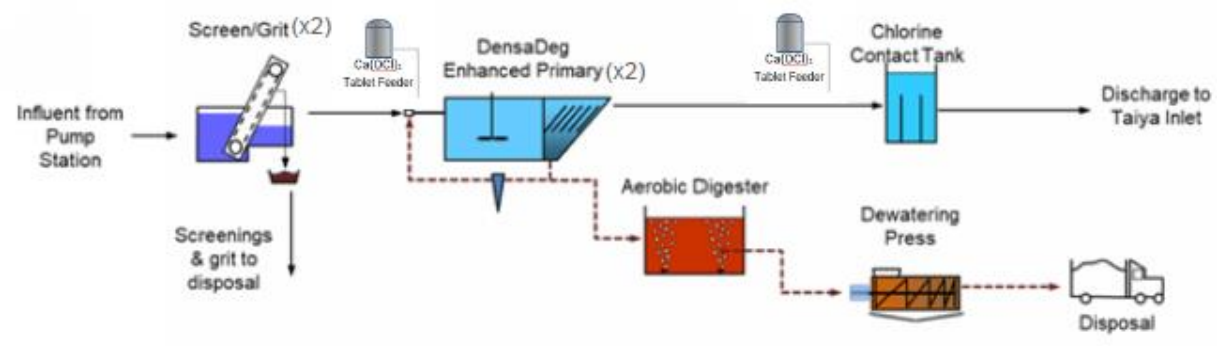
Water Pollution Control Federation, 1976. Subcommittee on Chlorination of Wastewater. *Chlorination of Wastewater*. Water Pollution Control Federation. Washington, D.C. 1976.

# Appendix A. Facility Treatment Process

**Figure 2. Facility Schematic**



# Appendix B. Water Quality Data

The water quality data are from discharge monitoring reports (DMRs) from December 2016 to September 2021, data from the Skagway WWTP transmitted February 8, 2022, and the permit application.

### Treatment Plant Effluent Data, DMR: $BOD_5$

| | Raw Sewage Influent | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross | Percent Removal |
|---|---|---|---|---|---|---|
| | **BOD, 5-day, 20 deg. C** | **BOD, 5-day, 20 deg** | **BOD, 5-day, 20 de** | **BOD, 5-day, 20** | **BOD, 5-day, 20 c** | **BOD, 5-day, percer** |
| | Milligrams per Liter | Milligrams per Liter | Milligrams per Liter | Pounds per Day | Pounds per Day | Percent |
| | MO AVG | DAILY MX | MO AVG | DAILY MX | MO AVG | MN % RMV |
| **LIMIT (5/1-9/30)** | | **200** | **140** | **1050** | **740** | |
| **LIMIT (10/1-4/30)** | **No Limit** | **100** | **80** | **530** | **420** | **30%** |
| Date | Raw Sewage InfluentB | Effluent GrossBOD, | Effluent GrossBOD | Effluent GrossB | Effluent GrossBO | Percent RemovalBO |
| 12/31/2016 | 71 | 32 | 28 | 79 | 69 | 61 |
| 01/31/2017 | 61 | 25 | 25 | 62 | 62 | 59 |
| 02/28/2017 | 89.8 | 27 | 27 | 66 | 66 | 81 |
| 03/31/2017 | 104 | 46 | 44 | 95 | 91 | 58 |
| 04/30/2017 | 370 | 91 | 87.5 | 155 | 149 | 76 |
| 05/31/2017 | 305 | 110 | 110 | 279 | 279 | 64 |
| 06/30/2017 | 280 | 170 | 160 | 494 | 465 | 43 |
| 07/31/2017 | 360 | 190 | 185 | 526 | 512 | 48 |
| 08/31/2017 | 303.33 | 300 | 193.33 | 776 | 500 | 38 |
| 09/30/2017 | 205 | 130 | 111 | 358 | 306 | 44 |
| 10/31/2017 | 255 | 180 | 129 | 372 | 267 | 52 |
| 11/30/2017 | 96.5 | 42 | 33.5 | 78 | 62 | 66 |
| 12/31/2017 | 59 | 37 | 32.5 | 77 | 67 | 45 |
| 01/31/2018 | 83 | 52 | 47 | 104 | 94 | 43 |
| 02/28/2018 | 95.5 | 49 | 48 | 107 | 105 | 50 |
| 03/31/2018 | 97 | 64 | 57 | 134 | 119 | 41 |
| 04/30/2018 | 390 | 250 | 180 | 541 | 390 | 53 |
| 05/31/2018 | 295 | 160 | 128.5 | 400 | 322 | 57 |
| 06/30/2018 | 255 | 150 | 130 | 398 | 345 | 49 |
| 07/31/2018 | 290 | 150 | 145 | 390 | 377 | 49 |
| 08/31/2018 | 300 | 140 | 125 | 375 | 330 | 59 |
| 09/30/2018 | 255 | 120 | 115 | 280 | 247 | 55 |
| 10/31/2018 | 140 | 130 | 96 | 108 | 192 | 30 |
| 11/30/2018 | 125 | 63 | 62.5 | 116 | 118 | 50 |
| 12/31/2018 | 56 | 26 | 23 | 43 | 48 | 58 |
| 01/31/2019 | 78 | 27 | 24.5 | 72 | 53 | 68 |
| 02/28/2019 | 57 | 33 | 28 | 65 | 55 | 52 |
| 03/31/2019 | 89.5 | 50 | 48 | 89 | 93 | 46 |
| 04/30/2019 | 155 | 130 | 93.5 | 290 | 197 | 39 |
| 05/31/2019 | 190 | 120 | 115 | 338 | 288 | 38 |
| 06/30/2019 | 235 | 170 | 145 | 489 | 421 | 39 |
| 07/31/2019 | 550 | 200 | 165 | 512 | 432 | 70 |
| 08/31/2019 | 375 | 150 | 140 | 395 | 401 | 57 |
| 09/30/2019 | 270 | 110 | 94 | 272 | 241 | 66 |
| 10/31/2019 | 300 | 160 | 91 | 268 | 174 | 70 |
| 11/30/2019 | 112 | 28 | 27 | 64 | 48 | 76 |
| 12/31/2019 | 130 | 33 | 31 | 76 | 58 | 76 |

## Treatment Plant Effluent Data, DMR: $BOD_5$ (cont.)

| | Raw Sewage Influent | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross | Percent Removal |
|---|---|---|---|---|---|---|
| | **BOD, 5-day, 20 deg. C** | **BOD, 5-day, 20 deg** | **BOD, 5-day, 20 de** | **BOD, 5-day, 20** | **BOD, 5-day, 20 c** | **BOD, 5-day, percer** |
| | Milligrams per Liter | Milligrams per Liter | Milligrams per Liter | Pounds per Day | Pounds per Day | Percent |
| | MO AVG | DAILY MX | MO AVG | DAILY MX | MO AVG | MN % RMV |
| **LIMIT (5/1-9/30)** | | **200** | **140** | **1050** | **740** | |
| **LIMIT (10/1-4/30)** | **No Limit** | **100** | **80** | **530** | **420** | **30%** |
| Date | Raw Sewage InfluentB | Effluent GrossBOD, | Effluent GrossBOD, | Effluent GrossB( | Effluent GrossBO | Percent RemovalBO |
| 01/31/2020 | 91 | 50 | 36 | 99 | 89 | 63 |
| 02/29/2020 | 265 | 38 | 33 | 89 | 66 | 88 |
| 03/31/2020 | 145 | 32 | 31 | 67 | 56 | 79 |
| 04/30/2020 | 225 | 54 | 51 | 84 | 91 | 78 |
| 05/31/2020 | 285 | 47 | 47 | 88 | 78 | 74 |
| 06/30/2020 | 225 | 67 | 52 | 118 | 97 | 77 |
| 07/31/2020 | 120 | 57 | 51 | 109 | 95 | 57 |
| 08/31/2020 | 105 | 49 | 39 | 103 | 72 | 64 |
| 09/30/2020 | 260 | 230 | 137 | 475 | 218 | 55 |
| 10/31/2020 | 125 | 56 | 50 | 107 | 64 | 59 |
| 11/30/2020 | 69 | 28 | 26 | 67 | 44 | 59 |
| 12/31/2020 | 80 | 26 | 25 | 198 | 78 | 68 |
| 01/31/2021 | 67 | 25 | 23 | 76 | 43 | 60 |
| 02/28/2021 | 64 | 19 | 19 | 66 | 47 | 69 |
| 03/31/2021 | 115 | 32 | 29 | 91 | 56 | 75 |
| 04/30/2021 | 170 | 120 | 78 | 292 | 122 | |
| 05/31/2021 | 160 | 90 | 65 | 194 | 99 | |
| 06/30/2021 | 106 | 63 | 50 | 158 | 100 | |
| 07/31/2021 | 100 | 38 | 33.5 | 80 | 65 | |
| 08/31/2021 | | | | | | |
| 09/30/2021 | 365 | 68 | 56 | 118 | 94 | |
| 10/31/2021 | | | | | | |
| **LIMIT (5/1-9/30)** | | **200** | **140** | **1050** | **740** | |
| **LIMIT (10/1-4/30)** | **No Limit** | **100** | **80** | **530** | **420** | **30%** |
| Date | Raw Sewage InfluentB | Effluent GrossBOD, | Effluent GrossBOD, | Effluent GrossB( | Effluent GrossBO | Percent RemovalBO |
| 5/1 - 9/30 | | | | | | |
| **COUNT** | **24** | **24** | **24** | **24** | **24** | **20** |
| **MEAN** | **258** | **128** | **108** | **322** | **266** | **55** |
| **MIN** | **100** | **38** | **34** | **80** | **65** | **38** |
| **MAX** | **550** | **300** | **193** | **776** | **512** | **77** |
| **STDV** | **102** | **64** | **48** | **178** | **149** | **12** |
| **CV** | **0.40** | **0.50** | **0.45** | **0.55** | **0.56** | **0.21** |
| **5th** | **101** | **40** | **35** | **82** | **67** | **38** |
| **95th** | **506** | **283** | **191** | **714** | **509** | **77** |
| **50th** | | | | | | |
| | | | | | | |
| **LIMIT (5/1-9/30)** | | **200** | **140** | **1050** | **740** | |
| **LIMIT (10/1-4/30)** | **No Limit** | **100** | **80** | **530** | **420** | **30%** |
| Date | Raw Sewage InfluentB | Effluent GrossBOD, | Effluent GrossBOD, | Effluent GrossB( | Effluent GrossBO | Percent RemovalBO |
| 10/1 - 4/30 | | | | | | |
| **COUNT** | **33** | **33** | **33** | **33** | **33** | **32** |
| **MEAN** | **134** | **62** | **50** | **130** | **101** | **61** |
| **MIN** | **56** | **19** | **19** | **43** | **43** | **30** |
| **MAX** | **390** | **250** | **180** | **541** | **390** | **88** |
| **STDV** | **89** | **53** | **36** | **107** | **73** | **14** |
| **CV** | **0.66** | **0.86** | **0.70** | **0.83** | **0.73** | **0.23** |
| **5th** | **57** | **23** | **22** | **56** | **44** | **36** |
| **95th** | **376** | **201** | **144** | **423** | **304** | **83** |
| | | | | | | |
| **Year-round** | | | | | | |
| **COUNT** | **57** | **57** | **57** | **57** | **57** | **52** |
| **MEAN** | **186** | **90** | **75** | **211** | **170** | **59** |
| **MIN** | **56** | **19** | **19** | **43** | **43** | **30** |
| **MAX** | **550** | **300** | **193** | **776** | **512** | **88** |
| **STDV** | **112** | **66** | **50** | **170** | **138** | **13.31** |
| **CV** | **0.60** | **0.74** | **0.67** | **0.80** | **0.81** | **0.227** |
| **5th** | **59** | **25** | **23** | **64** | **47** | **38.00** |
| **95th** | **377** | **232** | **181** | **528** | **469** | **80** |

## Treatment Plant Effluent Data, DMR: TSS

| | Raw Sewage Influent | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross | Percent Removal |
|---|---|---|---|---|---|---|
| | **Solids, total suspend** | **Solids, total susper** | **Solids, total suspe** | **Solids, total sus** | **Solids, total sus** | **Solids, suspended** |
| | Milligrams per Liter | Milligrams per Liter | Milligrams per Liter | Pounds per Day | Pounds per Day | Percent |
| | MO AVG | DAILY MX | MO AVG | DAILY MX | MO AVG | MN % RMV |
| **LIMIT (5/1-9/30)** | | **200** | **140** | **1050** | **740** | |
| **LIMIT (10/1-4/30)** | **No Limit** | **88** | **70** | **460** | **370** | **30%** |
| Date | Raw Sewage Influent | Effluent GrossSolids | Effluent GrossSolid | Effluent GrossSol | Effluent GrossSol | Percent RemovalSo |
| 12/31/2016 | 62 | 19 | 17.5 | 47 | 43 | 72 |
| 01/31/2017 | 45 | 16 | 16 | 40 | 40 | 64 |
| 02/28/2017 | 47.5 | 21 | 18 | 51 | 44 | 82 |
| 03/31/2017 | 79 | 21 | 18 | 44 | 37 | 77 |
| 04/30/2017 | 111.5 | 51 | 42 | 87 | 71 | 62 |
| 05/31/2017 | 325 | 62 | 57 | 157 | 144 | 82 |
| 06/30/2017 | 127 | 110 | 66.5 | 320 | 193 | 48 |
| 07/31/2017 | 285 | 112 | 106 | 310 | 294 | 56 |
| 08/31/2017 | 298 | 132 | 93.67 | 341 | 242 | 61 |
| 09/30/2017 | 129 | 38 | 33 | 105 | 91 | 74 |
| 10/31/2017 | 116.5 | 24 | 19 | 50 | 39 | 83 |
| 11/30/2017 | 200 | 14 | 11 | 26 | 20 | 93 |
| 12/31/2017 | 51.5 | 21 | 20.5 | 43 | 42 | 58 |
| 01/31/2018 | 69.5 | 26 | 24 | 67 | 62 | 66 |
| 02/28/2018 | 58 | 24 | 21 | 53 | 46 | 64 |
| 03/31/2018 | 50.5 | 25 | 22.5 | 52 | 47 | 56 |
| 04/30/2018 | 73 | 21 | 20.5 | 45 | 44 | 72 |
| 05/31/2018 | 346.5 | 56 | 44.5 | 140 | 111 | 76 |
| 06/30/2018 | 185 | 60 | 52 | 159 | 138 | 61 |
| 07/31/2018 | 119 | 86 | 72 | 223 | 187 | 38 |
| 08/31/2018 | 226.5 | 80 | 70 | 214 | 185 | 68 |
| 09/30/2018 | 385 | 52 | 48 | 121 | 103 | 87 |
| 10/31/2018 | 614 | 36 | 32 | 102 | 64 | 95 |
| 11/30/2018 | 110 | 13 | 11.1 | 24 | 21 | 90 |
| 12/31/2018 | 53 | 11 | 9 | 26 | 19 | 85 |
| 01/31/2019 | 38 | 13 | 12.5 | 35 | 27 | 66 |
| 02/28/2019 | 55 | 18 | 16 | 35 | 32 | 70 |
| 03/31/2019 | 50.5 | 19 | 28.6 | 34 | 55 | 71 |
| 04/30/2019 | 89 | 26 | 19.5 | 58 | 41 | 74 |
| 05/31/2019 | 106 | 60 | 50.5 | 169 | 126 | 53 |
| 06/30/2019 | 103 | 73 | 68.5 | 210 | 199 | 33 |
| 07/31/2019 | 406.5 | 105 | 89.5 | 269 | 234 | 78 |
| 08/31/2019 | 260 | 80 | 77 | 211 | 221 | 66 |
| 09/30/2019 | 217 | 56 | 44 | 139 | 113 | 80 |
| 10/31/2019 | 250 | 33 | 27 | 48 | 51 | 89 |
| 11/30/2019 | 130 | 17 | 14 | 35 | 25 | 89 |
| 12/31/2019 | 107 | 13 | 12 | 30 | 22 | 89 |

## Treatment Plant Effluent Data: TSS (cont.)

| | Raw Sewage Influent | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross | Percent Removal |
|---|---|---|---|---|---|---|
| | **Solids, total suspend** | **Solids, total suspe** | **Solids, total suspe** | **Solids, total sus** | **Solids, total sus** | **Solids, suspended** |
| | Milligrams per Liter | Milligrams per Liter | Milligrams per Liter | Pounds per Day | Pounds per Day | Percent |
| | MO AVG | DAILY MX | MO AVG | DAILY MX | MO AVG | MN % RMV |
| **LIMIT (5/1-9/30)** | | **200** | **140** | **1050** | **740** | |
| **LIMIT (10/1-4/30)** | **No Limit** | **88** | **70** | **460** | **370** | **30%** |
| Date | Raw Sewage Influent | Effluent GrossSolids | Effluent GrossSolid | Effluent GrossSol | Effluent GrossSol | Percent RemovalSol |
| 01/31/2020 | 92 | 22 | 21 | 43 | 52 | 77 |
| 02/29/2020 | 426 | 20 | 19 | 47 | 38 | 96 |
| 03/31/2020 | 172 | 18 | 15 | 38 | 27 | 92 |
| 04/30/2020 | 180 | 23 | 21 | 30 | 38 | 88 |
| 05/31/2020 | 258 | 20 | 19 | 32 | 32 | 90 |
| 06/30/2020 | 214 | 17 | 29 | 71 | 54 | 87 |
| 07/31/2020 | 153 | 30 | 26 | 57 | 48 | 82 |
| 08/31/2020 | 155 | 22 | 16 | 46 | 30 | 86 |
| 09/30/2020 | 149 | 40 | 31 | 83 | 49 | 80 |
| 10/31/2020 | 118 | 30 | 21 | 57 | 27 | 80 |
| 11/30/2020 | 116 | 16 | 16 | 38 | 27 | 86 |
| 12/31/2020 | 145 | 18 | 14 | 137 | 44 | 90 |
| 01/31/2021 | 77 | 15 | 14 | 46 | 26 | 80 |
| 02/28/2021 | 70 | 24 | 17 | 59 | 42 | 72 |
| 03/31/2021 | 158 | 16 | 14 | 45 | 27 | 91 |
| 04/30/2021 | 582 | 40 | 33 | 97 | 52 | 90 |
| 05/31/2021 | 269 | 37 | 27 | 80 | 41 | 77 |
| 06/30/2021 | 77 | 14 | 14 | 35 | 28 | 81 |
| 07/31/2021 | 122 | 14 | 12 | 29 | 23 | 90 |
| 08/31/2021 | | | | | | |
| 09/30/2021 | 605 | 18 | 17.5 | 31 | 29 | 97 |
| 10/31/2021 | | | | | | |
| **LIMIT (5/1-9/30)** | | **200** | **140** | **1050** | **740** | |
| **LIMIT (10/1-4/30)** | **No Limit** | **88** | **70** | **460** | **370** | **30%** |
| Date | Raw Sewage Influent | Effluent GrossSolids | Effluent GrossSolid | Effluent GrossSol | Effluent GrossSol | Percent RemovalSol |
| 5/1 - 9/30 | | | | | | |
| **COUNT** | **24** | **24** | **24** | **24** | **24** | **24** |
| **MEAN** | **230** | **57** | **48** | **148** | **121** | **72** |
| **MIN** | **77** | **14** | **12** | **29** | **23** | **33** |
| **MAX** | **605** | **132** | **106** | **341** | **294** | **97** |
| **STDV** | **123** | **34** | **27** | **97** | **82** | **17** |
| **CV** | **0.54** | **0.60** | **0.56** | **0.66** | **0.7** | **0.23** |
| **5th** | **84** | **14** | **13** | **30** | **24** | **34** |
| **95th** | **555** | **127** | **103** | **336** | **281** | **95** |
| **50th** | | | | | | |
| | | | | | | |
| **LIMIT (5/1-9/30)** | | **200** | **140** | **1050** | **740** | |
| **LIMIT (10/1-4/30)** | **No Limit** | **88** | **70** | **460** | **370** | **30%** |
| Date | Raw Sewage Influent | Effluent GrossSolids | Effluent GrossSolid | Effluent GrossSol | Effluent GrossSol | Percent RemovalSol |
| 10/1 - 4/30 | | | | | | |
| **COUNT** | **33** | **33** | **33** | **33** | **33** | **33** |
| **MEAN** | **139** | **22** | **19** | **51** | **39** | **79** |
| **MIN** | **38** | **11** | **9.00** | **24** | **19** | **56** |
| **MAX** | **614** | **51** | **42** | **137** | **71** | **96** |
| **STDV** | **140** | **8.45** | **7.01** | **24** | **13** | **12** |
| **CV** | **1.01** | **0.39** | **0.36** | **0.48** | **0.34** | **0.15** |
| **5th** | **43** | **12** | **10** | **25** | **20** | **57** |
| **95th** | **592** | **43** | **36** | **113** | **66** | **95** |
| | | | | | | |
| **Year-round** | | | | | | |
| **COUNT** | **57** | **57** | **57** | **57** | **57** | **57** |
| **MEAN** | **177** | **37** | **32** | **92** | **74** | **76** |
| **MIN** | **38** | **11** | **9** | **24** | **19** | **33** |
| **MAX** | **614** | **132** | **106** | **341** | **294** | **97** |
| **STDV** | **140** | **29** | **23** | **81** | **67** | **14.34** |
| **CV** | **0.79** | **0.79** | **0.74** | **0.88** | **0.91** | **0.188** |
| **5th** | **47** | **13** | **11** | **26** | **21** | **47.00** |
| **95th** | **584** | **110** | **90** | **311** | **235** | **95** |

## Treatment Plant Effluent Data, Measured Facility Data (received from Andy Miles, 2/8/22): $BOD_5$ and TSS

| Date | BOD Influent | BOD Effluent | TSS Influent | TSS Effluent |
|---|---|---|---|---|
| 1/11/2017 | 61 | 25 | 50 | 16 |
| 1/19/2017 | 61 | 25 | 40 | 16 |
| 2/8/2022 | 68 | 27 | 48 | 21 |
| 2/22/2017 | 71 | 27 | 47 | 15 |
| 3/8/2017 | 88 | 46 | 60 | 21 |
| 3/22/2017 | 120 | 42 | 98 | 15 |
| 4/12/2017 | 150 | 91 | 97 | 33 |
| 4/19/2017 | 590 | 84 | 126 | 51 |
| 5/17/2017 | 350 | 110 | 450 | 52 |
| 5/24/2017 | 260 | 110 | 200 | 62 |
| 6/8/2017 | 300 | 150 | 107 | 23 |
| 6/21/2017 | 260 | 170 | 147 | 110 |
| 7/19/2017 | 420 | 190 | 388 | 100 |
| 7/26/2017 | 300 | 180 | 182 | 112 |
| 8/21/2017 | 260 | 140 | 448 | 82 |
| 8/28/2017 | 270 | 140 | 262 | 67 |
| 9/11/2017 | 230 | 92 | 140 | 28 |
| 9/25/2017 | 180 | 130 | 118 | 38 |
| 10/10/2017 | 310 | 180 | 133 | 14 |
| 10/24/2017 | 200 | 78 | 100 | 24 |
| 11/14/2017 | 110 | 42 | 330 | 14 |
| 11/28/2017 | 83 | 25 | 70 | 8 |
| 12/12/2017 | 56 | 28 | 39 | 21 |
| 12/19/2021 | 62 | 37 | 64 | 20 |
| 1/9/2018 | 79 | 52 | 69 | 26 |
| 1/25/2018 | 87 | 42 | 70 | 22 |
| 2/13/2018 | 110 | 47 | 54 | 18 |
| 2/20/2018 | 81 | 49 | 62 | 24 |
| 3/6/2018 | 96 | 50 | 53 | 25 |
| 3/28/2018 | 98 | 64 | 48 | 20 |
| 4/10/2018 | 220 | 110 | 60 | 20 |
| 4/17/2018 | 560 | 250 | 86 | 21 |
| 5/15/2018 | 220 | 97 | 560 | 33 |
| 5/21/2018 | 370 | 160 | 133 | 56 |
| 6/11/2019 | 240 | 110 | 275 | 44 |
| 6/18/2018 | 270 | 150 | 95 | 60 |
| 7/9/2018 | 240 | 140 | 85 | 58 |
| 7/23/2018 | 340 | 150 | 152 | 86 |
| 8/13/2018 | 280 | 110 | 260 | 60 |
| 8/20/2018 | 320 | 140 | 193 | 80 |
| 9/10/2018 | 230 | 120 | 307 | 52 |
| 9/17/2018 | 280 | 110 | 462 | 44 |
| 10/8/2018 | 150 | 62 | 488 | 27 |
| 10/23/2018 | 130 | 130 | 740 | 36 |
| 11/5/2018 | 130 | 62 | 144 | 13 |
| 11/19/2018 | 120 | 63 | 76 | 9.2 |
| 12/11/2018 | 59 | 20 | 44 | 6 |
| 12/19/2018 | | | 61 | 11 |
| 12/28/2018 | 52 | 26 | | |

**Treatment Plant Effluent Data, Measured Facility Data (received from City of Skagway, 2/8/22): $BOD_5$ and TSS**

| Date | BOD Influent | BOD Effluent | TSS Influent | TSS Effluent |
|---|---|---|---|---|
| 1/11/2017 | 61 | 25 | 50 | 16 |
| 1/19/2017 | 61 | 25 | 40 | 16 |
| 2/8/2022 | 68 | 27 | 48 | 21 |
| 2/22/2017 | 71 | 27 | 47 | 15 |
| 3/8/2017 | 88 | 46 | 60 | 21 |
| 3/22/2017 | 120 | 42 | 98 | 15 |
| 4/12/2017 | 150 | 91 | 97 | 33 |
| 4/19/2017 | 590 | 84 | 126 | 51 |
| 5/17/2017 | 350 | 110 | 450 | 52 |
| 5/24/2017 | 260 | 110 | 200 | 62 |
| 6/8/2017 | 300 | 150 | 107 | 23 |
| 6/21/2017 | 260 | 170 | 147 | 110 |
| 7/19/2017 | 420 | 190 | 388 | 100 |
| 7/26/2017 | 300 | 180 | 182 | 112 |
| 8/21/2017 | 260 | 140 | 448 | 82 |
| 8/28/2017 | 270 | 140 | 262 | 67 |
| 9/11/2017 | 230 | 92 | 140 | 28 |
| 9/25/2017 | 180 | 130 | 118 | 38 |
| 10/10/2017 | 310 | 180 | 133 | 14 |
| 10/24/2017 | 200 | 78 | 100 | 24 |
| 11/14/2017 | 110 | 42 | 330 | 14 |
| 11/28/2017 | 83 | 25 | 70 | 8 |
| 12/12/2017 | 56 | 28 | 39 | 21 |
| 12/19/2021 | 62 | 37 | 64 | 20 |
| 1/9/2018 | 79 | 52 | 69 | 26 |
| 1/25/2018 | 87 | 42 | 70 | 22 |
| 2/13/2018 | 110 | 47 | 54 | 18 |
| 2/20/2018 | 81 | 49 | 62 | 24 |
| 3/6/2018 | 96 | 50 | 53 | 25 |
| 3/28/2018 | 98 | 64 | 48 | 20 |
| 4/10/2018 | 220 | 110 | 60 | 20 |
| 4/17/2018 | 560 | 250 | 86 | 21 |
| 5/15/2018 | 220 | 97 | 560 | 33 |
| 5/21/2018 | 370 | 160 | 133 | 56 |
| 6/11/2019 | 240 | 110 | 275 | 44 |
| 6/18/2018 | 270 | 150 | 95 | 60 |
| 7/9/2018 | 240 | 140 | 85 | 58 |
| 7/23/2018 | 340 | 150 | 152 | 86 |
| 8/13/2018 | 280 | 110 | 260 | 60 |
| 8/20/2018 | 320 | 140 | 193 | 80 |
| 9/10/2018 | 230 | 120 | 307 | 52 |
| 9/17/2018 | 280 | 110 | 462 | 44 |
| 10/8/2018 | 150 | 62 | 488 | 27 |
| 10/23/2018 | 130 | 130 | 740 | 36 |
| 11/5/2018 | 130 | 62 | 144 | 13 |
| 11/19/2018 | 120 | 63 | 76 | 9.2 |
| 12/11/2018 | 59 | 20 | 44 | 6 |
| 12/19/2018 | | | 61 | 11 |
| 12/28/2018 | 52 | 26 | | |

**Treatment Plant Effluent Data (received from City of Skagway, 2/8/22): $BOD_5$ and TSS (cont.)**

| Date | BOD Influent | BOD Effluent | TSS Influent | TSS Effluent |
|---|---|---|---|---|
| 1/15/2019 | 62 | 22 | 32 | 12 |
| 1/22/2019 | 94 | 27 | 44 | 13 |
| 2/4/2019 | 56 | 22 | 64 | 14 |
| 2/12/2019 | 57 | 33 | 46 | 18 |
| 3/5/2019 | 82 | 50 | 70 | 19 |
| 3/26/2019 | 97 | 46 | 31 | 9.6 |
| 4/8/2019 | 160 | 57 | 114 | 13 |
| 4/22/2019 | 150 | 130 | 64 | 26 |
| 5/6/2019 | 220 | 110 | 92 | 41 |
| 5/20/2019 | 160 | 120 | 120 | 60 |
| 6/3/2019 | 200 | 120 | 88 | 64 |
| 6/27/2019 | 270 | 170 | 118 | 73 |
| 7/24/2019 | 610 | 200 | 460 | 105 |
| 7/29/2019 | 490 | 130 | 353 | 74 |
| 8/12/2019 | 240 | 150 | 167 | 80 |
| 8/27/2019 | 510 | 130 | 475 | 47 |
| 9/16/2019 | 320 | 110 | 268 | 56 |
| 9/24/2019 | 220 | 78 | 165 | 32 |
| 10/9/2019 | 420 | 160 | 233 | 16 |
| 10/21/2019 | 160 | 49 | 180 | 31 |
| 11/18/2019 | 130 | 28 | 130 | 17 |
| 11/25/2019 | 94 | 26 | 130 | 11 |
| 12/12/2019 | 140 | 33 | 130 | 11 |
| 12/17/2019 | 120 | 28 | 84 | 13 |
| 1/8/2020 | 86 | 50 | 84 | 22 |
| 1/27/2020 | 96 | 22 | 100 | 20 |
| 2/11/2020 | 300 | 38 | 440 | 20 |
| 2/24/2020 | 230 | 28 | 412 | 18 |
| 3/9/2020 | 130 | 32 | 176 | 18 |
| 3/23/2020 | 160 | 29 | 168 | 11 |
| 4/27/2020 | 220 | 54 | 167 | 19 |
| 4/28/2020 | 230 | 47 | 193 | 23 |
| 5/5/2020 | 460 | 46 | 404 | 20 |
| 5/28/2020 | 110 | 47 | 112 | 17 |
| 6/16/2020 | 300 | 67 | 208 | 40 |
| 6/25/2020 | 150 | 36 | 220 | 17 |
| 7/13/2020 | 110 | 57 | 118 | 30 |
| 7/21/2020 | 130 | 44 | 187 | 22 |
| 8/12/2020 | 110 | 49 | 90 | 22 |
| 8/25/2020 | 100 | 28 | 220 | 10 |
| 9/14/2020 | 160 | 44 | 127 | 21 |
| 9/22/2020 | 360 | 230 | 170 | 40 |
| 10/12/2020 | 110 | 56 | 95 | 30 |
| 10/28/2020 | 140 | 44 | 140 | 12 |
| 11/16/2020 | 49 | 28 | 109 | 16 |
| 11/24/2020 | 88 | 23 | 122 | 16 |
| 12/21/2020 | 66 | 26 | 206 | 18 |
| 12/28/2020 | 94 | 24 | 84 | 9 |

| Date | BOD Influent | BOD Effluent | TSS Influent | TSS Effluent |
|---|---|---|---|---|
| 1/4/2021 | 94 | 25 | 86 | 12 |
| 1/19/2021 | 39 | 21 | 58 | 15 |
| 2/16/2021 | 46 | 19 | 55 | 24 |
| 2/26/2021 | 81 | 18 | 84 | 10 |
| 3/8/2021 | 120 | 26 | 150 | 16 |
| 3/22/2021 | 110 | 32 | 166 | 12 |
| 4/5/2021 | 49 | 32 | 125 | 22 |
| 4/20/2021 | 190 | 120 | 400 | 40 |
| 5/18/2021 | 120 | 90 | 87 | 37 |
| 5/25/2021 | 200 | 39 | 450 | 17 |
| 6/14/2021 | 81 | 36 | 54 | 14 |
| 6/22/2021 | 130 | 63 | 100 | 13 |
| 7/14/2021 | 110 | 29 | 84 | 10 |
| 7/26/2021 | 90 | 38 | 160 | 14 |
| 8/9/2021 | 200 | 150 | 144 | 23 |
| 8/23/2021 | 1300 | 33 | 2740 | 11 |
| 9/7/2021 | 370 | 68 | 340 | 18 |
| 9/22/2021 | 360 | 44 | 870 | 17 |
| 10/18/2021 | 160 | 68 | 140 | 20 |
| 10/25/2021 | 150 | 45 | 136 | 11 |
| 11/8/2021 | 130 | 51 | 132 | 19 |
| 11/29/2021 | 100 | 28 | 112 | 18 |
| 12/13/2021 | 87 | 34 | 118 | 28 |
| 12/27/2021 | 300 | 31 | 305 | 20 |
| | | | | |
| | | | | |
| | | | | |
| **LIMIT (5/1-9/30)** | | **200** | | **140** |
| **LIMIT (10/1-4/30)** | **No limit** | **100** | **No limit** | **80** |
| Date | BOD inf | BOD eff | TSS inf | TSS effluent |
| 5/1 - 9/30 | | | | |
| **COUNT** | **50** | **50** | **50** | **50** |
| **MEAN** | **276** | **105** | **283** | **46** |
| **MIN** | **81** | **28** | **54** | **10** |
| **MAX** | **1300** | **230** | **2740** | **112** |
| **STDV** | **188** | **52** | **389** | **28** |
| **CV** | **0.68** | **0.49** | **1.37** | **0.62** |
| **5th** | **105** | **34** | **86** | **12** |
| **95th** | **501** | **186** | **522** | **103** |
| **50th** | **0** | | | |
| | | | | |
| **LIMIT (5/1-9/30)** | | **200** | | **140** |
| **LIMIT (10/1-4/30)** | **No limit** | **100** | **No limit** | **80** |
| Date | BOD inf | BOD eff | TSS inf | TSS effluent |
| 10/1 - 4/30 | | | | |
| **COUNT** | **70** | **70** | **70** | **70** |
| **MEAN** | **135** | **51** | **132** | **19** |
| **MIN** | **39** | **18** | **31** | **6** |
| **MAX** | **590** | **250** | **740** | **51** |
| **STDV** | **103** | **41** | **122** | **8** |
| **CV** | **0.76** | **0.81** | **0.92** | **0.41** |
| **5th** | **50** | **21** | **42** | **9** |
| **95th** | **306** | **130** | **407** | **32** |

## Treatment Plant Effluent Data, DMR: Chlorine and Fecal Coliform

| | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross |
|---|---|---|---|---|---|---|
| | **Chlorine** | **Chlorine** | **Chlorine** | **Chlorine** | **Coliform, fecal MF, M** | **Coliform, fecal M** |
| | micrograms per | micrograms pe | lbs per day | lbs per day | Number per 100 Millilite | Number per 100 |
| | DAILY MX | MO AVG | DAILY MX | MO AVG | DAILY MX | MO GEO |
| **LIMIT (5/1-9/30)** | | | | | | |
| **LIMIT (10/1-4/30)** | **240.0** | **120.0** | **1.3** | **0.6** | **1.50E+06** | **1,000,000** |
| Date | | | | | Effluent GrossColiform, | Effluent GrossCo |
| 12/31/2016 | 0.0 | 0.0 | 0.000 | 0 | 1700 | 1700 |
| 01/31/2017 | 0.0 | 0.0 | 0.000 | 0 | 1400 | 1400 |
| 02/28/2017 | 0.0 | 0.0 | 0.000 | 0 | 990 | 990 |
| 03/31/2017 | 0.0 | 0.0 | 0.000 | 0 | 450 | 450 |
| 04/30/2017 | 0.0 | 0.0 | 0.000 | 0 | 1400 | 1400 |
| 05/31/2017 | 0.0 | 0.0 | 0.000 | 0 | 53000 | 53000 |
| 06/30/2017 | 0.0 | 0.0 | 0.000 | 0 | 410000 | 410000 |
| 07/31/2017 | 0.0 | 0.0 | 0.000 | 0 | 50000 | 50000 |
| 08/31/2017 | 0.0 | 0.0 | 0.000 | 0 | 400000 | 400000 |
| 09/30/2017 | 10.0 | 5.0 | 0.028 | 0.0138 | 450 | 450 |
| 10/31/2017 | 0.0 | 0.0 | 0.000 | 0 | 540 | 540 |
| 11/30/2017 | 0.0 | 0.0 | 0.000 | 0 | 39000 | 39000 |
| 12/31/2017 | 0.0 | 0.0 | 0.000 | 0 | 8500 | 8500 |
| 01/31/2018 | 0.0 | 0.0 | 0.000 | 0 | 5000 | 5000 |
| 02/28/2018 | 0.0 | 0.0 | 0.000 | 0 | 16000 | 16000 |
| 03/31/2018 | 0.0 | 0.0 | 0.000 | 0 | 2000 | 2000 |
| 04/30/2018 | 30.0 | 10.0 | 0.065 | 0.0217 | 1400 | 1400 |
| 05/31/2018 | 0.0 | 0.0 | 0.000 | 0 | 73000 | 73000 |
| 06/30/2018 | 10.0 | 10.0 | 0.027 | 0.0266 | 37000 | 37000 |
| 07/31/2018 | 0.0 | 0.0 | 0.000 | 0 | 67000 | 67000 |
| 08/31/2018 | 10.0 | 2.5 | 0.026 | 0.0066 | 35000 | 35000 |
| 09/30/2018 | 20.0 | 10.0 | 0.043 | 0.0215 | 240000 | 240000 |
| 10/31/2018 | 0.0 | 0.0 | 0.000 | 0 | 3000 | 3000 |
| 11/30/2018 | 0.0 | 0.0 | 0.000 | 0 | 100 | 100 |
| 12/31/2018 | 0.0 | 0.0 | 0.000 | 0 | 630 | 630 |
| 01/31/2019 | 0.0 | 0.0 | 0.000 | 0 | 4300 | 4300 |
| 02/28/2019 | 0.0 | 0.0 | 0.000 | 0 | 8400 | 8400 |
| 03/31/2019 | 0.0 | 0.0 | 0.000 | 0 | 8600 | 8600 |
| 04/30/2019 | 0.0 | 0.0 | 0.000 | 0 | 2700 | 2700 |
| 05/31/2019 | 10.0 | 2.5 | 0.026 | 0.0063 | 27000 | 27000 |
| 06/30/2019 | 0.0 | 0.0 | 0.000 | 0 | 180000 | 180000 |
| 07/31/2019 | 0.0 | 0.0 | 0.000 | 0 | 870000 | 870000 |
| 08/31/2019 | 0.0 | 0.0 | 0.000 | 0 | 760000 | 760000 |
| 09/30/2019 | 0.0 | 0.0 | 0.000 | 0 | 57000 | 57000 |
| 10/31/2019 | 0.0 | 0.0 | 0.000 | 0 | 11000 | 11000 |
| 11/30/2019 | 0.0 | 0.0 | 0.000 | 0 | 5500 | 5500 |
| 12/31/2019 | 0.0 | 0.0 | 0.000 | 0 | 2100 | 2100 |
| 01/31/2020 | 0.0 | 0.0 | 0.000 | 0 | 9300 | 9300 |
| 02/29/2020 | 0.0 | 0.0 | 0.000 | 0 | 6000 | 6000 |
| 03/31/2020 | 20.0 | 5.0 | 0.036 | 0.0091 | 12000 | 12000 |
| 04/30/2020 | 160.0 | 53.0 | 0.283 | 0.095 | 3100 | 3100 |
| 05/31/2020 | 20.0 | 15.0 | 0.033 | 0.025 | 450 | 450 |
| 06/30/2020 | 17.0 | 15.0 | 0.032 | 0.028 | 11000 | 11000 |
| 07/31/2020 | 0.0 | 0.0 | 0.000 | 0 | 30000 | 30000 |
| 08/31/2020 | 0.0 | 0.0 | 0.000 | 0 | 3700 | 3700 |
| 09/30/2020 | 0.0 | 0.0 | 0.000 | 0 | 2300 | 2300 |
| 10/31/2020 | 0.0 | 0.0 | 0.000 | 0 | 5500 | 5500 |
| 11/30/2020 | 0.0 | 0.0 | 0.000 | 0 | 1300 | 1300 |
| 12/31/2020 | 0.0 | 0.0 | 0.000 | 0 | 630 | 630 |
| 01/31/2021 | 0.0 | 0.0 | 0.000 | 0 | 630 | 630 |
| 02/28/2021 | 0.0 | 0.0 | 0.000 | 0 | 6600 | 6600 |
| 03/31/2021 | 0.0 | 0.0 | 0.000 | 0 | 9600 | 9600 |
| 04/30/2021 | 0.0 | 0.0 | 0.000 | 0 | 44000 | 44000 |
| 05/31/2021 | 0.0 | 0.0 | 0.000 | 0 | 8600 | 8600 |
| 06/30/2021 | 160.0 | 5.0 | 0.401 | 0.01 | 1500 | 1500 |
| 07/31/2021 | 400.0 | 208.0 | 0.804 | 0.4029 | 100 | 100 |
| 08/31/2021 | | | | | | |
| 09/30/2021 | 110.0 | 67.0 | 0.171 | 0.1128 | 900 | 900 |
| 10/31/2021 | | | | | | |
| **Year-round** | | | | | | |
| **COUNT** | **13** | **13** | **13** | **13** | **57** | **57** |
| **MEAN** | **75** | **31** | **0.15** | **0.06** | **62129** | **62129** |
| **MIN** | **10** | **3** | **0.03** | **0.01** | **100** | **100** |
| **MAX** | **400** | **208** | **0.80** | **0.40** | **870000** | **870000** |
| **STDV** | **113** | **57** | **0.23** | **0.11** | **166904** | **166904** |
| **CV** | **1.50** | **1.81** | **1.51** | **1.81** | **2.69** | **2.69** |
| **5th** | **10** | **3** | **0.03** | **0.01** | **415** | **415** |
| **95th** | **256** | **123** | **0.56** | **0.23** | **445000** | **445000** |
| **99th** | | | | | | **808400** |

**Treatment Plant Effluent Data, DMR: Copper and Flow**

| | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross |
|---|---|---|---|---|---|---|
| | **Copper, total rec** | **Copper, total r** | **Copper, total recove** | **Copper, total recove** | **Flow, in conduit c** | **Flow, in condu** |
| | Micrograms per L | Micrograms per | Lbs per day | Lbs per day | Million Gallons per | Million Gallons p |
| | DAILY MX | MO AVG | DAILY MAX | MO AVG | DAILY MX | MO AVG |
| **LIMIT (5/1-9/30)** | | | | | | |
| **LIMIT (10/1-4/30)** | **210** | **150** | **1.1** | **0.8** | **0.63** | **0.53** |
| Date | Effluent GrossCop | Effluent GrossC | Effluent GrossCopper | Effluent GrossCopper | Effluent GrossFlow | Effluent GrossF |
| 12/31/2016 | 50 | 50 | 0.1238 | 0.1238 | 0.3446 | 0.2968 |
| 01/31/2017 | 95 | 95 | 0.2357 | 0.2357 | 0.4296 | 0.2975 |
| 02/28/2017 | 82 | 82 | 0.2011 | 0.2011 | 0.49 | 0.294 |
| 03/31/2017 | 78 | 78 | 0.1618 | 0.1618 | 0.3036 | 0.2488 |
| 04/30/2017 | 100 | 100 | 0.1702 | 0.1702 | 0.2281 | 0.2041 |
| 05/31/2017 | 24 | 24 | 0.0608 | 0.0608 | 0.3876 | 0.3039 |
| 06/30/2017 | 31 | 31 | 0.0901 | 0.0901 | 0.3967 | 0.3484 |
| 07/31/2017 | 36 | 36 | 0.0997 | 0.0997 | 0.3683 | 0.332 |
| 08/31/2017 | 44 | 44 | 0.1138 | 0.1138 | 0.3314 | 0.31 |
| 09/30/2017 | 17 | 17 | 0.0469 | 0.0469 | 0.3962 | 0.3305 |
| 10/31/2017 | 9.3 | 9.3 | 0.0192 | 0.0192 | 0.334 | 0.2479 |
| 11/30/2017 | 21 | 21 | 0.0388 | 0.0388 | 0.2472 | 0.2217 |
| 12/31/2017 | 9.5 | 9.5 | 0.0197 | 0.0197 | 0.3292 | 0.2482 |
| 01/31/2018 | 18 | 18 | 0.036 | 0.036 | 0.311 | 0.2397 |
| 02/28/2018 | 11 | 11 | 0.0241 | 0.0241 | 0.3049 | 0.2624 |
| 03/31/2018 | 16 | 16 | 0.0335 | 0.0335 | 0.2935 | 0.2512 |
| 04/30/2018 | 12 | 12 | 0.026 | 0.026 | 0.3407 | 0.2596 |
| 05/31/2018 | 15 | 15 | 0.0375 | 0.0375 | 0.3476 | 0.3 |
| 06/30/2018 | 19 | 19 | 0.0505 | 0.0505 | 0.3582 | 0.3184 |
| 07/31/2018 | 28 | 28 | 0.0728 | 0.0728 | 0.3366 | 0.3116 |
| 08/31/2018 | 29 | 29 | 0.0767 | 0.0767 | 0.4161 | 0.317 |
| 09/30/2018 | 35 | 35 | 0.0751 | 0.0751 | 0.2996 | 0.2572 |
| 10/31/2018 | 12 | 12 | 0.0209 | 0.0209 | 0.3839 | 0.2402 |
| 11/30/2018 | 5.8 | 5.8 | 0.0107 | 0.0107 | 0.2651 | 0.227 |
| 12/31/2018 | 5.7 | 5.7 | 0.0118 | 0.0118 | 0.3391 | 0.248 |
| 01/31/2019 | 7.8 | 7.8 | 0.0159 | 0.0159 | 0.3197 | 0.2571 |
| 02/28/2019 | 9 | 9 | 0.0177 | 0.0177 | 0.36 | 0.2363 |
| 03/31/2019 | 17 | 17 | 0.3281 | 0.3281 | 0.4161 | 0.2314 |
| 04/30/2019 | 11 | 11 | 0.0232 | 0.0232 | 0.3263 | 0.2524 |
| 05/31/2019 | 26 | 26 | 0.0651 | 0.0651 | 0.3494 | 0.3 |
| 06/30/2019 | 22 | 22 | 0.0639 | 0.0639 | 0.3693 | 0.3482 |
| 07/31/2019 | 35 | 35 | 0.0916 | 0.0916 | 0.3633 | 0.3138 |
| 08/31/2019 | 36 | 36 | 0.1032 | 0.1032 | 0.3894 | 0.3437 |
| 09/30/2019 | 28 | 28 | 0.0717 | 0.0717 | 0.3826 | 0.3072 |
| 10/31/2019 | 21 | 21 | 0.0401 | 0.0401 | 0.3328 | 0.2287 |
| 11/30/2019 | 13 | 13 | 0.023 | 0.023 | 0.2738 | 0.2121 |
| 12/31/2019 | 13 | 13 | 0.0243 | 0.0243 | 0.2764 | 0.2241 |
| 01/31/2020 | 17 | 17 | 0.0418 | 0.0418 | 0.3519 | 0.295 |
| 02/29/2020 | 13 | 13 | 0.0258 | 0.0258 | 0.3288 | 0.2383 |
| 03/31/2020 | 5.6 | 5.6 | 0.0102 | 0.0102 | 0.2518 | 0.2176 |
| 04/30/2020 | 6.9 | 6.9 | 0.0123 | 0.0123 | 0.2585 | 0.2142 |
| 05/31/2020 | 3.4 | 3.4 | 0.0057 | 0.0057 | 0.2484 | 0.1995 |
| 06/30/2020 | 18 | 18 | 0.0336 | 0.0336 | 0.2621 | 0.2241 |
| 07/31/2020 | 21 | 21 | 0.039 | 0.039 | 0.2523 | 0.2228 |
| 08/31/2020 | 5 | 5 | 0.0093 | 0.0093 | 0.2523 | 0.2228 |
| 09/30/2020 | 5.3 | 5.3 | 0.0084 | 0.0084 | 0.2477 | 0.1908 |
| 10/31/2020 | 15 | 15 | 0.0255 | 0.0255 | 0.229 | 0.1528 |
| 11/30/2020 | 9.6 | 9.6 | 0.0164 | 0.0164 | 0.2853 | 0.2047 |
| 12/31/2020 | 6.4 | 6.4 | 0.02 | 0.02 | 0.9149 | 0.3745 |
| 01/31/2021 | 8.2 | 8.2 | 0.0154 | 0.0154 | 0.364 | 0.2258 |
| 02/28/2021 | 8.4 | 8.4 | 0.021 | 0.021 | 0.4179 | 0.2997 |
| 03/31/2021 | 13 | 13 | 0.025 | 0.025 | 0.3403 | 0.2306 |
| 04/30/2021 | 16 | 16 | 0.0251 | 0.0251 | 0.2917 | 0.188 |
| 05/31/2021 | 14 | 14 | 0.0213 | 0.0213 | 0.2582 | 0.1825 |
| 06/30/2021 | 12 | 12 | 0.0241 | 0.0241 | 0.3005 | 0.241 |
| 07/31/2021 | 11 | 11 | 0.0214 | 0.0214 | 0.3892 | 0.2328 |
| 08/31/2021 | | | | | | |
| 09/30/2021 | 13 | 13 | 0.0219 | 0.0219 | 0.2612 | 0.2019 |
| 10/31/2021 | | | | | | |
| **Year-round** | | | | | | |
| **COUNT** | **57** | **57** | **57** | **57** | **57** | **57** |
| **MEAN** | **22** | **22** | **0.055** | **0.055** | **0.34** | **0.26** |
| **MIN** | **3** | **3** | **0.006** | **0.006** | **0.23** | **0.15** |
| **MAX** | **100** | **100** | **0.328** | **0.328** | **0.91** | **0.37** |
| **STDV** | **21** | **21** | **0.061** | **0.061** | **0.10** | **0.05** |
| **CV** | **0.96** | **0.96** | **1.11** | **1.113** | **0.287** | **0.191** |
| **5th** | **5** | **5** | **0.009** | **0.009** | **0.25** | **0.19** |
| **95th** | **83** | **83** | **0.205** | **0.205** | **0.4356** | **0.3482** |

## Treatment Plant Effluent Data, DMR: DO, pH, Temperature

| | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross | Effluent Gross |
|---|---|---|---|---|---|---|
| | Oxygen, dissolv | Oxygen, dissolved | pH | pH | Temperature, v | Temperature, |
| | Milligrams per Lit | Milligrams per Liter | Standard Units | Standard Units | Degrees Centigr | Degrees Centig |
| | DAILY MX | DAILY MN | MAXIMUM | MINIMUM | DAILY MAX | MO AVG |
| LIMIT (5/1-9/30) | | | | | | |
| LIMIT (10/1-4/30) | 17 mg/L | 2.0 mg/L | 9 | 6 | No limit | |
| Date | | Effluent GrossOxyg | Effluent GrosspH | Effluent GrosspH | Standard UnitsM | Effluent GrossT |
| 12/31/2016 | 11.78 | 10.68 | 6.97 | 6.83 | 9.2 | 8.63 |
| 01/31/2017 | 11.83 | 10.75 | 6.97 | 6.83 | 8.4 | 7.88 |
| 02/28/2017 | 11.7 | 10.77 | 6.94 | 6.8 | 7.7 | 7.03 |
| 03/31/2017 | 11.9 | 10.87 | 6.99 | 6.57 | 8.5 | 8.05 |
| 04/30/2017 | 9.49 | 7.27 | 7.07 | 6.93 | 9.6 | 8.6 |
| 05/31/2017 | 7.54 | 6.91 | 6.94 | 6.85 | 12.6 | 10.8 |
| 06/30/2017 | 8.99 | 5.9 | 7.1 | 6.97 | 14.4 | 13.85 |
| 07/31/2017 | 10.54 | 5.51 | 7.09 | 6.96 | 15.4 | 14.53 |
| 08/31/2017 | 8.97 | 4.45 | 7.1 | 7.05 | 16.6 | 15.75 |
| 09/30/2017 | 7.92 | 6.01 | 7.02 | 6.85 | 13.3 | 12.93 |
| 10/31/2017 | 11.68 | 7.13 | 7.07 | 6.99 | 11.7 | 11 |
| 11/30/2017 | 6.02 | 5.15 | 7.1 | 6.88 | 10.6 | 9.5 |
| 12/31/2017 | 6.64 | 5.83 | 7.25 | 6.92 | 8.7 | 7.9 |
| 01/31/2018 | 6.03 | 3.7 | 7.22 | 7.11 | 7.3 | 7.1 |
| 02/28/2018 | 12.93 | 6.18 | 7.15 | 7.05 | 6.8 | 6.5 |
| 03/31/2018 | 11.87 | 9.28 | 7.11 | 6.99 | 8.6 | 7.2 |
| 04/30/2018 | 11.75 | 9.24 | 7.07 | 6.92 | 9.4 | 8.1 |
| 05/31/2018 | 10.71 | 9.15 | 6.96 | 6.86 | 11.7 | 10.5 |
| 06/30/2018 | 9.58 | 8.82 | 6.99 | 6.94 | 12.9 | 12.4 |
| 07/31/2018 | 7.59 | 4.35 | 7.25 | 6.93 | 17.8 | 16.2 |
| 08/31/2018 | 9.72 | 6.92 | 7.58 | 7.06 | 17.8 | 15.3 |
| 09/30/2018 | 9.92 | 7.8 | 7.2 | 6.95 | 15.7 | 14.3 |
| 10/31/2018 | 10.58 | 10.1 | 7.19 | 6.68 | 12.6 | 12.2 |
| 11/30/2018 | 10.73 | 10.28 | 7.1 | 6.9 | 13.4 | 13 |
| 12/31/2018 | 10.85 | 10.28 | 7.14 | 6.98 | 12.2 | 11.4 |
| 01/31/2019 | 11.02 | 10.76 | 7.16 | 6.97 | 11.3 | 10.9 |
| 02/28/2019 | 10.75 | 10.5 | 7.28 | 7.04 | 12.9 | 12.3 |
| 03/31/2019 | 10.96 | 10.46 | 7.22 | 6.9 | 11.7 | 11.4 |
| 04/30/2019 | 11.01 | 9.53 | 6.98 | 6.77 | 12.7 | 11.35 |
| 05/31/2019 | 10.7 | 6.65 | 7.26 | 7.05 | 15.2 | 13.78 |
| 06/30/2019 | 9.18 | 4.74 | 7.32 | 7.09 | 18.6 | 17.3 |
| 07/31/2019 | 9.49 | 7.56 | 7.53 | 7.13 | 17.4 | 16.8 |
| 08/31/2019 | 16.33 | 5.32 | 7.35 | 6.66 | 18.8 | 17.25 |
| 09/30/2019 | 16.75 | 10.39 | 7.04 | 6.76 | 16.8 | 15.75 |
| 10/31/2019 | 13.2 | 7.13 | 7.15 | 6.83 | 14.5 | 13.6 |
| 11/30/2019 | 12.4 | 9.6 | 7 | 6.91 | 13.4 | 13.1 |
| 12/31/2019 | 16.8 | 8.8 | 7.16 | 6.66 | 11.7 | 10.9 |
| 01/31/2020 | 16.75 | 5.5 | 6.91 | 6.65 | 13.1 | 12.7 |
| 02/29/2020 | 16.55 | 6.98 | 6.89 | 6.64 | 14.5 | 12 |
| 03/31/2020 | 14.6 | 8.71 | 6.78 | 6.54 | 13.6 | 11.8 |
| 04/30/2020 | 14.4 | 5.4 | 6.78 | 6.66 | 15.1 | 13.2 |
| 05/31/2020 | 12.25 | 9.6 | 6.81 | 6.65 | 14.9 | 14.4 |
| 06/30/2020 | 12.4 | 9.6 | 7.06 | 7 | 14.2 | 13.9 |
| 07/31/2020 | 9.95 | 9.73 | 7 | 7 | 16.5 | 16.4 |
| 08/31/2020 | 10.4 | 9.6 | 7.04 | 7 | 17.6 | 16.7 |
| 09/30/2020 | 10.01 | 9.73 | 7.01 | 7 | 17.6 | 17.4 |
| 10/31/2020 | 10.4 | 9.6 | 7.04 | 7.01 | 15 | 14.5 |
| 11/30/2020 | 10.2 | 9.8 | 7.02 | 7.01 | 15.7 | 15.4 |
| 12/31/2020 | 9.65 | 5.6 | 7.6 | 6.81 | 15.1 | 14.9 |
| 01/31/2021 | 10.05 | 9.17 | 7.04 | 6.84 | 13.7 | 11.5 |
| 02/28/2021 | 10.9 | 8.73 | 7.04 | 6.83 | 12.2 | 11.4 |
| 03/31/2021 | 14.33 | 10.4 | 7.04 | 6.98 | 14.2 | 13.9 |
| 04/30/2021 | 10.2 | 8.71 | 7.04 | 6.99 | 14.4 | 47 |
| 05/31/2021 | 10.16 | 9.16 | 7.12 | 6.95 | | |
| 06/30/2021 | 9.52 | 8.58 | 6.82 | 6.74 | | |
| 07/31/2021 | 10.34 | 8.18 | 6.7 | 6.6 | | |
| 08/31/2021 | | | | | | |
| 09/30/2021 | 9.77 | 8.92 | 6.79 | 6.69 | | |
| 10/31/2021 | | | | | | |
| Year-round | | | | | | |
| COUNT | 57 | 57 | 57 | 57 | 53 | 53 |
| MEAN | 11.03 | 8.18 | 7.08 | 6.88 | 13 | 13 |
| MIN | 6.02 | 3.70 | 6.70 | 6.54 | 6.80 | 6.50 |
| MAX | 16.80 | 10.87 | 7.60 | 7.13 | 19 | 47 |
| STDV | 2.49 | 2.03 | 0.18 | 0.15 | 3.09 | 5.62 |
| CV | 0.226 | 0.248 | 0.026 | 0.022 | 0.232 | 0.430 |
| 5th | 6.58 | 4.44 | 6.78 | 6.60 | 7.58 | 7.08 |
| 95th | 17 | 11 | 7.5 | 7.1 | 18 | 17 |

## Receiving Water Data, Taiya Inlet, Permit Application

| Sample Site Locations and Orientation to ZID | | | | | |
|---|---|---|---|---|---|
| Site# | Orientation | Lattitude | Longitude | | |
| 1 | Center ZID | **59.4484** | -135.3269 | | |
| 2 | East Boundary of ZID | **59.4484** | -135.3260 | | |
| 3 | 200 m East of ZID boundary | 59.4484 | -135.3235 | Reference | |
| 4 | West Boundary of ZID | 59.4487 | -135.3272 | | |
| 5 | 200 m West of ZID boundary | 59.4488 | -135.3293 | Reference | |

| | | | | |
|---|---|---|---|---|
| 1 | mid depth = 9.14 m | bottom depth = 18.29 m | | |
| 2 | mid depth= 9.14 m | bottom depth= 18.29 m | | |
| 3 | mid depth= 9.14 m | bottom depth = 18.29 m | | |
| 4 | mid depth = 9.14 m | bottom depth = 15.24 m | | |
| 5 | mid depth= 9.14 m | bottom depth = 15.24 m | | |

## Receiving Water Data, Taiya Inlet, Permit Application

**Table 2-5 Results from Subpart G questionnaire**

| Site# M/DN | Temp C | Cond mS/cm | TDS g/l | Salinty ppt | D.O mg/l | pH S.U. | Turb. NTU | Depth |
|---|---|---|---|---|---|---|---|---|
| **Site# 1** | 7.30 | 19.58 | 19.23 | 18.16 | 12.04 | 7.96 | 0.50 | surface |
| 10/28/2002 | 7.58 | 20.72 | 20.19 | 19.15 | 11.54 | 7.96 | 0.90 | |
| | 7.63 | 21.45 | 20.86 | 19.86 | 11.64 | 7.96 | 0.60 | |
| | 7.57 | 21.70 | 21.15 | 20.15 | 11.40 | 7.96 | 0.50 | |
| | 7.49 | 25.15 | 24.56 | 23.73 | 10.59 | 7.93 | 0.40 | |
| | 7.66 | 30.54 | 29.68 | 29.25 | 9.81 | 7.89 | 0.40 | mid |
| | 7.59 | 30.80 | 30.00 | 29.59 | 9.36 | 7.89 | 0.60 | |
| | 7.52 | 30.94 | 30.19 | 29.79 | 9.17 | 7.89 | 0.70 | |
| | 7.49 | 30.99 | 30.26 | 29.87 | 9.09 | 7.88 | 0.70 | |
| | 7.42 | 31.13 | 30.46 | 30.08 | 9.04 | 7.89 | 0.60 | |
| | 7.39 | 31.16 | 30.52 | 30.14 | 9.03 | 7.89 | 0.50 | |
| | 7.37 | 31.21 | 30.59 | 30.22 | 8.99 | 7.89 | 0.50 | bottom |
| **Site# 2** | 7.38 | 19.62 | 19.22 | 18.15 | 11.26 | 7.89 | 0.80 | surface |
| 10/28/2002 | 7.56 | 20.53 | 20.01 | 18.97 | 11.08 | 7.94 | 1.10 | |
| | 7.62 | 21.65 | 21.07 | 20.07 | 10,98 | 7.94 | 0.90 | |
| | 7.57 | 21.91 | 21.35 | 20.37 | 11.01 | 7.93 | 1.00 | |
| | 7.55 | 26.21 | 25.55 | 24.79 | 9.15 | 7.90 | 0.00 | |
| | 7.69 | 30.35 | 29.47 | 29.03 | 9.11 | 7.88 | 0.5 | |
| | 7.60 | 30.77 | 29.95 | 29.55 | 8.69 | 7.88 | 0.6 | mid |
| | 7.51 | 30.94 | 30.21 | 29.81 | 8.2 | 7.87 | 0.8 | |
| | 7.50 | 31.01 | 30.27 | 29.88 | 7.67 | 7.88 | 0.8 | |
| | 7.46 | 31.02 | 30.32 | 29.93 | 8.39 | 7.87 | 0.8 | |
| | 7.45 | 31.12 | 30.43 | 30.05 | 7.62 | 7.88 | 0.5 | |
| | 7.42 | 31.15 | 30.48 | 30.1 | 7.67 | 7.88 | 0.7 | bottom |
| **Site #4** | 7.44 | 19.90 | 19.47 | 18.40 | 12.43 | 8.00 | 0.80 | surface |
| 10/28/2002 | 7.60 | 20.87 | 20.32 | 19.30 | 12.34 | 7.98 | 0.80 | |
| | 7.60 | 20.91 | 20.36 | 19.34 | 12.15 | 7.98 | 0.80 | |
| | 7.58 | 21.87 | 21.30 | 20.31 | 11.97 | 7.97 | 0.70 | |
| | 7.55 | 24.92 | 24.29 | 23.45 | 11.00 | 7.94 | 0.50 | |
| | 7.69 | 30.42 | 29.54 | 29.10 | 10.02 | 7.90 | 0.50 | mid |
| | 7.60 | 30.71 | 29.90 | 29.48 | 9.65 | 7.90 | 0.70 | |
| | 7.55 | 30.83 | 30.05 | 29.65 | 9.42 | 7.89 | 0.50 | |
| | 7.44 | 31.01 | 30.33 | 29.94 | 9.35 | 7.89 | 0.60 | |
| | 7.37 | 31.21 | 30.59 | 30.22 | 9.27 | 7.89 | 0.70 | |
| | 7.38 | 31.21 | 30.58 | 30.21 | 9.27 | 7.89 | 0.60 | |
| | 7.36 | 31.22 | 30.60 | 30.23 | 9.25 | 7.89 | 0.60 | bottom |
| **Site #5** | 7.38 | 19.60 | 19.21 | 18.14 | 13.00 | 7.99 | 1.00 | surface |
| 10/28/2002 | 7.59 | 20.80 | 20.26 | 19.23 | 12.67 | 7.98 | 0.80 | |
| | 7.64 | 21.42 | 20.83 | 19.83 | 12.42 | 7.98 | 0.80 | |
| | 7.67 | 26.18 | 25.44 | 24.68 | 11.11 | 7.90 | 0.20 | |
| | 7.71 | 29.74 | 28.87 | 28.37 | 10.54 | 7.90 | 0.50 | |
| | 7.67 | 30.05 | 29.19 | 28.72 | 10.01 | 7.91 | 0.60 | |
| | 7.57 | 30.74 | 29.95 | 29.54 | 10.04 | 7.90 | 0.50 | mid |
| | 7.54 | 30.87 | 30.11 | 29.71 | 9.77 | 7.90 | 0.60 | |
| | 7.47 | 30.99 | 30.28 | 29.89 | 9.67 | 7.90 | 0.60 | |
| | 7.44 | 31.00 | 30.31 | 29.92 | 9.53 | 7.89 | 0.60 | |
| | 7.40 | 31.08 | 30.43 | 30.05 | 9.50 | 7.90 | 0.60 | |
| | 7.41 | 31.02 | 30.37 | 29.98 | 9.41 | 7.90 | 1.00 | bottom |

## Receiving Water Data, Taiya Inlet, Permit Application

| | Temp C | Cond mS/cm | TDS g/l | Salinty ppt | D.O mg/l | pH S.U. | Turb. NTU | Depth |
|---|---|---|---|---|---|---|---|---|
| **Site# 1** | 10.09 | 0.56 | 0.51 | 0.38 | 1.72 | 8.04 | 17.20 | surface |
| 7/19/2004 | 12.44 | 7.54 | 6.44 | 5.61 | 2.49 | 7.89 | 29.40 | |
| | 12.41 | 10.02 | 8.58 | 7.63 | 2.35 | 7.96 | 19.80 | |
| | 12.32 | 11.69 | 10.03 | 9.03 | 2.20 | 7.97 | 19.10 | |
| | 11.95 | 13.44 | 11.63 | 10.60 | 2.15 | 8.01 | 19.00 | |
| | **8.49** | 24.07 | 22.85 | 21.99 | 1.86 | 7.82 | 21.30 | |
| | 7.24 | 27.46 | 27.01 | 26.33 | 1.69 | 7.77 | 19.50 | mid |
| | 6.70 | 28.71 | 28.69 | 28.10 | 1.58 | 7.75 | 19.00 | |
| | 6.92 | 28.74 | 28.53 | 27.95 | 1.39 | 7.74 | 19.20 | |
| | 5.68 | 29.75 | 30.65 | 30.11 | 1.37 | 7.68 | 20.20 | |
| | 6.17 | 29.83 | 30.27 | 29.76 | 1.21 | 7.68 | 31.40 | |
| | 5.66 | 29.89 | 30.81 | 30.28 | 1.27 | 7.67 | 18.50 | |
| | 5.66 | 29.94 | 30.86 | 30.34 | 1.19 | 7.66 | 21.40 | bottom |
| **Site #2** | 12.30 | 5.46 | 4.69 | 3.99 | 8.47 | 7.40 | 21.90 | surface |
| 7/19/2004 | 12.74 | 7.97 | 6.77 | 5.91 | 6.71 | 7.70 | 19.70 | |
| | 12.67 | 8.75 | 7.44 | 6.54 | 6.31 | 7.82 | 19.60 | |
| | 11.84 | 13.10 | 11.38 | 10.34 | 5.60 | 7.83 | 20.30 | |
| | 10.54 | 17.40 | 15.62 | 14.57 | 5.01 | 7.81 | 21.00 | |
| | 7.16 | 26.91 | 26.53 | 25.81 | 4.30 | 7.66 | 19.80 | mid |
| | 6.60 | 28.62 | 28.68 | 28.07 | 3.96 | 7.65 | 19.60 | |
| | 6.28 | 29.18 | 29.52 | 28.96 | 3.69 | 7.63 | 17.60 | |
| | 6.07 | 29.39 | 29.93 | 29.37 | 3.52 | 7.62 | 18.30 | |
| | 5.62 | 29.57 | 30.52 | 29.96 | 3.30 | 7.59 | 18.20 | |
| | 5.91 | 29.62 | 30.30 | 29.76 | 2.84 | 7.61 | 19.00 | |
| | 5.19 | 29.62 | 30.97 | 30.40 | 3.12 | 7.57 | 45.10 | bottom |
| **Site# 3** | 10.40 | 4.64 | 4.18 | 3.53 | 2.62 | 7.98 | 32.90 | surface |
| | | | | | | | | |
| 7/19/2004 | 12.24 | 7.77 | 6.67 | 5.82 | 2.13 | 7.88 | 25.70 | |
| | 12.58 | 11.34 | 9.67 | 8.68 | 2.21 | 7.99 | 19.80 | |
| | 12.47 | 10.91 | 9.33 | 8.35 | 2.34 | 8.04 | 19.00 | |
| | 11.45 | 15.04 | 13.19 | 12.14 | 2.33 | 8.00 | 20.20 | |
| | 9.71 | 20.46 | 18.79 | 17.79 | 2.13 | 7.88 | 21.00 | |
| | 7.33 | 27.28 | 26.77 | 26.08 | 1.93 | 7.77 | 19.20 | mid |
| | 6.67 | 28.55 | 28.55 | 27.94 | 1.82 | 7.75 | 19.80 | |
| | 6.39 | 29.12 | 29.37 | 28.80 | 1.68 | 7.72 | 19.70 | |
| | 5.97 | 29.69 | 30.32 | 29.79 | 1.58 | 7.70 | 19.30 | |
| | 5.67 | 29.82 | 30.72 | 30.19 | 1.41 | 7.67 | 18.70 | |
| | 5.70 | 29.87 | 30.75 | 30.22 | 1.44 | 7.66 | 18.70 | |
| | 5.22 | 29.85 | 31.18 | 30.63 | 1.38 | 7.63 | 18.40 | |
| | 4.90 | 29.79 | 31.43 | 30.86 | 1.24 | 7.59 | 17.40 | bottom |
| **Site #4** | 11.73 | 8.12 | 7.07 | 6.20 | 3.53 | 7.92 | 24.00 | surface |
| 7/19/2004 | 11.44 | 7.33 | 6.43 | 5.59 | 3.68 | 7.98 | 25.50 | |
| | 12.00 | 8.01 | 6.93 | 6.06 | 3.47 | 7.93 | 25.00 | |
| | 11.98 | 10.80 | 9.35 | 8.36 | 3.31 | 7.94 | 20.90 | |
| | 11.67 | 10.93 | 9.53 | 8.54 | 3.30 | 7.99 | 21.40 | |
| | 11.85 | 10.96 | 9.51 | 8.53 | 3.31 | 8.02 | 20.80 | |
| | 10.56 | 15.81 | 14.19 | 13.12 | 3.04 | 7.94 | 21.20 | |
| | 10.58 | 15.70 | 14.09 | 13.02 | 2.90 | 7.95 | 21.10 | mid |
| | 8.60 | 23.95 | 22.67 | 21.80 | 2.62 | 7.83 | 20.10 | |
| | 7.10 | 27.94 | 27.60 | 26.95 | 2.40 | 7.77 | 17.80 | |
| | 6.68 | 28.87 | 28.86 | 28.28 | 2.21 | 7.75 | 18.50 | |
| | 6.36 | 29.50 | 29.78 | 29.24 | 2.08 | 7.73 | 18.80 | |
| | 5.78 | 29.88 | 30.69 | 30.17 | 1.95 | 7.69 | 18.20 | |
| | 5.59 | 30.03 | 31.02 | 30.50 | 1.73 | 7.67 | 17.20 | |
| | 5.58 | 30.04 | 31.04 | 30.52 | 1.68 | 7.66 | 28.50 | bottom |
| **Site# 5** | 12.24 | 7.02 | 6.03 | 5.22 | 3.34 | 7.90 | 23.80 | surface |
| 7/19/2004 | 12.47 | 8.56 | 7.32 | 6.43 | 3.47 | 7.93 | 19.90 | |
| | 12.42 | 11.73 | 10.04 | 9.04 | 3.44 | 7.93 | 19.30 | |
| | 12.59 | 12.58 | 10.72 | 9.70 | 3.40 | 8.08 | 18.50 | |
| | 10.63 | 17.48 | 15.66 | 14.61 | 3.28 | 7.94 | 21.70 | |
| | 7.67 | 26.43 | 25.68 | 24.94 | 2.96 | 7.77 | 21.30 | |
| | 6.64 | 28.52 | 28.55 | 27.93 | 2.76 | 7.73 | 19.70 | mid |
| | 6.22 | 29.35 | 29.75 | 29.19 | 2.54 | 7.70 | 20.70 | |
| | 6.20 | 29.39 | 29.80 | 29.25 | 2.45 | 7.70 | 20.30 | |
| | 6.21 | 29.48 | 29.89 | 29.34 | 2.30 | 7.69 | 21.00 | |
| | 5.32 | 29.79 | 31.02 | 30.47 | 2.32 | 7.63 | 16.90 | |
| | 5.28 | 29.81 | 31.09 | 30.54 | 1.96 | 7.62 | 17.20 | |
| | 5.25 | 29.83 | 31.14 | 30.58 | 1.83 | 7.61 | 17.40 | |
| | 10.95 | 4.87 | 4.33 | 3.66 | 2.40 | 7.98 | 31.60 | bottom |

# Receiving Water Data, Taiya Inlet, Permit Application

| Site# M/DN | Temp C | Cond mS/cm | TDS g/l | Salinty ppt | D.O mg/l | pH S.U. | Turb. NTU | Depth |
|---|---|---|---|---|---|---|---|---|
| **Site# 1** | 9.34 | 24.70 | 22.91 | 22.09 | 9.41 | 7.82 | 4.20 | surface |
| 8/23/2004 | 9.19 | 25.14 | 23.41 | 22.62 | 9.32 | 7.80 | 2.90 | |
| | 8.71 | 27.38 | 25.84 | 25.18 | 9.23 | 7.75 | 1.30 | |
| | 8.69 | 27.39 | 25.86 | 25.20 | 9.25 | 7.75 | 1.60 | |
| | 8.08 | 28.79 | 27.65 | 27.08 | 9.17 | 7.70 | 0.80 | |
| | 7.59 | 29.95 | 29.17 | 28.69 | 8.84 | 7.67 | 0.40 | |
| | 7.21 | 30.60 | 30.13 | 29.70 | 8.66 | 7.65 | 0.30 | mid |
| | 6.81 | 30.98 | 30.86 | 30.46 | 8.47 | 7.62 | 0.20 | |
| | 6.76 | 31.070 | 30.990 | 30.59 | 8.39 | 7.6 | -0.2 | |
| | 6.73 | 31.090 | 31.040 | 30.65 | 8.33 | 7.61 | -0.1 | |
| | 6.58 | 31.260 | 31.350 | 30.97 | 8.32 | 7.61 | 0.3 | |
| | 6.58 | 31.270 | 31.360 | 30.98 | 8.31 | 7.6 | 0.1 | |
| | 9.40 | 24.300 | 22.500 | 21.66 | 10.37 | 7.85 | 4.6 | |
| | 9.01 | 25.710 | 24.060 | 23.29 | 10.02 | 7.79 | 3.2 | |
| | 8.81 | 26.950 | 25.350 | 24.66 | 9.82 | 7.78 | 2.4 | bottom |
| **Site#** 2 | 9.32 | 23.970 | 22.240 | 21.38 | 12.59 | 7.86 | 4.7 | surface |
| 8/23/2004 | 9.30 | 24.240 | 22.500 | 21.66 | 12.61 | 7.88 | 4.6 | |
| | 9.21 | 25.610 | 23.840 | 23.07 | 12.47 | 7.87 | 4.3 | |
| | 8.71 | 27.490 | 25.940 | 25.28 | 12.07 | 7.8 | 2.5 | |
| | 8.31 | 28.240 | 26.940 | 26.33 | 11.24 | 7.74 | 0.6 | |
| | 7.37 | 30.520 | 29.910 | 29.48 | 11 | 7.7 | 0.1 | |
| | 7.50 | 30.280 | 29.560 | 29.11 | 10.61 | 7.69 | 0.3 | mid |
| | 6.95 | 31.030 | 30.780 | 30.39 | 10.53 | 7.67 | 0.3 | |
| | 6.81 | 31.150 | 31.020 | 30.63 | 10.37 | 7.65 | 0 | |
| | 6.68 | 31.260 | 31.250 | 30.88 | 10.28 | 7.64 | 0.2 | |
| | 6.56 | 31.410 | 31.520 | 31.16 | 10.23 | 7.64 | 0.2 | |
| | 6.50 | 31.520 | 31.690 | 31.33 | 10.2 | 7.63 | 0.4 | bottom |
| **Site** #3 | 9.49 | 24.01 | 22.18 | 21.33 | 13.04 | 7.87 | 5.0 | surface |
| 8/23/2004 | 9.48 | 24.34 | 22.49 | 21.65 | 12.99 | 7.90 | 4.7 | |
| | 9.21 | 25.75 | 23.96 | 23.2 | 12.77 | 7.88 | 3.4 | |
| | 8.76 | 27.27 | 25.69 | 25.02 | 12.4 | 7.81 | 2.0 | |
| | 7.99 | 29.26 | 28.17 | 27.64 | 11.53 | 7.73 | 0.1 | |
| | 7.34 | 30.53 | 29.95 | 29.52 | 11.03 | 7.70 | 0.2 | mid |
| | 6.91 | 31.07 | 30.86 | 30.47 | 10.69 | 7.67 | 0.0 | |
| | 6.81 | 31.18 | 31.05 | 30.67 | 10.52 | 7.66 | 0.1 | |
| | 6.63 | 31.39 | 31.43 | 31.07 | 10.49 | 7.66 | 0.1 | |
| | 6.60 | 31.47 | 31.55 | 31.19 | 10.36 | 7.65 | 0.1 | |
| | 6.58 | 31.49 | 31.58 | 31.22 | 10.31 | 7.65 | 0.3 | |
| | 6.57 | 31.53 | 31.63 | 31.28 | 10.3 | 7.64 | 0.2 | bottom |
| **Site #4** | **8.82** | 26.84 | 25.25 | 24.55 | **9.8** | 7.78 | 5.4 | surface |
| 8/23/2004 | 8.84 | 26.85 | 25.24 | 24.55 | 9.81 | 7.78 | 1.4 | |
| | 7.51 | 30.13 | 29.41 | 28.94 | 9.36 | 7.69 | 0.1 | |
| | 7.51 | 30.20 | 29.49 | 29.03 | 9.07 | 7.67 | 0.4 | |
| | 7.21 | 30.61 | 30.14 | 29.71 | 8.95 | 7.66 | 0.3 | |
| | 6.95 | 30.95 | 30.70 | 30.3 | 8.93 | 7.65 | 0.2 | mid |
| | 6.94 | 30.98 | 30.75 | 30.35 | 8.93 | 7.64 | 0.4 | |
| | 6.83 | 31.09 | 30.95 | 30.56 | 9.05 | 7.63 | 0.3 | |
| | 6.83 | 31.11 | 30.97 | 30.58 | 9.11 | 7.63 | 0.3 | |
| | 6.55 | 31.36 | 31.48 | 31.11 | 9.16 | 7.62 | 1.4 | bottom |
| **Site #5** | 9.40 | 24.36 | 22.50 | 21.72 | 11.8 | 7.86 | 4.3 | surface |
| 8/23/2004 | 9.14 | 25.37 | 23.66 | **22.88** | 11.7 | 7.83 | 3.7 | |
| | 9.01 | 26.24 | 24.55 | 23.82 | 11.54 | 7.82 | 3.1 | |
| | 8.64 | 27.72 | 26.21 | 25.57 | 11.4 | 7.79 | 1.9 | |
| | 8.36 | 28.38 | 27.04 | 26.45 | 11.14 | 7.75 | 0.9 | |
| | 7.53 | 30.12 | 29.38 | 28.92 | 10.72 | 7.70 | 0.0 | |
| | 7.23 | 30.62 | 30.13 | 29.71 | 10.33 | 7.67 | 0.2 | mid |
| | 7.08 | 30.80 | 30.44 | 30.03 | 10.26 | 7.67 | 0.2 | |
| | 6.99 | 30.92 | 30.64 | 30.24 | ·10.21 | 7.66 | 1.0 | |
| | 7.00 | 30.94 | 30.65 | 30.25 | 10.25 | 7.66 | 0.2 | |
| | 6.47 | 31.44 | 31.63 | 31.27 | 10.2 | 7.63 | 5.8 | |
| | 6.47 | 31.43 | 31.62 | 31.26 | 10.01 | 7.62 | 1.3 | |
| | 6.47 | 31.42 | 31.61 | 31.25 | 9.95 | 7.62 | 3.3 | bottom |

# Receiving Water Data, Taiya Inlet, Permit Application

| Site# M/DN | Temp C | Cond mS/cm | TDS g/l | Salinty ppt | D.O mg/l | pH S.U. | Turb. NTU | Depth |
|---|---|---|---|---|---|---|---|---|
| **Site#** 1 | 11.12 | 9.09 | 8.04 | 7.10 | 11.73 | 7.60 | -999.9 | surface |
| 6/29/2005 | 10.08 | 16.75 | 15.23 | 14.16 | 10.89 | 7.72 | -999.9 | |
| | 8.65 | 25.47 | 24.08 | 23.30 | 10.14 | 7.65 | -999.9 | |
| | 8.67 | 25.45 | 24.04 | 23.25 | 10.13 | 7.66 | -999.9 | |
| | **8.22** | 27.07 | 25.89 | 25.20 | 10.00 | 7.67 | -999.9 | |
| | 8.02 | 28.06 | 26.99 | 26.37 | 7.45 | 7.70 | -999.9 | |
| | 7.98 | 28.39 | 27.34 | 26.74 | 1.38 | 7.71 | -999.9 | mid |
| | 7.57 | 28.7B | 28.04 | 27.46 | 4.22 | 7.74 | -999.9 | |
| | 7.10 | 29.16 | 28.79 | 28.24 | 7.68 | 7.73 | -999.9 | |
| | 6.92 | 29.65 | 29.44 | 28.92 | 8.34 | 7.74 | -999.9 | |
| | 6.88 | 29.77 | 29.59 | 29.08 | 8.66 | 7.73 | -999.9 | |
| | 6.79 | 29.89 | 29.79 | 29.29 | 9.12 | 7.74 | -999.9 | |
| | 6.26 | 30.49 | 30.87 | 30.42 | 9.42 | 7.71 | -999.9 | |
| | 10.79 | 8.45 | 7.54 | 6.63 | 12.68 | 7.90 | -999.9 | bottom |
| **Site# 2** | 10.91 | 8.50 | 7.56 | 6.65 | 12.53 | 7.89 | -999.9 | surface |
| 6/29/2005 | 9.44 | 18.39 | 17.01 | 15.96 | 11.83 | 7.85 | -999.9 | |
| | 7.66 | 28.05 | 27.26 | 26.64 | 11.30 | 7.82 | -999.9 | |
| | 7.68 | 28.50 | 27.69 | 27.09 | 11.17 | 7.82 | -999.9 | |
| | 7.64 | 28.80 | 28.00 | 27.43 | 11.14 | 7.82 | -999.9 | |
| | 7.60 | 29.05 | 28.28 | 27.73 | 11.16 | 7.82 | -999.9 | mid |
| | 7.37 | 29.37 | 28.79 | 28.26 | 11.21 | 7.80 | -999.9 | |
| | 7.29 | 29.37 | 28.85 | 28.32 | 11.18 | 7.80 | -999.9 | |
| | 6.98 | 29.80 | 29.54 | 29.03 | 11.22 | 7.78 | -999.9 | |
| | 6.58 | 30.30 | 30.38 | 29.92 | 11.21 | 7.76 | -999.9 | |
| | 6.52 | 30.36 | 30.49 | 30.03 | 11.20 | 7.76 | -999.9 | |
| | 6.12 | 30.86 | 31.37 | 30.94 | 11.22 | 7.74 | -999.9 | bottom |
| **Site#** 3 | 11.51 | 8.29 | 7.26 | 6.37 | 13.75 | 8.01 | -999.90 | surface |
| 6/29/2005 | 11.61 | 8.68 | 7.58 | 6.68 | 13.50 | 7.97 | -999.90 | |
| | 11.15 | 11.54 | 10.20 | 9.18 | 13.08 | 7.97 | -999.90 | |
| | 9.79 | 18.60 | 17.04 | 15.99 | 12.58 | 7.92 | -999.90 | |
| | 7.54 | 29.00 | 28.29 | 27.73 | 12.20 | 7.85 | -999.90 | |
| | 7.39 | 29.42 | 28.82 | 28.29 | 12.04 | 7.84 | -999.90 | |
| | 7.41 | 29.39 | 28.77 | 28.24 | 12.04 | 7.85 | -999.90 | mid |
| | 7.48 | 29.09 | 28.42 | 27.87 | 12.06 | 7.85 | -999.90 | |
| | 6.93 | 29.63 | 29.41 | 28.90 | 12.10 | 7.81 | -999.90 | |
| | 6.58 | 30.18 | 30.27 | 29.79 | 11.95 | 7.79 | -999.90 | |
| | 6.21 | 30.68 | 31.10 | 30.66 | 11.84 | 7.77 | -999.90 | |
| | 6.09 | 30.82 | 31.36 | 30.92 | 11.81 | 7.76 | -999.90 | |
| | 6.00 | 30.94 | 31.57 | 31.14 | **11.81** | 7.76 | -999.90 | bottom |
| **Slte#4** | 11.52 | 8.46 | 7.41 | 6.51 | 14.13 | 8.04 | -999.90 | surface |
| 6/29/2005 | 11.23 | 10.26 | 9.05 | 8.07 | 13.67 | 8.02 | -999.90 | |
| | 9.97 | 18.16 | 16.56 | 15.51 | 12.70 | 7.93 | -999.90 | |
| | 7.69 | 27.44 | 26.64 | 25.97 | 12.29 | 7.84 | -999.90 | |
| | 7.72 | 28.97 | 28.11 | 27.55 | 12.11 | 7.85 | -999.90 | |
| | 7.42 | 29.30 | 28.67 | 28.14 | 12.17 | 7.85 | -999.90 | mid |
| | 7.32 | 29.50 | 28.95 | 28.43 | 12.15 | 7.83 | -999.90 | |
| | 7.26 | 29.59 | 29.09 | 28.58 | 12.14 | 7.83 | -999.90 | |
| | 6.57 | 30.21 | 30.30 | 29.83 | 12.13 | 7.79 | -999.90 | |
| | 6.15 | 30.81 | 31.30 | 30.87 | 11.99 | 7.76 | -999.90 | |
| | 6.08 | 30.86 | 31.40 | 30.97 | 11.94 | 7.77 | -999.90 | |
| | 6.04 | 30.93 | 31.52 | 31.10 | 11.92 | 7.76 | -999.90 | bottom |
| **Site# 5** | 11.27 | 9.73 | 8.57 | 7.61 | 13.47 | 8.04 | -999.9 | surface |
| 6/29/2005 | 11.23 | 9.71 | 8.56 | 7.60 | 13.35 | 8.02 | -999.9 | |
| | 11.14 | 10.68 | 9.44 | 8.45 | 13.12 | 8.02 | -999.9 | |
| | 9.02 | 21.61 | 20.21 | 19.24 | 12.30 | 7.87 | -999.9 | |
| | 7.67 | 28.57 | 27.76 | 27.17 | 11.90 | 7.84 | -999.9 | |
| | 7.57 | 28.72 | 27.98 | 27.41 | 11.90 | 7.84 | -999.9 | |
| | 7.65 | 28.55 | 27.76 | 27.17 | 11.90 | 7.84 | -999.9 | mid |
| | 7.37 | 29.57 | 28.97 | 28.46 | 11.90 | 7.82 | -999.9 | |
| | 7.32 | 29.61 | 29.06 | 28.55 | 11.92 | 7.83 | -999.9 | |
| | 7.39 | 29.59 | 28.99 | 28.47 | 11.94 | 7.82 | -999.9 | |
| | 6.74 | 30.07 | 30.02 | 29.54 | 11.90 | 7.78 | -999.9 | |
| | 6.76 | 29.99 | 29.92 | 29.43 | 11.86 | 7.78 | -999.9 | |
| | 7.34 | 29.62 | 29.05 | 28.54 | 11.87 | 7.81 | -999.9 | |
| | 6.07 | 30.94 | 31.49 | 31.07 | 12.00 | 7.76 | -999.9 | bottom |

## Receiving Water Data, Taiya Inlet, Permit Application

| Summer values (7/19/04 and 8/23/05): Site 1 (in ZID) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Temp C | Cond mS/cm | TDS g/l | Salinty ppt | D.O mg/l | pH S.U. | Turb. NTU |
| 95th (surface) | 12.4235 | 29.312 | 28.334 | 27.8045 | 9.3605 | 8.0235 | 24.945 |
| 95th (mid) | 9.1465 | 31.2635 | 31.3535 | 30.9735 | 10.1425 | 7.811 | 24.12 |
| minimum (mid) | 5.66 | 24.30 | 22.50 | 21.66 | 1.21 | 7.60 | -0.20 |
| maximum (mid) | 9.40 | 31.27 | 31.36 | 30.98 | 10.37 | 7.85 | 31.40 |
| 95th (surface a | 12.3875 | 31.2175 | 31.2725 | 30.89 | 9.8675 | 8 | 27.375 |
| 95th (bottom) | 8.6525 | 29.7905 | 30.5845 | 30.056 | 9.3885 | 7.774 | 20.45 |
| | | | | | | | |
| 5th percentile (surface) | | | | | 1.797 | | |
| 5th percentile (mid) | | | | | 1.249 | | |

| Other values: (7/19/04 and 8/23/05): Sites 3 and 5 (reference conditions) | | | | | | |
|---|---|---|---|---|---|---|
| | DO (mg/L) | | | | | |
| 5th (surface) | 12.979 | | | | | |
| 5th (mid) | 12.054 | | | | | |
| 5th (bottom) | 10.2475 | | | | | |
| | | | | | | |

| Other values: (7/19/04 and 8/23/05): Sites 2 and 4 (ZID Boundary conditions) | | | | | | |
|---|---|---|---|---|---|---|
| | DO (mg/L) | | | | | |
| 5th (surface) | 12.578 | | | | | |
| 5th (mid) | 10.514 | | | | | |
| 5th (bottom) | 10.044 | | | | | |

| All data | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Temp C | Cond mS/cm | TDS g/l | Salinty ppt | D.O mg/l | pH S.U. | Turb. NTU |
| average | 8.03 | 25.35 | 24.78 | 24.14 | 8.42 | 7.80 | 8.85 |
| minimum | 4.90 | 0.56 | 0.51 | 0.38 | 1.19 | 7.40 | 0.00 |
| maximum | 12.74 | 31.53 | 31.69 | 31.33 | 14.13 | 8.08 | 45.10 |
| 5th percentile | 5.682 | 8.4505 | 7.329 | 6.438 | 1.68 | 7.62 | 0.1 |
| 95th percentile | 12.216 | 31.258 | 31.43 | 31.061 | 12.7 | 7.999 | 24.7 |

# Appendix C. $BOD_5$ and TSS TBEL Calculations

Section IV.A.2 of the Fact Sheet describes TBELs for facilities with 301(h) waivers and primary treatment standards of a minimum of 30 percent removal of $BOD_5$ and TSS. EPA used best professional judgment to calculate $BOD_5$ and TSS TBELs, using data collected by Skagway WWTP from 2016 - 2020. Primary treatment can effectively remove TSS, but is less effective in removing $BOD_5$. As a result, the approaches to calculate TBELs for $BOD_5$ and TSS are different, which reflect technology-based levels that can be achieved by Skagway WWTP. EPA evaluated limits based on the new proposed seasons of April 1 – September 30 and October 1 – March 31. The proposed $BOD_5$ and TSS limits remain the same from the 2002 permit because of anti-backsliding. See below for calculations and assumptions to derive $BOD_5$ limits.

## $BOD_5$ TBEL Calculation

**BOD - AML**

1. Take the 95th percentile of the non-parametric **monthly average influent** (not log normal transformed) and multiply by 0.7 to calculate a 30% reduction.

2. Compare limit to current permit limit and take more stringent of the two.

| | BOD, monthly avg inf, 95th percentile, mg/L | BOD Inf, 30% reduction, mg/L | BOD, Current AML, mg/L | BOD, Proposed AML, mg/L | Basis | BOD, Proposed AML, lbs/day |
|---|---|---|---|---|---|---|
| 5/1-9/30 | 506 | 354 | 140 | 140 | Current permit limit | 736 |
| 10/1-4/30 | 376 | 263 | 80 | 80 | Current permit | 420 |

**BOD - MDL**

1. To get multiplier from Table 5-3 in TSD, calculate the CV of the **measured effluent** BOD, n=2 for bimonthly sampling, using the 99th/95th portion of the table.

2. Use monthly average limit previously derived in step 1.a.2 as LTA and multiply it by the Table 5-3 multiplier.

3. Compare limit to current permit limit and take more stringent of the two.

| **5/1 - 9/30** | | **10/1 - 4/30** | |
|---|---|---|---|
| **CV, meas BOD eff** | **0.49** | **CV, meas BOD eff** | **0.81** |
| **n** | **2** | **n** | **2** |
| **Table 5-3 multiplier** | **1.6** | **Table 5-3 multiplier** | **1.9** |
| **BOD proposed AML** | **140** | **BOD proposed AML** | **80** |
| **BOD proposed MDL** | **227** | **BOD Proposed MDL** | **155** |

## TSS TBEL Calculations

### TSS - AML

a. Monthly average (mg/L) – Log normally transform actual measured effluent data (e.g., weekly, monthly) in Ecology or EPA spreadsheet. Use variance of data that was log-transformed. Take calculated, performance-based TSS monthly average limit from spreadsheet. Compare limit to current permit limit and take more stringent of the two.

| | TSS, calc AML, mg/L | TSS, Current AML, mg/L | TSS, Proposed AML, mg/L | Basis | TSS, Proposed AML, lbs/day |
|---|---|---|---|---|---|
| 5/1-9/30 | 67 | 140 | 67 | Calc AML is more stringent | 352 |
| 10/1-4/30 | 29 | 70 | 30 | Calc AML is more stringent, but lower than secondary treatment requirement. Apply secondary treatment. | 158 |

a. Daily max (mg/L) – Take calculated, performance-based daily max limit from log transform **actual measured** effluent data spreadsheet. Compare limit to current permit limit and take more stringent of the two.

| | TSS, calc MDL, mg/L | TSS, Current MDL, mg/L | TSS, Proposed MDL, mg/L | Basis | TSS, Proposed AML, lbs/day |
|---|---|---|---|---|---|
| 5/1-9/30 | 129 | 200 | 129 | Calc AML is more stringent | 678 |
| 10/1-4/30 | 43 | 88 | 45 | Calc AML is more stringent, but lower than secondary treatment requirement. Apply secondary treatment. | 236 |

# May – September, TSS data, log transformed

Instructions: Enter data on 'Input 1' tab and below with yellow fields.
-- Click here for more details --

## Performance-based Effluent Limits

| INPUT | |
|---|---|
| LogNormal Transformed Mean: | 3.2581 |
| LogNormal Transformed Variance: | 0.4728 |
| Number of Samples per month for compliance monitoring: | 2 |
| Autocorrelation factor ($n_e$) (use 0 if unknown): | 0 |
| **OUTPUT** | |
| E(X) = | 32.9341 |
| V(X) = | 655.698 |
| VARn | 0.2641 |
| MEANn= | 3.3625 |
| VAR(Xn)= | 327.849 |
| **RESULTS** | |
| **Maximum Daily Effluent Limit:** | **128.7** |
| **Average Monthly Effluent Limit:** | **67.2** |
| 67.2110545 | 62.71949126 |

Use spreadsheet on right to calculate the log-normal transformed mean and variance.

**LogNormal Transformed Mean and Variance**

*Enter data in yellow cells.*
*Insert / delete rows as needed.*

| Date | Data | Ln() |
|---|---|---|
| 5/17/2017 | 52 | 3.951 |
| 5/24/2017 | 62 | 4.127 |
| 6/8/2017 | 23 | 3.135 |
| 6/21/2017 | 110 | 4.700 |
| 7/19/2017 | 100 | 4.605 |
| 7/26/2017 | 112 | 4.718 |
| 8/21/2017 | 82 | 4.407 |
| 8/28/2017 | 67 | 4.205 |
| 9/11/2017 | 28 | 3.332 |
| 9/25/2017 | 38 | 3.638 |
| 5/15/2018 | 33 | 3.497 |
| 5/21/2018 | 56 | 4.025 |
| 6/11/2019 | 44 | 3.784 |
| 6/18/2018 | 60 | 4.094 |
| 7/9/2018 | 58 | 4.060 |
| 7/23/2018 | 86 | 4.454 |
| 8/13/2018 | 60 | 4.094 |
| 8/20/2018 | 80 | 4.382 |
| 9/10/2018 | 52 | 3.951 |
| 9/17/2018 | 44 | 3.784 |
| 5/6/2019 | 41 | 3.714 |
| 5/20/2019 | 60 | 4.094 |
| 6/3/2019 | 64 | 4.159 |
| 6/27/2019 | 73 | 4.290 |
| 7/24/2019 | 105 | 4.654 |
| 7/29/2019 | 74 | 4.304 |
| 8/12/2019 | 80 | 4.382 |
| 8/27/2019 | 47 | 3.850 |
| 9/16/2019 | 56 | 4.025 |
| 9/24/2019 | 32 | 3.466 |
| 5/5/2020 | 20 | 2.996 |
| 5/28/2020 | 17 | 2.833 |
| 6/16/2020 | 40 | 3.689 |
| 6/25/2020 | 17 | 2.833 |
| 7/13/2020 | 30 | 3.401 |
| 7/21/2020 | 22 | 3.091 |
| 8/12/2020 | 22 | 3.091 |
| 8/25/2020 | 10 | 2.303 |
| 9/14/2020 | 21 | 3.045 |
| 9/22/2020 | 40 | 3.689 |
| 5/18/2021 | 37 | 3.611 |
| 5/25/2021 | 17 | 2.833 |
| 6/14/2021 | 14 | 2.639 |
| 6/22/2021 | 13 | 2.565 |
| 7/14/2021 | 10 | 2.303 |
| 7/26/2021 | 14 | 2.639 |
| 8/9/2021 | 23 | 3.135 |
| 8/23/2021 | 11 | 2.398 |
| 9/7/2021 | 18 | 2.890 |
| 9/22/2021 | 17 | 2.833 |

| | |
|---|---|
| **AVERAGE of ln transformed data** | 3.61 |
| **STDEV of ln transformed data** | 0.69 |
| **CV of ln transformed data** | 0.19 |
| **Variance of ln transformed data** | 0.473 |

# October – April, TSS, Log-transformed

Instructions: Enter data on 'Input 1' tab and below with yellow fields.
-- Click here for more details --

## Performance-based Effluent Limits

| INPUT | |
|---|---|
| LogNormal Transformed Mean: | 2.8500 |
| LogNormal Transformed Variance: | 0.1527 |
| Number of Samples per month for compliance monitoring: | 2 |
| Autocorrelation factor ($n_e$) (use 0 if unknown): | 0 |
| **OUTPUT** | |
| E(X) = | 18.6596 |
| V(X) = | 57.448 |
| VARn | 0.0793 |
| MEANn= | 2.8867 |
| VAR(Xn)= | 28.724 |
| **RESULTS** | |
| **Maximum Daily Effluent Limit:** | **42.9** |
| **Average Monthly Effluent Limit:** | **28.5** |
| 28.49917662 | 27.47590886 |

Use spreadsheet on right to calculate the log-normal transformed mean and variance.

**LogNormal Transformed Mean and Variance**

*Enter data in yellow cells.*
*Insert / delete rows as needed.*

| Date | Data | Ln() |
|---|---|---|
| 1/11/2017 | 16 | 2.773 |
| 1/19/2017 | 16 | 2.773 |
| 2/8/2022 | 21 | 3.045 |
| 2/22/2017 | 15 | 2.708 |
| 3/8/2017 | 21 | 3.045 |
| 3/22/2017 | 15 | 2.708 |
| 4/12/2017 | 33 | 3.497 |
| 4/19/2017 | 51 | 3.932 |
| 10/10/2017 | 14 | 2.639 |
| 10/24/2017 | 24 | 3.178 |
| 11/14/2017 | 14 | 2.639 |
| 11/28/2017 | 8 | 2.079 |
| 12/12/2017 | 21 | 3.045 |
| 12/19/2021 | 20 | 2.996 |
| 1/9/2018 | 26 | 3.258 |
| 1/25/2018 | 22 | 3.091 |
| 2/13/2018 | 18 | 2.890 |
| 2/20/2018 | 24 | 3.178 |
| 3/6/2018 | 25 | 3.219 |
| 3/28/2018 | 20 | 2.996 |
| 4/10/2018 | 20 | 2.996 |
| 4/17/2018 | 21 | 3.045 |
| 10/23/2018 | 36 | 3.584 |
| 11/5/2018 | 13 | 2.565 |
| 11/19/2018 | 9.2 | 2.219 |
| 12/11/2018 | 6 | 1.792 |
| 12/19/2018 | 11 | 2.398 |
| 1/15/2019 | 12 | 2.485 |
| 1/22/2019 | 13 | 2.565 |
| 2/4/2019 | 14 | 2.639 |
| 2/12/2019 | 18 | 2.890 |
| 3/5/2019 | 19 | 2.944 |
| 3/26/2019 | 9.6 | 2.262 |
| 4/8/2019 | 13 | 2.565 |
| 4/22/2019 | 26 | 3.258 |
| 10/9/2019 | 16 | 2.773 |
| 10/21/2019 | 31 | 3.434 |
| 11/18/2019 | 17 | 2.833 |
| 11/25/2019 | 11 | 2.398 |
| 12/12/2019 | 11 | 2.398 |
| 12/17/2019 | 13 | 2.565 |
| 1/8/2020 | 22 | 3.091 |
| 1/27/2020 | 20 | 2.996 |
| 2/11/2020 | 20 | 2.996 |
| 2/24/2020 | 18 | 2.890 |
| 3/9/2020 | 18 | 2.890 |
| 3/23/2020 | 11 | 2.398 |
| 4/27/2020 | 19 | 2.944 |
| 4/28/2020 | 23 | 3.135 |
| 10/12/2020 | 30 | 3.401 |
| 10/28/2020 | 12 | 2.485 |
| 11/16/2020 | 16 | 2.773 |
| 11/24/2020 | 16 | 2.773 |
| 12/21/2020 | 18 | 2.890 |
| 12/28/2020 | 9 | 2.197 |
| 1/4/2021 | 12 | 2.485 |
| 1/19/2021 | 15 | 2.708 |
| 2/16/2021 | 24 | 3.178 |
| 2/26/2021 | 10 | 2.303 |
| 3/8/2021 | 16 | 2.773 |
| 3/22/2021 | 12 | 2.485 |
| 4/5/2021 | 22 | 3.091 |
| 4/20/2021 | 40 | 3.689 |
| 10/18/2021 | 20 | 2.996 |
| 10/25/2021 | 11 | 2.398 |
| 11/8/2021 | 19 | 2.944 |
| 11/29/2021 | 18 | 2.890 |
| 12/13/2021 | 28 | 3.332 |
| 12/27/2021 | 20 | 2.996 |

| | |
|---|---|
| **AVERAGE of ln transformed data** | 2.85 |
| **STDEV of ln transformed data** | 0.39 |
| **CV of ln transformed data** | 0.14 |
| **VAR of ln transformed data** | 0.152717413 |

# Appendix D. Reasonable Potential and WQBEL Formulae

A. Reasonable Potential Analysis

EPA uses the process described in the 1991 TSD to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a WQBEL must be included in the permit.

1. Mass Balance

For discharges to flowing water bodies, the maximum projected receiving water concentration is determined using the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \textit{Equation 1}$$

where,

| | | |
|---|---|---|
| $C_d$ | = | Receiving water concentration downstream of the effluent discharge (that is, the concentration at the edge of the mixing zone) |
| $C_e$ | = | Maximum projected effluent concentration |
| $C_u$ | = | 95th percentile measured receiving water upstream concentration |
| $Q_d$ | = | Receiving water flow rate downstream of the effluent discharge = $Q_e+Q_u$ |
| $Q_e$ | = | Effluent flow rate (set equal to the design flow of the WWTP) |
| $Q_u$ | = | Receiving water low flow rate upstream of the discharge (1Q10, 7Q10 or 30B3) |

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

$$C_d = \frac{C_e \times Q_e + C_u \times Q_u}{Q_e + Q_u} \qquad \textit{Equation 2}$$

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with 100% of the receiving stream.

If the mixing zone is based on less than complete mixing with the receiving water, the equation becomes:

$$C_d = \frac{C_e \times Q_e + C_u \times (Q_u \times \%MZ)}{Q_e + (Q_u \times \%MZ)} \qquad \textit{Equation 3}$$

Where:

% MZ = the percentage of the receiving water flow available for mixing.

If a mixing zone is not allowed, dilution is not considered when projecting the receiving water concentration and,

$$C_d = C_e \qquad \textit{Equation 4}$$

A dilution factor (D) can be introduced to describe the allowable mixing. Where the dilution factor is expressed as:

$$D = \frac{Q_e + Q_u \times \%MZ}{Q_e} \qquad \textit{Equation 5}$$

After the dilution factor simplification, the mass balance equation becomes:

$$C_d = \frac{C_e - C_u}{D} + C_u \qquad \textit{Equation 6}$$

If the criterion is expressed as dissolved metal, the effluent concentrations are measured in total recoverable metal and must be converted to dissolved metal as follows:

$$C_d = \frac{CF \times C_e - C_u}{D} + C_u \qquad \textit{Equation 7}$$

Where $C_e$ is expressed as total recoverable metal, $C_u$ and $C_d$ are expressed as dissolved metal, and CF is a conversion factor used to convert between dissolved and total recoverable metal.

The above equations for $C_d$ are the forms of the mass balance equation which were used to determine reasonable potential and calculate WLAs.

2. Maximum Projected Effluent Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, the 1991 TSD recommends using the maximum projected effluent concentration (Ce) in the mass balance calculation (see equation 3, page C-5). To determine the maximum projected effluent concentration (Ce) EPA has developed a statistical approach to better characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) with the uncertainty due to a limited number of data to project an estimated maximum concentration for the effluent. Once the CV for each pollutant parameter has been calculated, the reasonable potential multiplier (RPM) used to derive the maximum projected effluent concentration (Ce) can be calculated using the following equations:

First, the percentile represented by the highest reported concentration is calculated.

$$p_n = (1 - \text{confidence level})^{1/n} \qquad \textit{Equation 8}$$

where,

$p_n$ = the percentile represented by the highest reported concentration

n = the number of samples

confidence level = 99% = 0.99

and

$$RPM = \frac{C_{99}}{C_{P_n}} = \frac{e^{Z_{99} \times \sigma - 0.5 \times \sigma^2}}{e^{Z_{P_n} \times \sigma - 0.5 \times \sigma^2}} \qquad \textit{Equation 9}$$

Where,

| | | |
|---|---|---|
| $\sigma^2$ | = | $\ln(CV^2 + 1)$ |
| $Z_{99}$ | = | 2.326 (z-score for the 99th percentile) |
| $Z_{Pn}$ | = | z-score for the $P_n$ percentile (inverse of the normal cumula distribution function at a given percentile) |
| CV | = | coefficient of variation (standard deviation ÷ mean) |

The maximum projected effluent concentration is determined by simply multiplying the maximum reported effluent concentration by the RPM:

$$C_e = (RPM)(MRC) \qquad \textit{Equation 10}$$

where MRC = Maximum Reported Concentration.

3. Maximum Projected Effluent Concentration at the Edge of the Mixing Zone

   Once the maximum projected effluent concentration is calculated, the maximum projected effluent concentration at the edge of the acute and chronic mixing zones is calculated using the mass balance equations presented previously.

4. Reasonable Potential

   The discharge has reasonable potential to cause or contribute to an exceedance of water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the most stringent criterion for that pollutant.

B. WQBEL Calculations

1. Calculate the Wasteload Allocations (WLAs)

   WLAs are calculated using the same mass balance equations used to calculate the concentration of the pollutant at the edge of the mixing zone in the reasonable potential analysis. To calculate the WLAs, $C_d$ is set equal to the acute or chronic criterion and the equation is solved for $C_e$. The calculated $C_e$ is the acute or chronic WLA. Equation 6 is rearranged to solve for the WLA, becoming:

$$C_e = WLA = D \times (C_d - C_u) + C_u \qquad \textit{Equation 11}$$

   Alaska's water quality criteria for some metals are expressed as the dissolved fraction, but the Federal regulation at 40 CFR 122.45(c) requires that effluent limits be expressed as total recoverable metal. Therefore, EPA must calculate a WLA in total recoverable metal that will be protective of the dissolved criterion. This is accomplished by dividing the WLA expressed as dissolved by the criteria translator, as shown in equation 12. The criteria translator (CT) is equal to the conversion factor, because site-specific translators are not available for this discharge.

$$C_e=WLA=\frac{D\times(C_d-C_u)+C_u}{CT}$$ *Equation 12*

The next step is to compute the "long term average" concentrations which will be protective of the WLAs. This is done using the following equations from the 1991 TSD:

$$LTA_a=WLA_a\times e^{(0.5\sigma^2-z\,\sigma)}$$ *Equation 13*

$$LTA_c=WLA_c\times e^{(0.5\sigma_4^2-z\sigma_4)}$$ *Equation 14*

where,

$\sigma^2$ = $\ln(CV^2+1)$

$Z_{99}$ = 2.326 (z-score for the 99th percentile probability basis)

CV = coefficient of variation (standard deviation ÷ mean)

$\sigma_4^2$ = $\ln(CV^2/4+1)$

For ammonia, because the chronic criterion is based on a 30-day averaging period, the Chronic Long Term Average (LTAc) is calculated as follows:

$$LTA_c=WLA_c\times e^{(0.5\sigma_{30}^2-z\sigma_{30})}$$ *Equation 15*

where,

$\sigma_{30}^2$ = $\ln(CV^2/30+1)$

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits as shown below.

2. Derive the maximum daily and average monthly effluent limits

Using the 1991 TSD equations, the MDL and AML effluent limits are calculated as follows:

$$MDL=LTA\times e^{(z_m\sigma-0.5\sigma^2)}$$ *Equation 16*

$$AML=LTA\times e^{(z_a\sigma_n-0.5\sigma_n^2)}$$ *Equation 17*

where σ, and $\sigma^2$ are defined as they are for the LTA equations above, and,

$\sigma_n^2$ = $\ln(CV^2/n+1$

$z_a$ = 1.645 (z-score for the 95th percentile probability basis)

$z_m$ = 2.326 (z-score for the 99th percentile probability basis)

n = number of sampling events required per month. With the exception of ammonia, if the AML is based on the $LTA_c$, i.e., $LTA_{minimum} = LTA_c$), the value of ''n'' should is set at a minimum of 4. For ammonia, In the case of ammonia, if the AML is based on the $LTA_c$, i.e., $LTA_{minimum} = LTA_c$), the value of ''n'' should is set at a minimum of 30.

# APPENDIX E. REASONABLE POTENTIAL AND WQBEL CALCULATIONS

## Reasonable Potential Analysis (RPA) and Water Quality Effluent Limit (WQBEL) Calculations

| | |
|---|---|
| **Facility Name** | City of Skagway |
| **Facility Flow (mgd)** | 0.63 |
| **Facility Flow (cfs)** | 0.97 |

| **Critical River Flows (CFS)** | | Annual Crit. Flows | Seasonal Low Flow | Seasonal High Flow | Annual Crit. Flows |
|---|---|---|---|---|---|
| Aquatic Life - Acute Criteria - Criterion Max. Concentration (CMC) | **1Q10** | | | | -- |
| Aquatic Life - Chronic Criteria - Criterion Continuous Concentration (CCC) | **7Q10 or 4B3** | | | | -- |
| Ammonia | **30B3 or 30Q10/30Q5** (seasonal) | | | | -- |
| Human Health - Non-Carcinogen | **Harmonic Mean Flow** | | | | -- |
| Human Health - carcinogen | **Harmonic Mean Flow** | | | | -- |

| | | | |
|---|---|---|---|
| DF at defined percent of river flow allow | 0% | **8.5** | Note: Acute and Chronic dilution factors used |
| DF at defined percent of river flow allow | 0% | **14.0** | |

| **Receiving Water Data** | | | Notes: | Annual Crit. Flows | Seasonal Low Flow | Seasonal High Flow |
|---|---|---|---|---|---|---|
| Hardness, as mg/L $CaCO_3$ | 130 | | $5^{th}$ % at critical flows | | | |
| Temperature, °C | | Temperature, °C | $95^{th}$ percentile | 12.4235 | | |
| pH, S.U. | | pH, S.U. | $95^{th}$ percentile | 8.02 | | |

| Pollutants of Concern | | | AMMONIA, default: cold water, fish early life stages present | AMMONIA, default: cold water, fish early life stages present | AMMONIA, default: cold water, fish early life stages present | CHLORINE (Total Residual) |
|---|---|---|---|---|---|---|
| Effluent Data | **Number of Samples in Data Set (n)** | | 4 | | | 13 |
| | **Coefficient of Variation (CV) = Std. Dev./Mean (default CV = 0.6)** | | 0.6 | | | 0.6 |
| | **Effluent Concentration, µg/L (Max. or 95th Percentile) - ($C_e$)** | | 21,000 | | | 400 |
| | **Calculated $50^{th}$ % Effluent Conc. (when n>10), Human Health Only** | | | | | |
| Receiving Water Data | **$90^{th}$ Percentile Conc., µg/L - ($C_u$)** | | | | | |
| | **Geometric Mean, µg/L, Human Health Criteria Only** | | | | | |
| Applicable Water Quality Criteria | Aquatic Life Criteria, µg/L | Acute | 18,900 | -- | -- | 13. |
| | Aquatic Life Criteria, µg/L | Chronic | 2,800 | -- | -- | 7.5 |
| | Acute:chronic ratio | | 6.75 | -- | -- | 1.73 |
| | Human Health Water and Organism, µg/L | | -- | -- | -- | -- |
| | Human Health, Organism Only, µg/L | | -- | -- | -- | -- |
| | Metals Criteria Translator, decimal (or default use Conversion Factor) | Acute | | | | -- |
| | | Chronic | | | | -- |
| | Carcinogen (Y/N), Human Health Criteria Only | | -- | -- | -- | N |
| Percent River Flow Default Value = **0%** | **Aquatic Life - Acute** | **1Q10** | 0% | -- | -- | 0% |
| | Aquatic Life - Chronic | 7Q10 or 4B3 | | | | 0% |
| | | 30B3 or 30Q10/30Q5 | 0% | -- | -- | 0% |
| | Human Health - Non-Carcinogen | Harmonic Mean | | | | 0% |
| | Human Health - Carcinogen | Harmonic Mean | | | | 0% |
| Calculated Dilution Factors (DF) (or enter Modeled DFs) | Aquatic Life - Acute | 1Q10 | 8.5 | -- | -- | 16.0 |
| | Aquatic Life - Chronic | 7Q10 or 4B3 | | | | 28.0 |
| | Aquatic Life - Chronic Ammonia | 30B3 or 30Q10/30Q5 | 14.0 | -- | -- | 28.0 |
| | Human Health - Non-Carcinogen | Harmonic Mean | | | | 28.0 |
| | Human Health - Carcinogen | Harmonic Mean | | | | 28.0 |

### Aquatic Life Reasonable Potential Analysis

| | | | | | | |
|---|---|---|---|---|---|---|
| σ | $\sigma^2=\ln(CV^2+1)$ | | 0.555 | -- | -- | 0.555 |
| $P_n$ | $=(1\text{-confidence level})^{1/n}$, where confidence level = | **99%** | 0.316 | -- | -- | 0.702 |
| Multiplier (TSD p. 57) | $=\exp(z\sigma-0.5\sigma^2)/\exp[\text{normsinv}(P_n)\sigma-0.5\sigma^2]$, where | **99%** | 4.7 | -- | -- | 2.7 |
| Statistically projected critical discharge concentration ($C_e$) | | | 99457 | -- | -- | 1083.49 |
| Predicted max. conc.(ug/L) at Edge-of-Mixing Zone | | Acute | 11701 | -- | -- | 67.72 |
| (note: for metals, concentration as dissolved using conversion factor as translator) | | Chronic | 7104 | -- | -- | 38.70 |
| Reasonable Potential to exceed Aquatic Life Criteria | | | **YES** | -- | -- | **YES** |

### Aquatic Life Effluent Limit Calculations

| | | | | | | |
|---|---|---|---|---|---|---|
| **Number of Compliance Samples Expected per month (n)** | | | 4 | 4 | 4 | 4 |
| n used to calculate AML (if chronic is limiting then use min=4 or for ammonia min=30) | | | 30 | -- | -- | 4 |
| LTA Coeff. Var. (CV), decimal | (Use CV of data set or default = 0.6) | | 0.600 | -- | -- | 0.600 |
| Permit Limit Coeff. Var. (CV), decimal | (Use CV from data set or default = 0.6) | | 0.600 | -- | -- | 0.600 |
| Acute WLA, ug/L | $C_d = (\text{Acute Criteria} \times MZ_a) - C_u \times (MZ_a\text{-}1)$ | Acute | 160,650 | -- | -- | 208.0 |
| Chronic WLA, ug/L | $C_d = (\text{Chronic Criteria} \times MZ_c) - C_u \times (MZ_c\text{-}1)$ | Chronic | 39,200 | -- | -- | 210.0 |
| Long Term Ave (LTA), ug/L | $WLAa \times \exp(0.5\sigma^2\text{-}z\sigma)$, Acute | **99%** | 51,572 | -- | -- | 66.8 |
| ($99^{th}$ % occurrence prob.) | $WLAc \times \exp(0.5\sigma^2\text{-}z\sigma)$; ammonia n=30, Chronic | **99%** | 30,587 | -- | -- | 110.7 |
| Limiting LTA, ug/L | used as basis for limits calculation | | 30,587 | -- | -- | 66.8 |
| Applicable Metals Criteria Translator (metals limits as total recoverable) | | | | | | -- |
| Average Monthly Limit (AML), ug/L , where % occurrence prob = | | **95%** | **36,388** | -- | -- | **104** |
| Maximum Daily Limit (MDL), ug/L , where % occurrence prob = | | **99%** | **95,279** | -- | -- | **208** |
| Average Monthly Limit (AML), mg/L | | | **36.4** | -- | -- | **0.104** |
| Maximum Daily Limit (MDL), mg/L | | | **95.3** | -- | -- | **0.208** |
| Average Monthly Limit (AML), lb/day | | | **191** | -- | -- | **0.545** |
| Maximum Daily Limit (MDL), lb/day | | | **501** | -- | -- | **1.093** |

| Pollutants of Concern | | | Copper | Lead | Zinc | Chloroform | Toluene | Phenol | Bis (2-ethylhexyl) phthalate | Fecal |
|---|---|---|---|---|---|---|---|---|---|---|
| Effluent Data | **Number of Samples in Data Set (n)** | | 57 | 1 | 1 | 1 | 1 | 1 | 1 | 57 |
| | **Coefficient of Variation (CV) = Std. Dev./Mean (default CV = 0.6)** | | 1.05 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.96 |
| | **Effluent Concentration, µg/L (Max. or 95th Percentile) - ($C_e$)** | | 83 | 2.9 | 57 | 1.4 | 2.2 | 16 | 0.0176 | 445,000 |
| | **Calculated 50th % Effluent Conc. (when n>10), Human Health Only** | | | | | | | | | |
| Receiving Water Data | **90th Percentile Conc., µg/L - ($C_u$)** | | | | | | | | | |
| | **Geometric Mean, µg/L, Human Health Criteria Only** | | | | | | | | | |
| Applicable Water Quality Criteria | Aquatic Life Criteria, µg/L | Acute | 4.8 | 210. | 90. | #N/A | -- | -- | #N/A | 14. |
| | Aquatic Life Criteria, µg/L | Chronic | 3.1 | 8.1 | 81. | #N/A | -- | -- | #N/A | 43. |
| | Acute:chronic ratio | | 1.55 | 25.93 | 1.11 | -- | -- | -- | -- | 0.33 |
| | Human Health Water and Organism, µg/L | | | | | | | | | #N/A |
| | Human Health, Organism Only, µg/L | | 69,000. | #N/A | #N/A | 4,700. | 200,000. | 4,600,000. | 59. | #N/A |
| | Metals Criteria Translator, decimal (or default use Conversion Factor) | Acute | .83 | .951 | .946 | -- | -- | -- | -- | -- |
| | | Chronic | .83 | .951 | .946 | -- | -- | -- | -- | -- |
| | Carcinogen (Y/N), Human Health Criteria Only | | N | N | N | N | N | N | N | -- |
| Percent River Flow Default Value = **0%** | **Aquatic Life - Acute** | **1Q10** | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Aquatic Life - Chronic | 7Q10 or 4B3 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | | 30B3 or 30Q10/30Q5 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Human Health - Non-Carcinogen | Harmonic Mean | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Human Health - Carcinogen | Harmonic Mean | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Calculated Dilution Factors (DF) (or enter Modeled DFs) | Aquatic Life - Acute | 1Q10 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| | Aquatic Life - Chronic | 7Q10 or 4B3 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| | Aquatic Life - Chronic Ammonia | 30B3 or 30Q10/30Q5 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| | Human Health - Non-Carcinogen | Harmonic Mean | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| | Human Health - Carcinogen | Harmonic Mean | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |

## Aquatic Life Reasonable Potential Analysis

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| σ | $\sigma^2=\ln(CV^2+1)$ | | 0.862 | 0.555 | 0.555 | 0.555 | 0.555 | 0.555 | 0.555 | 0.808 |
| $P_n$ | $=(1\text{-confidence level})^{1/n}$, where confidence level = | **99%** | 0.922 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.922 |
| Multiplier (TSD p. 57) | $=\exp(z\sigma-0.5\sigma^2)/\exp[\text{normsinv}(P_n)\sigma-0.5\sigma^2]$, where | **99%** | 2.2 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 2.1 |
| Statistically projected critical discharge concentration ($C_e$) | | | 181.10 | 38.27 | 752.22 | 18.48 | 29.03 | 211.15 | 0.23 | 924745.29 |
| Predicted max. conc.(ug/L) at Edge-of-Mixing Zone | | Acute | 9.39 | 2.27 | 44.48 | -- | 1.81 | 13.20 | -- | -- |
| (note: for metals, concentration as dissolved using conversion factor as translator) | | Chronic | 5.37 | 1.30 | 25.41 | -- | 1.04 | 7.54 | -- | -- |
| Reasonable Potential to exceed Aquatic Life Criteria | | | **YES** | **NO** | **NO** | **--** | **NA** | **NA** | **--** | **YES** |

## Aquatic Life Effluent Limit Calculations

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of Compliance Samples Expected per month (n)** | | | 4 | | 1 | | | | | |
| n used to calculate AML (if chronic is limiting then use min=4 or for ammonia min=30) | | | 4 | -- | -- | -- | -- | -- | -- | 0 |
| LTA Coeff. Var. (CV), decimal | (Use CV of data set or default = 0.6) | | 1.050 | -- | -- | 0.600 | -- | -- | 0.600 | 0.960 |
| Permit Limit Coeff. Var. (CV), decimal | (Use CV from data set or default = 0.6) | | 1.050 | -- | -- | 0.600 | -- | -- | 0.600 | 0.960 |
| Acute WLA, ug/L | $C_d = (\text{Acute Criteria} \times MZ_a) - C_u \times (MZ_a\text{-}1)$ | Acute | 76.8 | -- | -- | -- | -- | -- | -- | 224.0 |
| Chronic WLA, ug/L | $C_d = (\text{Chronic Criteria} \times MZ_c) - C_u \times (MZ_c\text{-}1)$ | Chronic | 86.8 | -- | -- | -- | -- | -- | -- | 1,204.0 |
| Long Term Ave (LTA), ug/L | $\text{WLAa} \times \exp(0.5\sigma^2\text{-}z\sigma)$, Acute | **99%** | 15.0 | -- | -- | -- | -- | -- | -- | 47.4 |
| (99th % occurrence prob.) | $\text{WLAc} \times \exp(0.5\sigma^2\text{-}z\sigma)$; ammonia n=30, Chronic | **99%** | 31.1 | -- | -- | -- | -- | -- | -- | 463.0 |
| Limiting LTA, ug/L | used as basis for limits calculation | | 15.0 | -- | -- | -- | -- | -- | -- | 47.4 |
| Applicable Metals Criteria Translator (metals limits as total recoverable) | | | 0.83 | -- | -- | -- | -- | -- | -- | -- |
| Average Monthly Limit (AML), ug/L , where % occurrence prob = | | **95%** | **36** | **--** | **--** | **--** | **--** | **--** | **--** | **--** |
| Maximum Daily Limit (MDL), ug/L , where % occurrence prob = | | **99%** | **93** | **--** | **--** | **--** | **--** | **--** | **--** | **--** |
| Average Monthly Limit (AML), mg/L | | | **0.036** | **--** | **--** | **--** | **--** | **--** | **--** | **--** |
| Maximum Daily Limit (MDL), mg/L | | | **0.093** | **--** | **--** | **--** | **--** | **--** | **--** | **--** |
| Average Monthly Limit (AML), lb/day | | | **0.189** | **--** | **--** | **--** | **--** | **--** | **--** | **--** |
| Maximum Daily Limit (MDL), lb/day | | | **0.486** | **--** | **--** | **--** | **--** | **--** | **--** | **--** |

## Human Health Reasonable Potential Analysis

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| σ | $\sigma^2=\ln(CV^2+1)$ | | 0.862 | 0.555 | 0.555 | 0.555 | 0.555 | 0.555 | 0.555 | 0.808 |
| $P_n$ | $=(1\text{-confidence level})^{1/n}$ where confidence level = | **95%** | 0.949 | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 | 0.949 |
| Multiplier | $=\exp(2.326\sigma-0.5\sigma^2)/\exp[\text{invnorm}(P_N)\sigma-0.5\sigma^2]$, prob. = | **50%** | 0.245 | 2.490 | 2.490 | 2.490 | 2.490 | 2.490 | 2.490 | 0.267 |
| Dilution Factor (for Human Health Criteria) | | | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| Max Conc. at edge of Chronic Zone, ug/L ($C_d$) | | | 0.725 | 0.258 | 5.068 | 0.124 | 0.196 | 1.423 | 0.002 | 4,245.414 |
| Reasonable Potential to exceed HH Water & Organism | | | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** | **#N/A** |
| Reasonable Potential to exceed HH Organism Only | | | **NO** | **#N/A** | **#N/A** | **NO** | **NO** | **NO** | **NO** | **#N/A** |

## WET Reasonable Potential Analysis

The 2002 permit required the facility to conduct chronic whole effluent toxicity testing once in the summer during the permit term. The results of chronic WET testing in 2003 using the mussel (*Mytilus galloprovincialis*) larval test approach was 17.9 TUc, respectively (see Table 21 below).

**Table 21. Whole Effluent Toxicity Test Results**

| Test Date | Species and Test Type | NOEC (%) | LOEC (%) | EC50 (%) | IC25 (%) | TUc | TUa (TUc/10) |
|---|---|---|---|---|---|---|---|
| 11-19-2003 | Mussel larval test | 5.6 | >5.6 | >5.6 | >5.6 | 18 | 1.8 |

The predicted maximum effluent WET concentration at the edge of the ZID was compared to Alaska's WQS for WET in order to assess whether the facility's discharge has the reasonable potential to contribute to an excursion of Alaska's WQS. In order to determine a maximum probable effluent concentration prior to dilution, the facility's maximum WET result is multiplied by an uncertainty factor or "multiplier" recommended in Table 3-1 in EPA's Technical Support Document for Water Quality-based Toxics Control (EPA 505/2-90-001), which relies upon the number of samples within the dataset (n = 1) and the coefficient of variation calculated (CV). If there are not enough data to calculate a coefficient of variation, the TSD recommends using 0.6 as a default value. Using a 95$^{th}$ percentile confidence level in accordance with AK WQS, the multiplier used is 6.2.

The reasonable potential analysis relied on the following formula and assumptions. Table 22 and Appendix E includes the inputs and results.

$$Cr = [Ce + [Cs(Sa - 1)]]/Sa$$

Where:
$C_r$ = max predicted concentration at the edge of the ZID (in TUc)
$C_e$ = max predicted facility effluent WET concentration (max facility-provided WET test result (in TUc) X TSD multiplier or 18 TUc X 6.2, or 112 TUc)
$C_s$ = receiving water WET concentration (in TUc, assumed zero in absence of data, per TSD)
$S_a$ = dilution factor anticipated in ADEC 401 certification of proposed permit
When the WET concentration in the receiving water is 0 TUc, the equation is simplified to:
$Cr = Ce/Sa$

**Table 22. Reasonable Potential Calculations for Whole Effluent Toxicity**

| | **$T_u$** | **TSD Multiplier** | **Ce** | **Cs** | **Sa** | **Cr** | **AK WQS limit, CCC (TUc)** | **Reasonable Potential if Cr>CCC (YES or NO)** |
|---|---|---|---|---|---|---|---|---|
| Chronic | 18 | 6.2 | 112 | 0 | 14 | 8 | 1 | YES[1] |
| Acute | 1.8 | 6.2 | 12 | 0 | 8.5 | 0.48 | 1.4 | YES |

With only one data point collected 20 years ago the toxicity of the current discharge is highly uncertain and these results were not used in the reasonable potential analysis for WET. In order to characterize the toxicity of the effluent for the protection of Alaska WQS, the permit proposes to increase WET monitoring to two tests per year while the permit remains in effect. See Part IV.B.3 of this fact sheet and Part I.C of the draft permit.

# Appendix F. Effluent Limit Calculations for pH

# Appendix G. Essential Fish Habitat Assessment

Pursuant to the requirements for Essential Fish Habitat (EFH) assessments, this appendix contains the following information:

- Listing of EFH Species in the Facility Area
- Description of the Facility and Discharge Location
- EPA's Evaluation of Potential Effects to EFH

## A. Listing of EFH Species in the Facility Area

All waterbodies used by anadromous salmon throughout Alaska must be considered for EFH identification. According to NOAA Fisheries, the receiving water is a migration corridor for sockeye, coho, chum, and pink salmon.

## B. Description of the Facility and Discharge Location

The activities and sources of wastewater at the Skagway WWTP are described in detail in Part II and Appendix A of this Fact Sheet. The location of the outfall is described in Part III ("Receiving Water").

## C. EPA's Evaluation of Potential Effects to EFH

Water quality is an important component of aquatic life habitat. NPDES permits are developed to protect water quality in accordance with WQSs. The standards protect the beneficial uses of the waterbody, including all life stages of aquatic life. The development of permit limits for an NPDES discharger includes the basic elements of ecological risk analysis. The underlying technical process leading to NPDES permit requirements incorporates the following elements of risk analysis:

### *Effluent Characterization*

Characterization of Skagway WWTP's effluent was accomplished using a variety of sources, including:

- Permit application monitoring
- Permit compliance monitoring
- Statistical evaluation of effluent variability
- Quality assurance plans and evaluations

### *Identification of Pollutants of Concern and Threshold Concentrations*

The pollutants of concern include pollutants with aquatic life criteria in the Alaska WQSs. Threshold concentrations are equal to the numeric water quality criteria for the protection of aquatic life. No other pollutants of concern were identified by NMFS.

### *Exposure and Wasteload Allocation*

Analysis of the transport of pollutants near the discharge point with respect to the following:

- Mixing zone policies in the Alaska WQS

- Dilution modeling and analysis
- Exposure considerations (e.g., prevention of lethality to passing organisms)
- Consideration of multiple sources and background concentrations

***Statistical Evaluation for Permit Limit Development***

Calculation of permit limits using statistical procedures addressing the following:

- Effluent variability and non-continuous sampling
- Fate/transport variability
- Duration and frequency thresholds identified in the water quality criteria

***Monitoring Programs***

Development of monitoring requirements, including:

- Compliance monitoring of the effluent
- Ambient monitoring

***Protection of Aquatic Life in NPDES Permitting***

EPA's approach to aquatic life protection is outlined in detail in the Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001, March 1991). EPA and states evaluate toxicological information from a wide range of species and life stages in establishing water quality criteria for the protection of aquatic life.

The NPDES program evaluates a wide range of chemical constituents (as well as whole effluent toxicity testing results) to identify pollutants of concern with respect to the criteria values. When a facility discharges a pollutant at a level that has a "reasonable potential" to exceed, or to contribute to an exceedance of, the water quality criteria, permit limits are established to prevent exceedances of the criteria in the receiving water (outside any authorized mixing zone).

***Effects Determination***

Since the draft permit has been developed to protect aquatic life species in the receiving water in accordance with the Alaska WQSs, EPA has determined that issuance of this permit is not likely to adversely affect any EFH in the vicinity of the discharge. EPA will provide NMFS with copies of the draft permit and Fact Sheet during the public notice period. Any recommendations received from NMFS regarding EFH will be considered prior to reissuance of this permit.

# Appendix H. Outfall and Receiving Water Sampling Locations

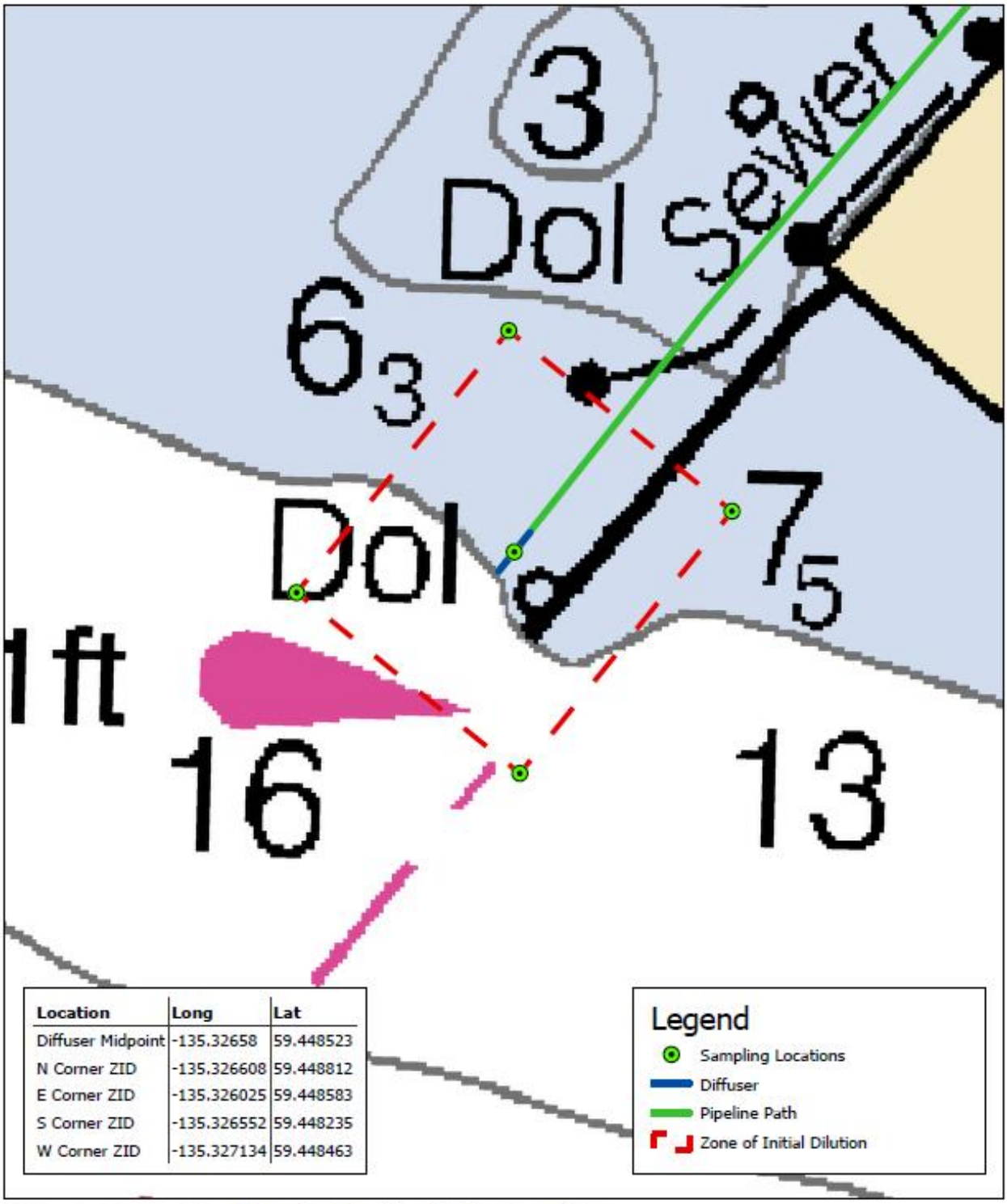



Figure 1. Receiving Water Sampling Locations. City of Skagway Wastewater Treatment Plant. NPDES Permit No. AK0021466.

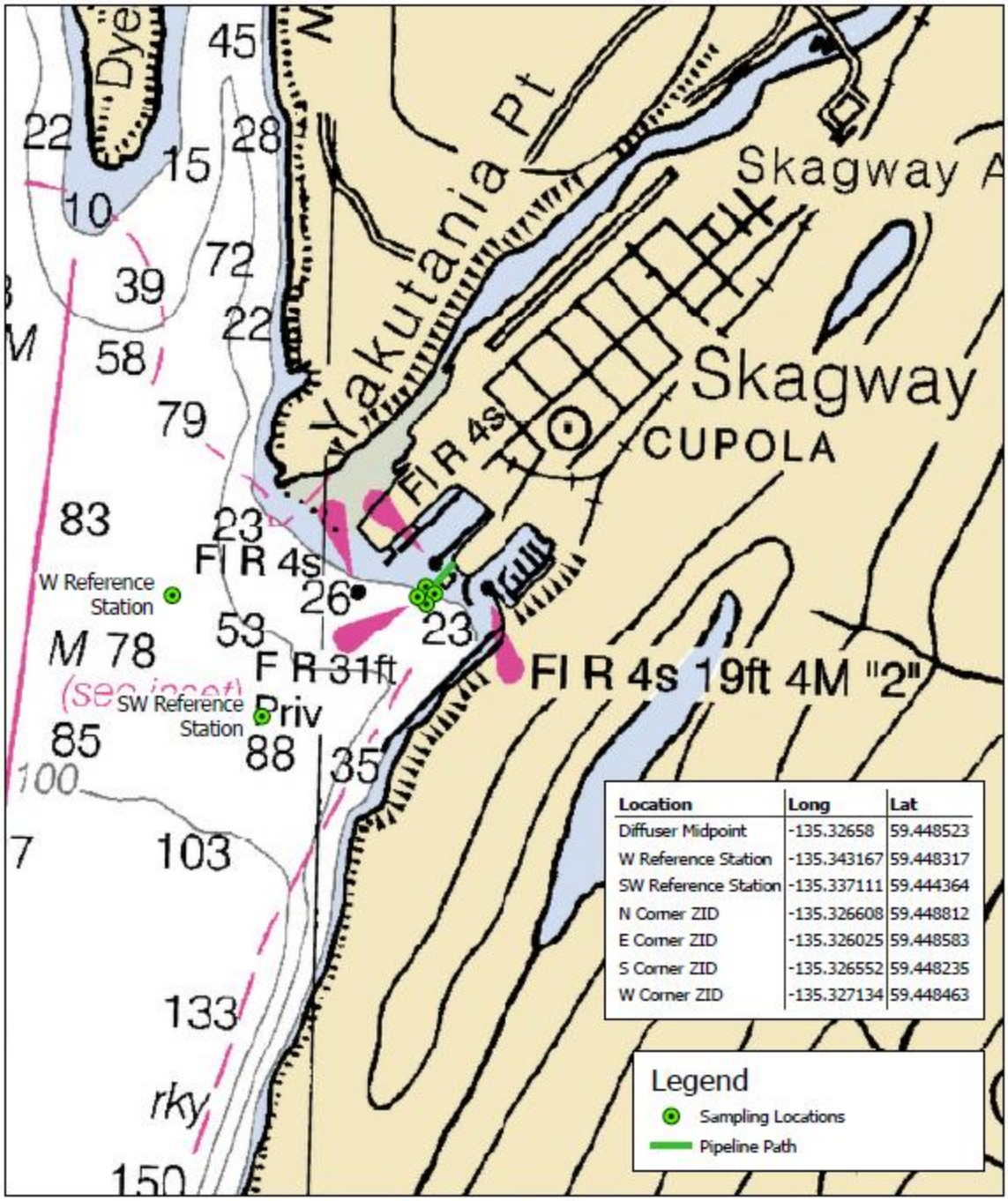



Figure 2. Receiving Water Sampling Locations. City of Skagway Wastewater Treatment Plant. NPDES Permit No. AK0020010.

## APPENDIX I. DRAFT 401 CERTIFICATION

STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DRAFT CERTIFICATE OF REASONABLE ASSURANCE

A Certificate of Reasonable Assurance, as required by Section 401 of the Clean Water Act, has been requested by the Environmental Protection Agency (EPA) for the marine water discharge of primary treated domestic wastewater from the City of Skagway Wastewater Treatment Facility (WWTF).

The activity is located at 59.448523° north latitude, 135.326580° west longitude, near Skagway, Alaska with discharges to Taiya Inlet.

Water Quality Certification is required for the activity because the activity will be authorized by an EPA permit identified as National Pollutant Discharge Elimination Permit No. AK0020010 and because a discharge will result from the activity.

Public notice of the application for this certification is made in accordance with 18 Alaska Administrative Code (AAC) 15.180. Public notice of the City of Skagway's Antidegradation Form 2G, included as an attachment to this certification, is made in accordance with 18 AAC 70.016. In accordance with 18 AAC 70.016, *Antidegradation implementation methods for discharges authorized under the federal Clean Water Act,* the Alaska Department of Environmental Conservation (DEC or Department) reviewed the City of Skagway's Antidegradation Form 2G and determined that the information provided by the City of Skagway complies with the requirements of 18 AAC 70.016. DEC will accept comments on these documents during the public notice period.

DEC has completed its review of EPA's Preliminary Draft National Pollutant Discharge Elimination Permit (NPDES) No. AK0020010 and associated documents and by means of this Draft Certificate of Reasonable Assurance conditionally certifies that there is reasonable assurance that the activity and the resulting proposed modified discharge from the Skagway WWTF is compliant with the requirements of Section 401 of the Clean Water Act, 40 Code of Federal Regulations (CFR) 125.61, Alaska Statutes Title 46, and Alaska Water Quality Standards 18 AAC 70 provided that the proposed modified discharge adheres to the stipulations provided below in this certification. Furthermore, as per 40 CFR 125.64(b), the Department has determined that the proposed modified discharge will not result in an additional treatment pollution control or other requirement on any other point or nonpoint sources as Taiya Inlet is not included on DEC's 2022 Integrated Water Quality Monitoring and Assessment Report as an impaired waterbody nor is the subject portion of Taiya Inlet subject to a proposed or approved Total Maximum Daily Load.

A Final Certification of Reasonable Assurance is pending review of any public comments received and is contingent on the inclusion of the following stipulations in NPDES Permit No. AK0020010:

1. In accordance with 18 AAC 70.240, DEC authorizes mixing zones in Taiya Inlet for copper, dissolved oxygen, temperature, total residual chlorine, enterococcus bacteria, fecal coliform bacteria, and whole effluent toxicity contained in the discharge from the Skagway WWTF. The mixing zones are defined as follows:

   The chronic mixing zone has a dilution of 28:1 and is defined as a rectangular area with a length of 6.1 meters and width of 7.4 meters centered over the diffuser with the length oriented perpendicular to the diffuser.

   The acute mixing zone has a dilution of 16:1 and is defined as a rectangular area with a length of 4.5 meters and width of 6.4 meters centered over the diffuser with the length oriented perpendicular to the diffuser.

   *Rationale: In accordance with State Regulations 18 AAC 70.240, the department has authority to designate mixing zones in permits or certifications. The designated mixing zones will ensure that the most stringent water quality criteria for copper (acute 5.8 micrograms per liter (µg/L), chronic 3.7 µg/L total recoverable), dissolved oxygen (6.0 milligrams per liter (mg/L) daily minimum (surface for a depth of 1 meter, no less than 4 mg/L at any depth below the surface), 17 mg/L daily maximum), temperature (15º Celsius), total residual chlorine (acute 13 µg/L, chronic 7.5 µg/L), and whole effluent toxicity (1.0 chronic toxic units) are met at all points outside of the mixing zone.*

2. In order for the Skagway WWTF to achieve compliance with the fecal coliform and enterococcus bacteria final effluent limits, DEC requires the establishment of a Compliance Schedule in the permit. Final effluent limits must be met as soon as possible, but no later than 5 years after the effective date of the permit. Interim requirements that will lead to compliance with the final effluent limits with dates for their achievement must be established in the permit. The following interim requirements shall be included in the Compliance Schedule:

   By one year after the effective date of the permit, the permittee shall develop a facility plan that evaluates alternatives to meet the final fecal coliform and enterococcus bacteria effluent limits and select their preferred alternative.

   By two years after the effective date of the permit, the permittee must complete the design of the preferred alternative and request approval to construct from DEC's Engineering Support and Plan Review (ESPR).

   By three years after the effective date of the permit, the permittee must secure funding and select a contractor to construct upgrades.

   By four years after the effective date of the permit, the permittee must commence construction.

   By five years after the effective date of the permit, the permittee must complete construction, complete optimization of facility upgrade operations, and achieve compliance with the final

fecal coliform and enterococcus effluent limits. Final approval to operate must be requested from ESPR.

The permittee must submit progress or compliance reports on interim and final requirements no later than 14 days following the scheduled date of each requirement.

*Rationale:*
*In accordance with State Regulations 18 AAC 15.090, the Department may attach terms and reporting requirements, and the posting of a performance bond or other surety, that it considers necessary to ensure that conditions to a permit, variance, or approval, including operating, monitoring, inspection, sampling, access to records and all applicable criteria will be met.*

*According to 18 AAC 83.560, the Department has authority to specify a schedule of compliance leading to compliance with 33 U.S.C. 1251-1387 (Clean Water Act). Any schedule of compliance must require compliance as soon as possible, but no later than the applicable statutory deadline under 33 U.S.C. 1251-1387 (Clean Water Act). 18 AAC 83.560(b) requires interim requirements and dates for their achievement if the schedule of compliance exceeds one year from the date of permit issuance. Time between interim requirements must not exceed one year. Progress reports must be submitted no later than 14 days following each interim date and the final date of compliance.*

*According to 18 AAC 72.200, Application for department approval, (a) Except as otherwise provided in 18 AAC 72.035(d) and 18 AAC 72.200(b), a person must submit a plan to the department and obtain approval of that plan before constructing, installing, or modifying any part of a domestic wastewater collection, treatment, storage, or disposal system. To obtain approval, a person shall provide to the department the information required by 18 AAC 72.205. 18 AAC 72.240, states that the department will issue final approval to operate if the information required by 18 AAC 72.235 confirms that (A) the system was constructed as originally approved or (B) the system, or a designated phase of that system, otherwise meets the requirements of AS 46.03 and 18 AAC 72. DEC plan approval requirements will ensure that the most stringent water quality criteria for fecal coliform and enterococcus bacteria are met at all points outside the mixing zone.*

3. DEC requires that the permit contain the following final fecal coliform effluent limits:

Monthly Average 200 fecal coliform per 100 mL (FC/100 mL)
Weekly Average 400 FC/100 mL
Daily Maximum 800 FC/100 mL.

*Rationale:*
*In accordance with State Regulations 18 AAC 15.090, the Department may attach terms and reporting requirements, and the posting of a performance bond or other surety, that it considers necessary to ensure that conditions to a permit, variance, or approval, including operating, monitoring, inspection, sampling, access to records and all applicable criteria will be met.*

*18 AAC 72.990(21) defines disinfect to treat by means of a chemical, physical, or other process such as chlorination, ozonation, application of ultraviolet light, or sterilization, designed to eliminate pathogenic organisms, and producing an effluent with a 30-day 200 FC/100 mL monthly average and a seven-day 400 FC/100 mL average. These limits are required as final fecal coliform limits. A daily maximum final effluent limit of 800 FC/100 mL limit is also required. Establishment of a daily maximum limit will help ensure compliance with water quality criteria. Since these limits are dependent on the use of specific technological processes, DEC applies these final fecal coliform bacteria effluent limits as technology-based limits. These final fecal coliform bacteria effluent limits will ensure that the most stringent water quality criteria for fecal coliform bacteria are met at all points outside the mixing zone.*

4. DEC requires that the permit contain the following final enterococcus bacteria limits:

   30-day Geometric Mean 980 colony forming unit (CFU)/100 mL
   Daily Maximum 3,640 CFU/100 mL).

   *<u>Rationale</u>:*
   *In accordance with State Regulations 18 AAC 15.090, the Department may attach terms and reporting requirements, and the posting of a performance bond or other surety, that it considers necessary to ensure that conditions to a permit, variance, or approval, including operating, monitoring, inspection, sampling, access to records and all applicable criteria will be met.*

   *Enterococcus bacteria has reasonable potential to exceed water quality criteria. Effluent limits based on the reasonable potential for enterococcus bacteria to exceed water quality criteria and the dilution required for the effluent to meet enterococcus water quality criteria water quality criteria were therefore developed. The final enterococcus bacteria limits will ensure that the most stringent water quality criteria for enterococcus bacteria are met at all points outside the mixing zone. DEC expects that after the implementation of disinfection, the Skagway WWTF may achieve compliance with enterococcus water quality criteria (30-day geometric mean 35 CFU/100 mL with not more than 10% of the samples exceeding a statistical threshold value of 130 CFU/100 mL), therefore these final enterococcus bacteria limits may be revised in the next permit reissuance.*

5. DEC requires the following copper effluent limits:

   Average Monthly 18 µg/L (total recoverable)
   Daily Maximum 45 µg/L (total recoverable)

   *<u>Rationale</u>:*
   *18 AAC 70.240(b)(2) requires the Department to consider the characteristics of the effluent after treatment of the wastewater. Additionally, 18 AAC 83.435(d) specifies that when the Department determines, using the procedures in 18 AAC 83.435(c), that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the*

*allowable ambient concentration of a state numeric criteria within a state water quality standard for and individual permit, the permit must contain effluent limits for that pollutant.*

*DEC used the process described in the Technical Support Document (TSD) for Water Quality-Based Toxics Control (Environmental Protection Agency, 1991) and DEC's guidance, Alaska Pollutant Discharge Elimination System Permits Reasonable Potential Analysis and Effluent Limits Development Guide (June 30, 2014) to determine the reasonable potential for copper to exceed water quality criteria. The results of the reasonable potential analysis indicated that copper with a maximum expected concentration of 45 µg/L total recoverable, has reasonable potential to exceed Alaska copper marine water quality criteria (chronic 3.7 µg/L total recoverable, acute 5.8 µg/L total recoverable). Effluent limits based on the reasonable potential for copper to exceed water quality criteria and the dilution required for the effluent to meet copper water quality criteria were therefore developed (average monthly 18 µg/L total recoverable, daily maximum 45 µg/L total recoverable). These effluent limits will ensure that the most stringent copper water quality criteria are met at all points outside the mixing zone.*

6. DEC requires the following total residual chlorine effluent limits:

   Average Monthly 71 µg/L
   Daily Maximum 208 µg/L

   *Rationale:*
   *18 AAC 70.240(b)(2) requires the Department to consider the characteristics of the effluent after treatment of the wastewater. Additionally, 18 AAC 83.435(d) specifies that when the Department determines, using the procedures in 18 AAC 83.435(c), that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the allowable ambient concentration of a state numeric criteria within a state water quality standard for and individual permit, the permit must contain effluent limits for that pollutant.*

   *DEC used the process described in the Technical Support Document (TSD) for Water Quality-Based Toxics Control (Environmental Protection Agency, 1991) and DEC's guidance, Alaska Pollutant Discharge Elimination System Permits Reasonable Potential Analysis and Effluent Limits Development Guide (June 30, 2014) to determine the reasonable potential for total residual chlorine to exceed water quality criteria. The results of the reasonable potential analysis indicated that total residual chlorine with a maximum expected concentration of 209 µg/L, has reasonable potential to exceed Alaska total residual chlorine marine water quality criteria (acute 13 µg/L, chronic 7.5 µg/L). Effluent limits based on the reasonable potential for total residual chlorine to exceed water quality criteria and the dilution required for the effluent to meet total residual chlorine water quality criteria were therefore developed (average monthly 71 µg/L, daily maximum 208 µg/L). These effluent limits will ensure that the most stringent total residual chlorine water quality criteria are met at all points outside the mixing zone.*

| DRAFT | DRAFT |
| --- | --- |
| Signature | Date |
| DRAFT | DRAFT |
| Printed Name | Title |

# APPENDIX J. ANTI-DEGRADATION ANALYSIS

# Antidegradation Form 2G

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC)
Wastewater Discharge Authorization Program
555 Cordova Street, AK 99501
907-269-6285

Form 2G must be completed by all applicants. The applicant shall submit sufficient information for the department to complete an antidegradation analysis and make findings under 18 AAC 70.016 (b), (c), and (d). DEC may request additional information as necessary.

Antidegradation analysis is tier-specific and the department findings for Tier 1 and Tier 2 are on a parameter-by-parameter basis. Analysis and department findings for Tier 3 water are on a basis of a designated water.

The antidegradation review procedure is based on:

- The level of protection (i.e. Tier 1, 2, or 3) assigned to the pollutants of concern within the receiving water,
- The type of receiving water,
- Existing water quality of the receiving water,
- The necessity of degradation, and
- The social and economic importance of the regulated activity.

All discharges that require a permit under 18 AAC 83 Alaska Pollutant Discharge Elimination System (APDES) or an application for state certification of a federal permit under Section 401 of the Clean Water Act (CWA) are subject to antidegradation regulatory requirements under 18 AAC 70.016. [18 AAC 70.016(a)(1)(A & B)]

Submit completed form to DEC Division of Water to the address above, or via email to either of the following email addresses depending on the type of permit:

- 401 Certification for 404 CWA, or other federal permits: DEC-401Cert@alaska.gov
- APDES Permits: DEC.Water.WQPermit@alaska.gov
- Or, via other means as coordinated with DEC Division of Water.

## Section 1- Facility Information [18 AAC 70.016(a)(5)(A – G)]

**Facility Name**: The City of Skagway, Alaska Wastewater Treatment Plant **Permit Number**: AK-002001-0

1. Provide a list of Parameters of Concern in the discharge, the respective concentrations, persistence, and potential impacts to the receiving water.
2. Identify which Tier protection level should apply for each Parameter of Concern.

***(For multiple parameters or if additional space is needed, attach separate sheet)***

Receiving Waterbody or Wetland:

Taiya Inlet

| Parameter of Concern: | Respective Concentrations: | Tier* Protection Level: *(*Note, complete this entry after completing the rest of the form)* |
|---|---|---|
| Total Residual Chlorine, Copper and Fecal Coliform | 400 µg/L, 100 µg/L, and 870,000 col/100 mL | Tier 2 |

Persistence:

Total Residual Chlorine (TRC) concentrations are tested on a monthly basis in the Wastewater Treatment Plant (WWTP) effluent and ranged from non-detect to 400 µg/L. Most concentrations during 2017 to 2021 were non-detect with 15 samples having detectable results. Copper concentrations are tested in the WWTP effluent on a monthly basis and has ranged from 3.4 µg/L to 100 µg/L with an average of 21.1 µg/L. Fecal coliform is consistantly discharged from the WWTP with geometric means ranging from non-detect to 870,000 col/100 mL. Ranges for both parameters are from 2017 to the end of 2021.

Potential Impacts:

TRC concentrations typically do not persist for extended periods, but can potentially impact the microbial, fungi, and biofilm in habitats in which it is discharged into.

High copper concentrations can have impacts on aquatic organisms depending on the hardness of the waterbody. The higher the hardness, the higher the copper concentrations that aquatic organisms can withstand. Copper concentrations are unknown as copper was not been tested in the receiving waterbody as it was not required by the current discharge permit.

Fecal coliform, found in human and animal feces, is used to indicate the possible presence of disease-causing bacteria. Based on sampling conducted from 2001 to 2006 fecal coliform concentrations at six stations (TP-1 to TP-06) in the receiving waterbody resulted in concentrations ranging from non-detect to 62 col/100 mL. More recently, samples collected at the sample locations in June 2022 resulted in concentrations ranging from non-detect to 2 col/100 mL. As described in the mixing zone Form 2-M and associated attachment, it is assumed that bacteria (fecal coliform, enterococcus) will be substantially reduced from current levels due to ADEC's determination that disinfection standards (18 AAC 72) will have to be met by the facility, which are 200 cfu/100 mL (average) applied at end of pipe. At these disinfection-reduced levels, bacteria will still need a mixing zone but the dilution and size needed will be controlled by other parameters.

If applicable, data is attached on the parameters that may alter the effects of the discharge to the receiving water. ☐ Yes, ☐ No, ☑ N/A

## Section 2- Baseline Water Quality Provisions [18 AAC 70.016(a)(6)(A – C)]

If determined necessary and requested by the Department, submit sufficient and credible baseline water quality information for the receiving water which meets the requirements of 18 AAC 70.016(a)(6)(A – C).

## Section 3- Tier 1 Protection Level and Analysis [18 AAC 70.016(b)]

1. Does a discharge of any parameter identified in Section 1 occur to a Category 4 [305(b)] or Category 5 [303(d)] waterbody listed in the current approved Alaska's Integrated Water Quality Monitoring and Assessment Report?
   *See http://dec.alaska.gov/water/water-quality/impaired-waters.aspx for the most recently approved integrated report and category listings.*

   ☐ Yes ☑ No

   a. If yes, list parameters from Section 1 that are present in the proposed discharge that will be included in the Tier 1 analysis in the following table.

| **Receiving Water and Wetlands Information** (if additional space is needed, attach separate sheet): | | | | | | | |
|---|---|---|---|---|---|---|---|
| **a.** Name of waterbodies or wetlands to which you discharge: | **Impaired Waters** | | | | | | |
| | **b.** Is the proposed discharge(s) directly to any segment of a Category 4 or 5 waterbody? | | If you answered yes to b, then answer the following three questions (c, d, and e). | | | | |
| | | | **c.** What parameter(s) are causing the Category 4 or 5 water degradation? | **d.** Are the parameter(s) causing the degradation present in the proposed discharge? | | **e.** Is the discharge consistent with the assumptions and requirements of applicable EPA approved or established Total Maximum Daily Load (TMDL)? | |
| | Yes | No | | Yes | No | Yes | No |
| | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ |
| | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ |

## Section 4- Tier 2 Protection Level and Analysis [18 AAC 70.016(c)]

*If not identified as requiring only Tier 1 level of protection, Tier 2 is presumed for all water as the default protection level for all parameters [18 AAC 70.016(c)(1)].*

1. Is the application for a *(Check all that apply)*:

   ☐ New Discharge* ☑ Existing Discharge ☐ Expanded Discharge*

   *Note: "new or expanded," with respect to discharges means discharges that are regulated for the first time or discharges that are expanded such that they could result in an increase in permitted parameter load or concentration or other changes in discharge characteristics that could lower water quality or have other adverse environmental impacts.

2. Does a discharge of any parameter identified in Section 1 – Facility Information require Tier 2 analysis as defined under 18 AAC 70.016(c)(2)(A) – (E)?

   ☑ **Yes**, proceed to **Question 3**

   ☐ **No**, please **explain below** and proceed to **Section 5**

3. For each parameter requiring a Tier 2 analysis, provide a description per discharge (e.g., parameter specific per outfall) and analysis of a range of practicable alternatives that have the potential to prevent or lessen the degradation associated with the proposed discharge [18 AAC 70.016(c)(4)] (*if additional space is needed, attach separate sheet*). Include:

   A. Identification of receiving water quality and accompanying environmental impacts on the receiving water for each of the practicable alternatives;

Please see Supplemental Attachment

B. Evaluation of the cost for each of the practicable alternatives, relative to the degree of water quality degradation;

Please see Supplemental Attachment

C. Identification of a proposed practicable alternative that prevents or lessens water quality degradation while also considering accompanying cross-media environmental impacts. (*If the applicant has selected a non-degrading alternative, the social or economic importance analysis in Question 4 is not required.*

Please see Supplemental Attachment

**4. Social or Economic Importance** [18 AAC 70.016(c)(5)]

Provide information that demonstrates the accommodation of important social or economic development. The applicant shall complete either a social OR economic importance analysis (or both) identifying each affected community in the area where the receiving water for the proposed discharge is located. *(if additional space is needed, attach separate sheet)*

| **(A) Social Importance Analysis**: *(select one or more areas, and describe below)* | **(B) Economic Importance Analysis**: *(select one or more areas, and describe below)*: |
|---|---|
| ☑ community services provided; | ☑ employment, job availability, and salary impacts; |
| ☑ public health or safety improvements; | ☐ tax base impacts; |
| ☑ infrastructure improvements; | ☐ expanded leases and royalties; |
| ☑ education and training; | ☑ commercial activities; |
| ☑ cultural amenities; | ☐ access to resources; |
| ☑ recreational opportunities | ☐ access to a transportation network |

**Describe** (checked items above or attach as separate document)

Adequate wastewater treatment and the facilities to complete the treatment are crucial to communities to grow social and economic development opportunities. It has been documented many times over that wastewater treatment facilities provide short and long-term benefits for the people they serve, the environment that surrounds them, and the economies of the area they serve. Investing in wastewater and other sanitation infrastructure is crucial to the public health and safety by preventing disease and protecting human health, protecting the environment by treating the effluent, and enhancing the quality of life. The Municipality of Skagway has been providing wastewater treatment services at their existing facility since 1976 which has allowed for population and economic growth to the region. During the 2007 re-application the population was 850 with 800 being served by the wastewater facilities and as of the 2020 census is now 1,240 individuals with serving approximately 400 connections.

The existing facility is permitted for a monthly average flow of 0.53 MGD and a daily maximum flow of 0.63 MGD. Over the period of 2017-2021, the average effluent flows from the plant have been approximately 0.25 MGD and the maximum daily flow has been approximately 0.33 MGD. This suggests that Skagway will be able to operate under the existing permit without needing to request additional flow limits or expand the existing facility to accommodate additional growth/flow for several years. Also, based on the biological monitoring reports completed under the existing permit requirements, the facility has not adversely impacted aquatic life or the overall health of the Taiya Inlet.

The wastewater facility provides employment to community members and includes education and training to ensure proper treatment of effluent and the ability of the employees to grow within the skill set. By employing and maintaining staff who live and have connections in the community they have an understanding of the importance of protecting the uses of Taiya Inlet such as recreational and cultural practices that occur.

The social and economic impacts of not authorizing a mixing zone should also be considered. The capital and on-going operation and maintenance costs that would be associated with the additional treatment alternatives would have a significant impact on the Municipality of Skagway and would increase the cost of operation to the customers that fund the operation of the WWTP. Substantial increases in water and sewer rates could negatively impact that quality of life and could cause individuals and/or companies to locate elsewhere. The expenses of operation of the increased treatment in the event of losing the mixing zone would include an increase in wages due to the need for additional operators with higher certification levels to operate the facility. The ability to find an operator with the required qualifications would be extremely challenging as has been shown in small communities across the state.

**Section 5- Tier 3 Protection Level and Analysis** [18 AAC 70.016(d)]

1. Is the discharge to a designated Tier 3 water? ☐ Yes ☑ No

*(Currently, the State of Alaska has not designated any Tier 3 waters).*

*See http://dec.alaska.gov/water/water-quality/standards/antidegradation.aspx for Tier 3 for further information.)*

## Section 6. Certification Information

An Alaska Pollutant Discharge Elimination System (APDES) permit application must be signed by an individual with the appropriate authority per 18 AAC 83.385 or for 401 certification of 404 permits or other federal permits per 18 AAC 15.030.

| | |
|---|---|
| **APDES Permits** | |
| Corporate Executive Officer<br>18 AAC 83.385 (a)(1)(A) | For a corporation, a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation. |
| Corporate Operations Manager<br>18 AAC 83.385 (a)(1)(B) | For a corporation, the manager of one or more manufacturing, production, or operating facilities, if<br>(i) the manager is authorized to make management decisions that govern the operation of the regulated facility, including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental statutes and regulations;<br>(ii) the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and<br>(iii) authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. |
| Sole Proprietor or General Partner<br>18 AAC 83.385 (a)(2) | For a partnership or sole proprietorship, the general partner or the proprietor respectively. |
| Public Agency, Chief Executive Officer<br>18 AAC 83.385 (a)(3)(A) | For a municipality, state, or other public agency, the chief executive officer of the agency. |
| Public Agency, Senior Executive Officer<br>18 AAC 83.385 (a)(3)(B) | For a municipality, state, or other public agency, a senior executive officer having responsibility for the overall operations of a principal geographic unit or division of the agency. |
| **401 Certifications** | |
| Corporations<br>18 AAC 15.030(1) | In the case of corporations, by a principal executive officer of at least the level of vice president or his duly authorized representative, if the representative is responsible for the overall management of the project or operation. |
| Partnerships<br>18 AAC 15.030(2) | in the case of a partnership, by a general partner |
| Proprietorship<br>18 AAC 15.030(3) | in the case of a sole proprietorship, by the proprietor |
| Public Agency<br>18 AAC 15.030(4) | in the case of a municipal, state, federal or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee. |

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

| Organization: | Name: | Title: |
|---|---|---|
| Municipality of Skagway | Tyson Ames | Public Works Director |

| Phone: | Fax (optional): | Email: |
|---|---|---|
| 907-983-2449 | | t.ames@skagway.org |

| Mailing Address: | Street (PO Box): | | |
|---|---|---|---|
| | P.O. Box 415 | | |
| | City: | State: | Zip: |
| | Skagway | AK | 99840 |

Tyson Ames
Signature/Responsible Official

2-1-23
Date

## Section 7. Form 2G Preparer *(Complete if Form 2G was prepared by someone other than the certifier.)*

| Organization: | Name: | Title: |
|---|---|---|
| HDR Engineering, Inc | Tom Dupuis | Sr. Water Quality Engineer |

| Phone: | Fax (optional): | Email: |
|---|---|---|
| 208-890-0464 | | thomas.dupuis@hdrinc.com |

| Mailing Address: ☐ Check if same as Certifiers Information | Street (PO Box): | | |
|---|---|---|---|
| | 582 E. 36th Ave. Ste 500 | | |
| | City: | State: | Zip: |
| | Anchorage | AK | 99503 |

# Form 2G Supplemental Attachment

## Section 4-Tier 2 Protection Level and Analysis

### 3A-Identification of Receiving Water Quality and Accompanying Environmental Impacts for Each Practicable Alternative

The practicable alternative of additional treatment for the wastewater and wastewater treatment plant (WWTP) would include the addition of corrosion control chemical in the drinking water system, metals treatment at the WWTP that includes additional enhanced clarification or membrane filtration, and installation of additional equipment for disinfection (either for chlorination or ultraviolet (UV) disinfection) at the WWTP. If chlorination is chosen for disinfection, then a dichlorination system would likely be required to remove total residual chlorine (TRC) from the effluent before discharge to the receiving waterbody. Impacts to the receiving waterbody for this alternative would include a decrease in the concentrations of TRC, copper, and fecal coliform entering the receiving waterbody. There may be the introduction of some total residual chlorine from the disinfection process, but this would be monitored and likely have a permit limit that the WWTP will need to meet.

### 3B-Evalution of Cost for Each Practicable Alternative

The cost of installing and operating the various treatment systems at the WWTP include the cost of the chemicals, building improvements and/or construction required, land acquisition, and additional mechanical equipment and piping. The analysis and cost of treatment for each parameter is as follows:

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The Municipality of Skagway (MOS) has limited background data on copper in the drinking water and sanitary sewer systems. Reported copper concentrations in the water distribution system come from the MOS's required lead and copper sampling (currently sample every three years). This data is the best available information but the limited nature of the sampling makes it difficult to develop strong correlations between detected copper concentrations leaving the distribution system and the copper concentrations entering the wastewater. Corrosion of drinking water systems and plumbing has been established as one of the major contributors of metals to wastewater (Isaac et. al, 1997). In the case of MOS, corrosion of copper, brass, bronze, and galvanized metals is likely to be the single largest contributor of metals as the MOS lacks smelting, semiconductor, electroplating, paint manufacturing, large volume color printing, or wood preservative operations - industries that typically release large quantities of heavy metals into municipal sewer systems.

Results of the required water system lead and copper sampling from 2019 and 2020 indicate an average copper concentration in the water system ("at the tap") of approximately 400-600 µg/L. MOS does not currently sample for copper entering the wastewater treatment plant (WWTP). Effluent sampling as part of their current NPDES permit indicates average effluent copper concentrations of approximately

21.1 µg/L in the WWTP effluent which discharges into Tiaya Inlet. Typically, a portion of influent copper, and other metals, is bound to solids and removed as sludge in the treatment process.

The MOS WWTP's existing enhanced primary clarification process does provide some copper removal through the clarification/solids removal process. However, in order for the plant effluent to meet the much lower aquatic marine criteria, it is likely that a multi-faceted approach of reducing the copper concentrations coming into the WWTP as well as additional treatment within the plant that targets metals removal would be required at a significant capital and long-term operational cost to the MOS.

**Cost for Corrosion Control in Drinking Water System**

The Skagway water system is supplied by 4 wells tapping a confined underground aquifer. Source waters for Skagway are high quality ground waters and are delivered untreated. Water quality data for the drinking water wells indicate a very low background concentration of copper (and other metals) of less than 1 µg/L. The low background concentration of copper in the source water further suggests that influent copper at the WWTP is a result of corrosion of copper, brass, bronze, and galvanized metals from the drinking water system.

One option that could be explored if the MOS needs to reduce copper concentrations in the wastewater system is the use of corrosion control chemicals. While the drinking water in Skagway does not appear to be overly aggressive, a sodium carbonate (soda ash) solution could be evaluated to reduce the corrosive nature of the drinking water. Another potential additional 'treatment' option that may be employed in the drinking water system is the inclusion of corrosion control chemicals to minimize corrosion in the drinking water distribution system. The use of orthophosphates alone or blending with polyphosphates has been recommended by the United States Environmental Protection Agency (USEPA) for reducing lead and copper corrosion in plumbing systems for compliance with the federal Lead and Copper Rule.

For the purposes of this analysis, it is assumed the MOS could add a 100 percent orthophosphate solution, such as phosphoric acid, to assist in corrosion control in the water distribution system. However, to counteract the acid's pH depression, it is also assumed that soda ash would need to be added to maintain the current water pH.

Table 1 provides a rough (conceptual level) order of magnitude opinion of probable cost for the development of corrosion control chemical feed systems at the drinking water wells. It is assumed that separate buildings/structures would need to be constructed to house the chemical feed systems at each well.

**Table 1: Opinion of Probable Cost, Corrosion Control Chemical Addition**

| Item | Quantity | Units | Unit Cost | Cost |
|---|---|---|---|---|
| Chemical Addition Systems (Orthophosphate and Soda Ash) | 4 | LS | $350,000 | $1,400,000 |
| Well Houses (approx. 400sf at each well) | 1,600 | SF | $800 | $1,280,000 |
| Process Piping | 1 | LS | $201,000 | $201,000 |

| | | | | |
|---|---|---|---|---|
| Ancillary Equipment | 1 | LS | $536,000 | $536,000 |
| Site Work (excavation, grading, etc.) | 1 | LS | $268,000 | $268,000 |
| | **Subtotal** | | | **$3,685,000** |
| | Contingency (25%) | | | $921,250 |
| | Electrical, Instrumentation, and Control (25%) | | | $921,250 |
| | Engineering and Construction Management (20%) | | | $737,000 |
| | MOS Administration and Legal (5%) | | | $184,250 |
| | **Total** | | | **$6,448,750** |

Based on the current metals levels in the water distribution system, it is not known if corrosion control alone would reduce copper to a point where the MOS would meet potential marine criteria at end of pipe. Decreasing metals contributions from the drinking water system into the wastewater system could be part of a comprehensive approach to meeting the WWTP discharge permit requirements.

**Cost for WWTP Improvements To Remove the Copper**

Another alternative considered for removing copper would be to add unit processes at the WWTP to target the removal of metals. The process for removing metals to the required level would likely involve chemical precipitation and removal of the particles with enhanced clarification or membrane filtration. The Skagway WWTP's existing enhanced primary clarification process does provide some copper removal through the clarification/solids removal process. However, the current system likely does not have capacity to treat the copper to the low level required for discharge. Based on current flows and loads to the plant, an expansion would likely be required to handle the targeted metals removal and increased solids within the system. Upgrades to the facility would need to include additional enhanced clarification, increased aerobic digester capacity, and additional dewatering equipment.

Table 2 provides a rough order of magnitude (ROM) opinion of probable cost for the development of metals removal processes at the WWTP. It is assumed that a separate building/structure would have to be constructed to house the treatment systems and additional land would need to be purchased to have room for the new facilities. The existing treatment plant building(s) are essentially at capacity, with room for only minor reconfiguration or addition of small equipment. Any upgrades that require significant space would have to be exterior or a building addition would need to be constructed, but space for new structures is extremely limited on the existing WWTP site. This conceptual cost analysis assumes that land near the existing WWTP (generally in the Skagway Harbor area) could be acquired by the MOS to expand the existing facility. It is likely, however, that acquiring land in this area would be extremely costly, if available at all.

In the event that the MOS would need to expand their WWTP facilities beyond their existing site, they would likely need to consider temporary treatment facilities while large scale modifications were made within the existing footprint of the WWTP or look to construct a new WWTP on a new property. Beyond the WWTP system and site, it is likely that the MOS would also need to upgrade its incinerator at the Municipal Solid Waste Facility to handle the increased volume of solids or explore options to ship the

additional solids to the lower 48 if upgrades to the incinerator were not viable. Either alternative would involve a complex permitting, design, and construction effort and would result in project costs well beyond the conceptual cost provided here

**Table 2: Opinion of Probable Cost, WWTP Treatment Process to Remove Copper**

| Item | Quantity | Units | Unit Cost | Cost |
|---|---|---|---|---|
| Additional enhanced clarification equipment | 1 | LS | $2,200,000 | $2,200,000 |
| Aerobic Digester tankage and equipment | 1 | LS | $1,200,000 | $1,200,000 |
| Additional Dewatering Equipment | 1 | LS | $385,000 | $385,000 |
| Additional Treatment Building (Structure and Mech) | 1,500 | SF | $800 | $1,200,000 |
| Land Acquisition | 1 | LS | $850,000 | $850,000 |
| Process Piping | 1 | LS | $498,500 | $498,500 |
| Ancillary Equipment | 1 | LS | $997,000 | $997,000 |
| Site Work (excavation, grading, etc.) | 1 | LS | $1,495,500 | $1,495,500 |
| | **Subtotal** | | | **$8,826,000** |
| | Contingency (25%) | | | $2,206,500 |
| | Electrical, Instrumentation, and Control (25%) | | | $2,206,500 |
| | Engineering and Construction Management (20%) | | | $1,765,200 |
| | MOS Administration and Legal (5%) | | | $441,300 |
| | Operations (new FTE in Utility Dept) | | | $190,000 |
| | **Total** | | | **$15,636,000** |

**Cost for WWTP Improvements To Disinfect**

The existing Skagway WWTP utilizes tablet chlorine addition in three locations within the existing DensaDeg system. The small chlorine feeders are used periodically for odor control or to knock down the fecal coliform numbers slightly but are not sized to fully disinfect the wastewater on a continual basis. To meet the potential technology-based, end-of-pipe permit limits for fecal coliform and enterococcus (18-AAC-72 technology basis), a new disinfection system would be required at the Skagway WWTP. A detailed preliminary engineering evaluation should be performed to evaluate the viability of ultraviolet (UV) disinfection on the treated effluent from the existing enhanced primary clarifiers in comparison to the treatment effectiveness, costs, etc of chemical disinfection. For the purposes of this conceptual analysis, the use of sodium hypochlorite has been assumed for plant effluent disinfection. There are a number of potential alternatives to consider for a chlorine disinfection system including on-site generation versus storage, tote versus mini-bulk versus bulk storage of commercial hypochlorite, chemical transfer and metering pumping, chlorine contact basin versus pipeline for detention, etc. Additionally, if chlorination is the selected alternative for disinfection than it is likely that dechlorination processes will be necessary to minimize the effects of potentially toxic chlorine residuals on the environment. As with a chlorination system, there are a number of potential alternatives to consider for a dechlorination system; which generally include reacting the residual chlorine with a reducing agent or by adsorption on and reaction with activated carbon. For the

purposes of this conceptual analysis, the use of sodium bisulfite has been assumed for dechlorination. Sodium bisulfite would be injected in the disinfection channel to neutralize any chlorine remaining after the disinfection process is complete and would have a similar metering pump system and chemical storage requirements to the hypochlorite system. A detailed preliminary engineering evaluation should be performed, taking into account capital costs, as well as life cycle costs, chemical delivery, facility footprint, and sensitivity to power costs and hypochlorite/sodium bisulfite production costs before selecting the most viable alternative for the Skagway WWTP.

Table 4 provides a rough order of magnitude (ROM) opinion of probable cost for the development of chlorine disinfection systems and assumes mini-bulk storage of hypochlorite at the facility (2 – 3,000 gallon chlorine tanks) and associated ancillary equipment, and the construction of a concrete chlorine contact basin to achieve adequate detention time prior to discharge. It is assumed that a separate building/structure would have to be constructed to house the treatment systems and additional land would need to be purchased to have room on-site for the new facilities. Note the discussion above on the assumptions regarding land acquisition and expanded facilities and implications to the project cost and complexity.

**Table 3: Opinion of Probable Cost, WWTP Treatment Process for Disinfection**

| Item | Quantity | Units | Unit Cost | Cost |
|---|---|---|---|---|
| **New Equipment (Hypochlorite System)** | 1 | LS | $1,500,000 | $1,500,000 |
| - Mini-bulk storage (2 - 3,000 gal tanks) | | | | |
| - Hypochlorite Metering Pumps | | | | |
| - Hypochlorite Transfer Pumps | | | | |
| - Dechlorination system (metering pumps, containment, etc.) | | | | |
| Process Piping | 1 | LS | $450,000 | $450,000 |
| **New Building** | | | | |
| Additional Treatment Building (Structure and Mech) | 1,900 | SF | $800 | $1,520,000 |
| Land Acquisition | 1 | LS | $850,000 | $850,000 |
| Ancillary equipment/systems | 1 | LS | $390,000 | $390,000 |
| Misc Concrete (Chlorine Contact Basin) | 1 | LS | $600,000 | $600,000 |
| Site Work (excavation, grading, etc.) | 1 | LS | $585,000 | $585,000 |
| | **Subtotal** | | | **$5,895,000** |
| | Contingency (25%) | | | $1,473,750 |
| | Electrical, Instrumentation, and Control (25%) | | | $1,473,750 |
| | Engineering and Construction Management (20%) | | | $1,179,000 |
| | MOS Administration and Legal (5%) | | | $294,750 |
| | Operations (new FTEs in Utility Dept) | | | $285,000 |
| | **Total** | | | **$10,316,000** |

The rough order of magnitude opinions of probable cost for the development of treatment processes at the WWTP and development of corrosion control chemical feed systems for the water distribution system include estimated construction dollars, contingencies, administration, and engineering fees. Construction costs are based on conceptual alternatives. The costs have been estimated based on information from cost estimating guides and experience gained while designing similar facilities.

Preliminary cost estimates include the costs to construct the improvements as well as a number of additional factors, including an allowance for the contractor's overhead and profit and mobilization/demobilization costs. The ROM costs include capital costs of the conceptual alternatives to provide a planning-level comparison and an indication of the significant capital expenditure that would be required to construct such facilities. The cost estimates do not provide a life-cycle cost analysis of long-term impacts to the MOS. On top of an overall increased operational complexity for more advanced treatment processes, long term costs for chemical addition, energy usage, and additional maintenance requirements would result in a significant annual O&M cost increase.

Overall, the only practicable alternative for the WWTP is to further treat copper and fecal coliform at a cost that would range from $30-$40 million dollars.

With an authorized mixing zone, there are still costs associated with disinfection in order to meet the ADEC TBEL fecal coliform permit limits which as shown above is approximately $9,000,000-$11,000,000.

### 3C-Identification of a Proposed Practicable Alternative that Prevents or Lessens

The one practicable alternative has been evaluated in the sections above. This is the only practicable alternative that can be considered for reducing copper and fecal coliform in the effluent at the Skagway WWTP. Overall costs to treat for the two parameters listed would range between $30 to $40 million. Adding the advanced treatment for metals would be very costly for Skagway and would not be a cost-effective alternative given that the MOS will continue to discharge metals concentrations that are comparable to historical values and continue to discharge via a multi-port diffuser. Cross-media or ancillary effects would include a likely increase in chemical (phosphorus, iron or aluminum-based precipitant, etc.) discharge from the WWTP and other effects associated with chemical manufacturing and shipping and an increase in energy consumption for heat and electrical needs in the facility.

## References

R. A. Isaac, L. Gil, A. N. Cooperman, K. Hulme, B. Eddy, M. Ruiz, K. Jacobson, C. Larson, and O. C. Pancorbo. Corrosion in Drinking Water Distribution Systems: A Major Contributor of Copper and Lead to Wastewaters and Effluents. *Environmental Science & Technology* **1997** *31* (11), 3198-3203
DOI: 10.1021/es970185i