



# Fact Sheet

Public Comment Start Date: August 10, 2011

Public Comment Expiration Date: September 9, 2011

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## **Proposed Issuance of a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA)**

### **Denali National Park Front Country Wastewater Treatment Lagoon**

#### **EPA Proposes To Issue NPDES Permit**

EPA proposes to issue 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 limitations and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

#### **State Certification**

EPA is requesting that the Alaska Department of Environmental Conservation (ADEC) certify the NPDES permit for this facility, under Section 401 of the Clean Water Act. Comments regarding the certification should be directed to:

Alaska Department of Environmental Conservation  
Division of Water  
610 University Avenue  
Fairbanks AK 99709

**Public Comment**

Persons wishing to comment on, or request a Public Hearing for the draft permit for this facility may do so in writing by the expiration date of the Public Comment period. 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 EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Office of Water and Watersheds will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If substantive comments are received, EPA will address the comments and issue the 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.

**Documents are Available for Review**

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday at the address below. The draft permits, fact sheet, and other information can also be found by visiting the Region 10 NPDES website at "<http://epa.gov/r10earth/waterpermits.htm>."

United States Environmental Protection Agency  
Region 10  
1200 Sixth Avenue, OWW-130  
Seattle, Washington 98101  
(206) 553-0523 or  
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permits are also available at:

USEPA Region 10: Alaska Operations Office Federal Building, Room 537  
222 West 7th Avenue, #19 Anchorage, Alaska 99513-7588  
(907) 271-5083 or  
Toll Free: 1-800-781-0983 (in Alaska)

Alaska Department of Environmental Conservation  
Division of Water  
610 University Avenue  
Fairbanks AK 99709

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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.
ACR	Acute-to-Chronic Ratio
ADEC	Alaska Department of Environmental Conservation
AML	Average Monthly Limit
ASR	Alternative State Requirement
AWL	Average Weekly Limit
BA	Biological Assessment
BAT	Best Available Technology economically achievable
BCT	Best Conventional pollutant control Technology
BE	Biological Evaluation
BO or BiOp	Biological Opinion
BOD <sub>5</sub>	Biochemical oxygen demand, five-day
BOD <sub>u</sub>	Biochemical oxygen demand, ultimate
BMP	Best Management Practices
BPT	Best Practicable
°C	Degrees Celsius
CBOD	Carbonaceous Biochemical Oxygen Demand
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
COD	Chemical Oxygen Demand
CSO	Combined Sewer Overflow
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EA	Environmental Assessment
EFH	Essential Fish Habitat

EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDF	Fundamentally Different Factor
FR	Federal Register
gpd	Gallons per day
HUC	Hydrologic Unit Code
IC	Inhibition Concentration
IDEQ	Idaho Department of Environmental Quality
I/I	Infiltration and Inflow
LA	Load Allocation
lbs/day	Pounds per day
LC	Lethal Concentration
LC <sub>50</sub>	Concentration at which 50% of test organisms die in a specified time period
LD <sub>50</sub>	Dose at which 50% of test organisms die in a specified time period
LOEC	Lowest Observed Effect Concentration
LTA	Long Term Average
LTCP	Long Term Control Plan
mg/L	Milligrams per liter
ml	milliliters
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit or Method Detection Limit
MF	Membrane Filtration
MPN	Most Probable Number
N	Nitrogen
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NOEC	No Observable Effect Concentration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System

NSPS	New Source Performance Standards
OWW	Office of Water and Watersheds
O&M	Operations and maintenance
PCS	Permit Compliance System
POTW	Publicly owned treatment works
PSES	Pretreatment Standards for Existing Sources
PSNS	Pretreatment Standards for New Sources
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
SIC	Standard Industrial Classification
SPCC	Spill Prevention and Control and Countermeasure
SS	Suspended Solids
SSO	Sanitary Sewer Overflow
s.u.	Standard Units
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRC	Total Residual Chlorine
TRE	Toxicity Reduction Evaluation
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
TU <sub>a</sub>	Toxic Units, Acute
TU <sub>c</sub>	Toxic Units, Chronic
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UV	Ultraviolet
WET	Whole Effluent Toxicity
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit

WQS Water Quality Standards

WWTP Wastewater treatment plant

## I. Applicant

### General Information

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

Denali National Park  
Front Country Wastewater Treatment Lagoon  
NPDES Permit # AK- 005377-5

Physical Address:  
Milepost 237 Parks Highway  
Denali National Park, AK 99755

Mailing Address:  
P.O. Box 9  
Denali National Park, AK 99755

Contact:  
Paul R. Anderson, Park Superintendent, 907-683-9581

## II. Facility Information

Denali National Park owns, operates and maintains the Front Country wastewater treatment plant (WWTP) that treats domestic sewage from the Park. The majority of influent to the plant is via gravity collection, with a small quantity coming from septage truck delivery. The upgraded Dual Power Multi Cell (DPMC) lagoon system will operate and discharge about 153 days per year during the summer (May-September). During the winter months, influent flow will be diverted to a winter storage lagoon.

Most flow through the DPMC system occurs via gravity. Pumping is required to return wastewater stored in the winter storage lagoon to the DPMC for additional treatment. Flow from the system is to the complete mix cell, where the majority of biological treatment occurs. Mechanical aerators mix and aerate the cell.

Flow is then to stabilization cells for solids separation and storage. The number of cells in series is adjustable to meet expected hydraulic changes to 2030. Flow then goes to disinfection contact piping, for treatment with sodium hypochlorite. Dechlorination is accomplished with sodium bisulfite prior to discharge. If approved by the Alaska Department of Conservation (ADEC), hypochlorite will be replaced with peracetic acid, which does not require neutralization.

Solids will be removed from the stabilization cells approximately every six years. Dry solids would be trucked out of the park and disposed in an approved solid waste facility. The population served is an estimated 400,000 transients (visitors) per year. The facility design flow is 0.11 mgd. The current annual average daily flow is 0.05 mgd, and the maximum daily flow is 0.06 mgd.

### Permit History

The draft permit covers a new facility. Wastewater was previously treated in lagoons and discharged to a leach field. Inefficient drainage in the area and increasing nitrate levels in groundwater at the facility prompted the change in discharge location to be the Nenana River. Denali National Park submitted an application for an NPDES permit on February 18, 2010, and sent additional material via electronic mail on March 2, 2010. EPA Region 10 determined that the application was complete, as of March 2, 2010.

### III. Receiving Water

This facility discharges to the Nenana River in Denali Borough, Alaska. The outfall, which is equipped with a discharge header in drain rock and rip rap, is located at the bank of the Nenana River inside the boundary of Denali National Park, at Latitude 63.7295° N, Longitude 148.8748° W. The Nenana River Watershed is USGS huc 19040508. The Nenana River is not listed on Alaska's Clean Water Act Section 303(d) list of impaired waters, and accordingly a Total Maximum Daily Load (TMDL) has not been established for the Nenana.

#### A. Low Flow Conditions

The *Technical Support Document for Water Quality-Based Toxics Control* (hereafter referred to as the TSD) (EPA, 1991) and the Alaska Water Quality Standards (WQS) recommend the flow conditions for use in calculating water quality-based effluent limits (WQBELs) using steady-state modeling. The TSD and the Alaska WQS state that WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years (7Q10) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years (1Q10) for acute criteria. Flow data were obtained from USGS Station 15518000, Nenana River near Healy AK, which was the station closest to the discharge point with more than ten continuous years of flow data. Flow units are cubic feet per second (cfs). Low flows were determined from EPA's DFLOW model for May through September, since Denali National Park only plans on discharging during this time period.

<b>Table 1: Low Flows in the Nenana River downstream of the Point of Discharge</b>		
<b>Season</b>	<b>1Q10 (CFS)</b>	<b>7Q10 (CFS)</b>
Full year	237	240
May through September	413	483

#### B. Water Quality Standards

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Federal regulations at 40 CFR 122.4(d) require that the conditions in NPDES permits ensure compliance with the water quality standards of all affected States. A State's water quality standards 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 (such as drinking water supply, contact recreation, and aquatic life) that each water body is expected to achieve. The

numeric and/or narrative water quality criteria are the criteria deemed necessary by the State to support the 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.

No specific use designations are listed for the Nenana River in 18 AAC 70.230(e). The Alaska Water Quality Standards state in 18 AAC 70.050 that unless specifically designated for other uses in 18 AAC 70.230(e), all fresh waters of the State of Alaska are to be protected for the following uses:

- Water supply for:
  - Drinking, culinary and food processing
  - Agriculture, including stock watering
  - Aquaculture
  - Industrial
- Contact recreation
- Growth and propagation of fish, shellfish, other aquatic life, and wildlife

#### **IV. Effluent Limitations**

##### **A. Basis for Effluent Limitations**

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a waterbody are being met and may be more stringent than technology-based effluent limits. The basis for the effluent limits proposed in the draft permit is provided in Appendix C.

##### **B. Proposed Effluent Limitations**

Below are the proposed effluent limits that are in the draft permit.

###### ***1. Narrative limitations to protect Alaska's narrative criteria for "residues" and oil and grease.***

1. The permittee must not discharge any floating solids, debris, sludge, deposits, foam, scum or other residues that cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines.
2. The permittee must not discharge any petroleum hydrocarbons or oils and grease that cause a sheen, film or discoloration on the surface of the water or adjoining shorelines.

2. *Narrative secondary treatment percent removal requirements for POTWs*

1. Removal Requirements for CBOD<sub>5</sub> and TSS: The monthly average effluent concentrations must not exceed 15 percent of the monthly average influent concentrations. Percent removal of CBOD<sub>5</sub> and TSS must be reported on the Discharge Monitoring Reports (DMRs). For each parameter, 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. Influent and effluent samples must be taken over approximately the same time period.

Table 2 (below) presents the proposed average monthly and average weekly, and maximum daily effluent limits.

<b>Table 2: Proposed Effluent Limits, Outfall 001</b>				
Parameter	Units	Effluent Limits		
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
Flow	mgd	0.11		
Five-Day Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> )	mg/L	25	40	
	lb/day	22.9	36.7	
	% removal	85% (min)	—	—
Total Suspended Solids (TSS)	mg/L	30	45	
	lb/day	27.5	41.3	
	% removal	85% (min)	—	—
Fecal Coliform Bacteria	#/100 ml	20 <sup>1</sup>	40 <sup>1</sup>	
pH	s.u.	6.5 to 8.5		
Total Residual Chlorine <sup>2</sup>	ug/L	8.0	—	18.0
	lb/day	0.01	—	0.02

1. The permittee must report the geometric mean fecal coliform concentration. If any value used to calculate the geometric mean is less than 1, the permittee must round that value up to 1 for purposes of calculating the geometric mean. No more than 10% of the fecal coliform samples analyzed during a calendar month may exceed 40 FC/100 ml.

2. Effluent limits for total residual chlorine apply only if the permittee adds chlorine to the effluent for total or partial disinfection. EPA shall use 40 ug/L (ML, minimum level) as the concentration based compliance level for TRC. When the daily maximum concentration is below 40 ug/L, the permittee will be in compliance with the TRC limits. EPA shall use 0.04 lbs/day as the loading based compliance level. When the daily maximum loading is below 0.04 lbs/day, the permittee will be in compliance with the TRC loading limits.

**V. Monitoring Requirements**

**A. Basis for Effluent and Surface Water Monitoring**

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality.

The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) or on the application for renewal, as appropriate, to the U.S. Environmental Protection Agency (EPA).

### B. 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 can be used for averaging if they are conducted using EPA-approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits (MDLs) are less than the effluent limits.

Table 3, below, presents the proposed effluent monitoring requirements for the Denali National Park WWTP. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. The samples must be representative of the volume and nature of the monitored discharge. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR. Monitoring for CBOD<sub>5</sub> and TSS in the permit is required to be done monthly at a minimum during discharge. If only the minimum is performed, this is the value that will be compared to both monthly average and weekly average CBOD<sub>5</sub> and TSS permit limits to determine compliance. As noted above, permittees have the option of taking more frequent samples than are required that can be used for averaging if approved test methods with appropriate MDLs are used.

<b>Table 3: Effluent Monitoring Requirements (during discharge)</b>				
<b>Parameter</b>	<b>Units</b>	<b>Sample Location</b>	<b>Sample Frequency</b>	<b>Sample Type</b>
<b>Flow</b>	mgd	Effluent	3/week	measurement
<b>CBOD<sub>5</sub></b>	mg/L	Influent & Effluent	1/month	grab
	lb/day	Influent & Effluent	1/month	calculation <sup>1</sup>
	% Removal	--	--	calculation <sup>2</sup>
<b>TSS</b>	mg/L	Influent & Effluent	1/month	grab
	lb/day	Influent & Effluent	1/month	calculation <sup>1</sup>
	% Removal	--	--	calculation <sup>2</sup>
<b>pH</b>	standard units	Effluent	3/week	grab
<b>Fecal Coliform</b>	#/100 ml	Effluent	1/month	grab
<b>Total Residual Chlorine</b> (if chlorine is used for disinfection)	µg/L	Effluent	3/week	grab
	lb/day	Effluent		calculation <sup>1</sup>
<b>Total Ammonia as N</b>	mg/L	Effluent	1/month	grab
<b>Temperature</b>	°C	Effluent	1/month	grab
<b>Oil and Grease</b>	mg/L	Effluent	1/year in permit years 2, 3 and 4 <sup>3</sup>	grab
<b>Total Dissolved Solids</b>	mg/L	Effluent	1/year in permit years 2, 3 and 4 <sup>3</sup>	grab
<b>Total Phosphorus as P</b>	mg/L	Effluent	1/year in permit years 2, 3 and 4 <sup>3</sup>	grab

<b>Table 3: Effluent Monitoring Requirements (during discharge)</b>				
<b>Parameter</b>	<b>Units</b>	<b>Sample Location</b>	<b>Sample Frequency</b>	<b>Sample Type</b>
<b>Total Kjeldahl Nitrogen</b>	mg/L	Effluent	1/year in permit years 2, 3 and 4 <sup>3</sup>	grab
<b>Nitrate plus Nitrite Nitrogen</b>	mg/L	Effluent	1/year in permit years 2, 3 and 4 <sup>3</sup>	grab
<b>Dissolved Oxygen</b>	mg/L	Effluent	1/year in permit years 2, 3 and 4 <sup>3</sup>	grab

Notes:

1. Loading is calculated by multiplying the concentration in mg/L by the flow in mgd and a conversion factor of 8.34.
2. Percent removal is calculated using the following equation:  
(average monthly influent – average monthly effluent) ÷ average monthly influent.
3. Monitoring required as per NPDES Permit Application Form 2A.

### C. Surface Water Monitoring

Table 4 presents the proposed surface water monitoring requirements for the draft permit. Results will inform the reasonable potential determination for specific parameters during the next permit cycle. Denali National Park shall establish a monitoring location upstream and outside the influence of the discharge from Outfall 001. The monitoring location must be approved by the Alaska Department of Environmental Conservation. Surface water monitoring results must be submitted with the NPDES renewal application.

<b>Table 4: Receiving Water Monitoring Requirements</b>			
<b>Parameter</b>	<b>Units</b>	<b>Sample Frequency</b>	<b>Sample Type</b>
Flow	cfs	2/year <sup>1</sup>	report
pH	Standard Units	2/year <sup>1</sup>	grab
Temperature	°C	2/year <sup>1</sup>	grab
Total Ammonia as N	mg/L	2/year <sup>1</sup>	grab
Fecal Coliform	#/100 mL	2/year <sup>1</sup>	grab

1. Samples shall be taken 2 times per year (once in June and once in September), beginning in June 2012. Samples should be taken on the same day as effluent monitoring samples. Flow data may be obtained from a representative USGS gage.

## VI. 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.

## **VII. Other Permit Conditions**

### **A. Quality Assurance Plan**

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. Denali National Park is required to develop and implement a Quality Assurance Plan for the Denali National Park WWTP within 180 days of the effective date of the final permit. The Quality Assurance Plan shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

### **B. Operation and Maintenance Plan**

The permit requires the Denali National Park 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 final permit. The plan shall be retained on site and made available to EPA and ADEC upon request. Any updates to plant operations shall be reflected in the plan.

### **C. Pretreatment Requirements**

The Denali National Park WWTP collects domestic sewage within the Park boundaries. No significant industrial user (SIU) discharges to the facility. As such, EPA does not believe it is necessary for the Denali National Park WWTP to develop a pretreatment program for EPA approval at this time.

### **D. Standard Permit Provisions**

of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because these requirements are based directly on NPDES regulations, they cannot be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

## **VIII. 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 the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. USFWS lists 14 animal species in Alaska as endangered or threatened, none of which inhabit freshwater. No federally listed species are found within the project area and no critical habitat has been designated in the vicinity. Therefore, EPA has determined that issuance of this permit will not affect any threatened or endangered species

in the vicinity of the discharge, and consultation is not required under Section 7 of the Endangered Species Act.

EPA has provided USFWS with copies of the draft permit and fact sheet during the public notice period. Any comments received from USFWS regarding endangered or threatened species will be considered prior to reissuance of this permit.

### **B. Essential Fish Habitat**

Essential fish habitat (EFH) includes 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 (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.

NOAA Alaska Fisheries has designated EFH for several species, although Pacific Salmon are the only species that inhabit freshwater during their life cycle; and NOAA's EFH descriptions refer to freshwaters identified in Alaska Department of Fish and Game's Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes. That Catalog identifies the Nenana River as a migrational corridor for anadromous fish, including salmon. However, that corridor does not extend as far upstream (south) as the discharge outfall from the Denali Park WWTP.

EPA has determined that issuance of this permit is not likely to adversely affect EFH in the vicinity of the discharge. EPA has provided NOAA Fisheries with copies of the draft permit and fact sheet during the public notice period. Any comments received from NOAA Fisheries regarding EFH will be considered prior to reissuance of this permit.

### **C. State Certification**

Section 401 of the CWA requires EPA to seek State certification before issuing a final permit. 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 water quality standards, or treatment standards established pursuant to any State law or regulation.

### **D. Permit Expiration**

The permit will expire five years from the effective date.

## **IX. References**

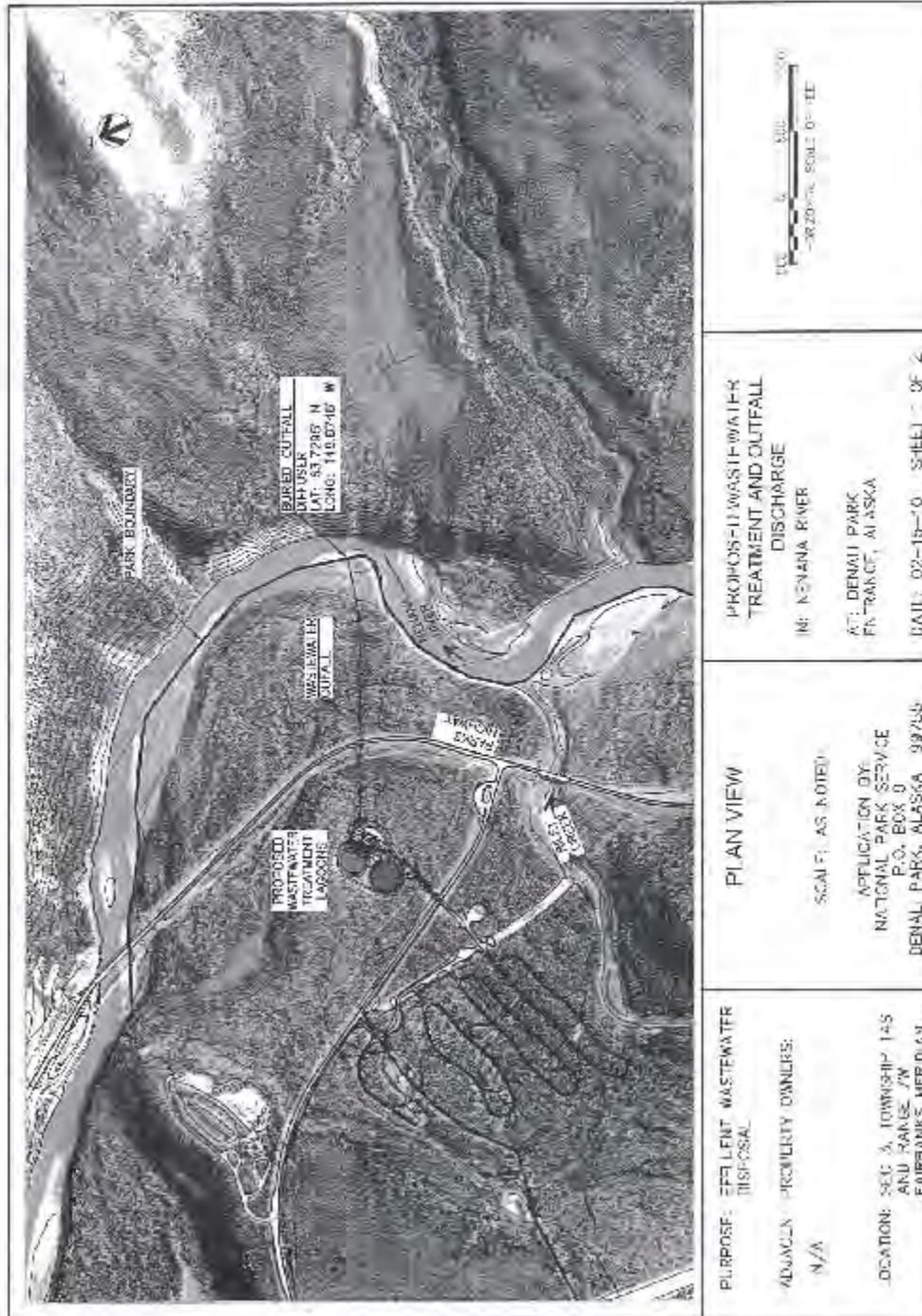
EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control*. US Environmental Protection Agency, Office of Water, EPA/505/2-90-001.

EPA. 1998. Low-Tech Alternative to Activated Sludge Promises Big Savings, Ocean Drive Wastewater Treatment Plant North Myrtle Beach, South Carolina. US Environmental Protection Agency, Region 4.

Rich, G.W. 2001. Low Maintenance – Mechanically Simple Wastewater Treatment Systems for Developing and Developed Countries. WEFTEC Latin American Technical Conference and Exhibition 2001, San Juan, P.R.

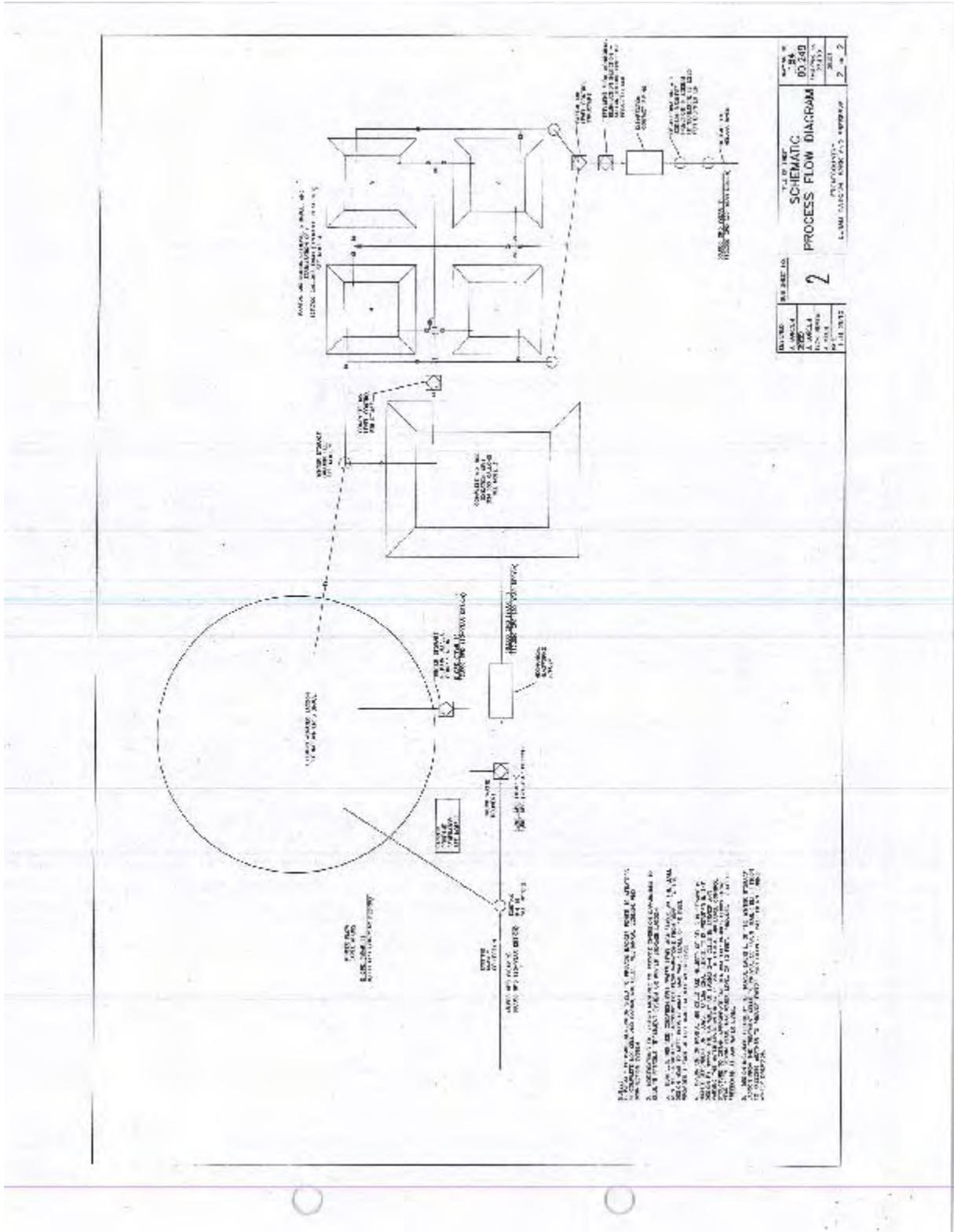
Water Pollution Control Federation. 1976. Subcommittee on Chlorination of Wastewater. *Chlorination of Wastewater*. Water Pollution Control Federation. Washington, D.C.

### Appendix A: Facility Map



<p>PURPOSE: EFFLUENT WASTEWATER DISPOSAL</p> <p>ADJACENT PROPERTY OWNERS: N/A</p> <p>LOCATION: SEC 3, TOWNSHIP 14S AND RANGE 7W FAIRBANKS MERIDIAN</p>	<p>PLAN VIEW</p> <p>SCALE: AS NOTED</p> <p>APPLICATION BY: NATIONAL PARK SERVICE P.O. BOX 0 DENALI PARK, ALASKA 99753</p>	<p>PHOSPHORUS WASTEWATER TREATMENT AND CUTFALL DISCHARGE</p> <p>NO: DENALI RIVER</p> <p>AT: DENALI PARK, FAIRBANKS, ALASKA</p> <p>DATE: 02-19-00 SHEET 0F 2</p>
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Appendix B: Flow Schematic



## Appendix C: Basis for Effluent Limits

The following discussion explains in more detail the statutory and regulatory basis for the technology and water quality-based effluent limits in the draft permit. Part A discusses technology-based effluent limits, Part B discusses water quality-based effluent limits in general, and Part C discusses facility specific water quality-based effluent limits.

### A. Technology-Based Effluent Limits

#### *Federal Secondary Treatment Effluent Limits*

The CWA requires POTWs to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as “secondary treatment,” which all POTWs were required to meet by July 1, 1977. EPA has developed and promulgated “secondary treatment” effluent limitations, which are found in 40 CFR 133.102. These technology-based effluent limits apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD<sub>5</sub>, TSS, and pH. The federally promulgated secondary treatment effluent limits are listed in Table C-1.

Parameter	Average Monthly Limit	Average Weekly Limit	Range
BOD <sub>5</sub>	30 mg/L	45 mg/L	---
TSS	30 mg/L	45 mg/L	---
Removal Rates for BOD <sub>5</sub> and TSS	85% (minimum)	---	---
pH	---	---	6.0 - 9.0 s.u.

On September 20, 1984, EPA revised the Secondary Treatment Regulations (40 CFR 133.102) for facilities that use trickling filters or waste stabilization ponds as the principal processes. These revisions established effluent limitations for Treatment Equivalent to Secondary Treatment (40 CFR 133.105). To be eligible for discharge limitations based on equivalent to secondary standards, a facility must meet all three of the following criteria:

- 1) Demonstrate that the BOD<sub>5</sub> and TSS effluent concentrations consistently achievable through proper operation and maintenance of the treatment works exceed the secondary treatment standards set forth in 40 CFR 133.102 (a) and (b);
- 2) The principle treatment process must be a trickling filter or waste stabilization pond; and
- 3) The treatment works provides significant biological treatment of municipal wastewater.

Further, in accordance with regulations at 40 CFR 133.103(c), adopted by EPA in 1977 and revised in 1984, states can adjust the maximum allowable TSS concentration for waste stabilization ponds upward from those specified in the equivalent to secondary treatment standards to conform to TSS concentrations achievable with waste stabilization ponds. The EPA has approved alternate TSS requirements of 70 mg/L 30-day average in the State of Alaska. To qualify for an adjustment up to 70 mg/L, a facility must use a waste stabilization pond as its

principal process for secondary treatment and its operations and maintenance data must indicate that it cannot achieve the equivalent to secondary standards.

However, new facilities or new discharges from trickling filters and waste stabilization ponds are often capable of achieving secondary treatment standards. The preamble to the secondary treatment regulation (49 FR 37002, September 20, 1984) and the regulations at 40 CFR 133.105(f)(2) note that when developing permits for new trickling filters and waste stabilization ponds, permitting authorities should consider the ultimate design capability of the treatment process, geographical and climatic conditions, and the performance capabilities of recently constructed facilities in similar situations.

To be eligible to receive equivalent to secondary limits or adjusted TSS requirements in the NPDES permit, the Denali National Park Front Country WWTP must meet the criteria above. The facility meets two of the criteria; the principle treatment process is a waste stabilization pond, and the treatment works provides significant biological treatment of the wastewater.

However, as a new facility, there is no treatment data available. To meet the final criteria allowing equivalent to secondary or adjusted limits EPA must find similar facilities, preferably in Alaska, for comparison. There are no discharging DPMC facilities in the State of Alaska, and there are no recently built aerated lagoons. Effluent data for older aerated lagoons in similar climatic situations (the Galena WWTF NPDES Permit No. AKG570029 and Fort Greely NPDES Permit No. AKG570010) shows that the facilities meet standard secondary treatment standards from Table C-1 most of the time, including the summer months when the Denali Park facility will be discharging.

The EPA searched other sources and found information on DPMC facilities in other places such as South Carolina and California (Rich 2001, EPA 1998). The information stated that DPMC facilities reliably meet secondary treatment standards in 40 CFR 133.102.

Because EPA does not have operation and maintenance data from a similar facility in a similar situation showing an inability to achieve regular secondary treatment standards, EPA is unable to place equivalent to secondary treatment or adjusted TSS limits in the draft permit. Therefore, the permit contains secondary treatment standards found in 40 CFR 133.102.

The Denali Park Front Country WWTP NPDES application indicates that the facility was designed to meet equivalent to secondary standards for TSS and 65 percent removal for both BOD<sub>5</sub> and TSS. If effluent data collected during the course of the permit demonstrates that with proper operation and maintenance the facility still cannot meet the secondary treatment standards, the permittee may request that the permit be reopened and modified to include equivalent to secondary standards.

### ***CBOD<sub>5</sub>***

The permittee requested that BOD<sub>5</sub> be replaced with CBOD<sub>5</sub> to eliminate test interference from nitrogenous oxygen demand. The EPA has replaced BOD<sub>5</sub> limitations (30 mg/L monthly average and 45 mg/L weekly average) with comparable CBOD<sub>5</sub> limitations (25 mg/L monthly average and 40 mg/L weekly average) as allowed at the option of the NPDES permitting authority per 40 CFR 133.102(a)(4).

***Chlorine***

Chlorine is often used to disinfect municipal wastewater prior to discharge. The Denali National Park WWTP uses chlorine disinfection, at least for initial operations.

A 0.5 mg/L average monthly technology based limit for chlorine is derived from standard operating practices. The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after 15 minutes of contact time. Therefore, a wastewater treatment plant that provides adequate chlorine contact time can meet a 0.5 mg/L total residual chlorine limit on a monthly average basis. In addition to average monthly limits (AMLs), NPDES regulations require effluent limits for POTWs to be expressed as average weekly limits (AWLs) unless impracticable. The AWL is calculated to be 1.5 times the AML, consistent with the secondary treatment limits for BOD<sub>5</sub> and TSS. This results in a technology based AWL for chlorine of 0.75 mg/L.

Because the permittee did not request a mixing zone, EPA has determined that these effluent limits are not sufficiently stringent to meet water quality standards from May through September, the expected period of discharge. As noted below, EPA performed a reasonable potential analysis and calculated water quality based limits based upon meeting total residual chlorine water quality criteria at the end of the pipe.

***Mass-Based Limits***

The federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, if possible. The regulation at 40 CFR 122.45(b) requires that effluent limitations 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:

$$\text{Mass based limit (lb/day)} = \text{concentration limit (mg/L)} \times \text{design flow (mgd)} \times 8.34^1$$

**B. Water Quality-based Effluent Limits*****Statutory and Regulatory Basis***

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to State or Tribal waters must also comply with limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the CWA. Federal regulations at 40 CFR 122.4(d) prohibit the issuance of an NPDES permit that does not ensure compliance with the water quality standards of all affected States. The NPDES regulation (40 CFR 122.44(d)(1)) implementing Section 301(b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which 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 water quality standard, including narrative criteria for water quality.

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the

<sup>1</sup> 8.34 is a conversion factor with units (lb × L)/(mg × gallon × 10<sup>6</sup>)

receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation.

### ***Reasonable Potential Analysis***

When evaluating the effluent to determine if water quality-based effluent limits are needed, based on numeric criteria, EPA projects the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern. EPA uses the concentration of the pollutant in the effluent and receiving water and, if appropriate, the dilution available from the receiving water, to project the receiving water concentration. If the projected concentration of the pollutant in the receiving water exceeds the numeric criterion for that specific chemical, then the discharge has the reasonable potential to cause or contribute to an exceedance of the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it is appropriate to allow a small area of the receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body and will decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and when the receiving water meets the criteria necessary to protect the designated uses of the water body. Mixing zones must be authorized by the Alaska Department of Environmental Conservation. The permittee has decided not to ask for a mixing zone, so total residual chlorine, fecal coliform and pH limits are based on meeting the water quality criteria at the end of the discharge pipe

### ***Procedure for Deriving Water Quality-based Effluent Limits***

The first step in developing a water quality-based effluent limit is to develop a wasteload allocation (WLA) for the pollutant. A wasteload allocation is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water.

In cases where a mixing zone is not authorized, either because the receiving water already exceeds the criterion, the receiving water flow is too low to provide dilution, the State does not authorize one, or the permittee does not request one, the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permittee will not cause or contribute to an exceedance of the criterion. The following discussion details the specific water quality-based effluent limits in the draft permit.

Once a WLA is identified, EPA calculates effluent limits which are protective of the WLA using statistical procedures described in Appendix E.

## **C. Facility-Specific Water Quality-based Limits**

### ***pH***

The most stringent water quality criterion for pH is for the protection of aquatic life and aquaculture water supply. The pH criteria for these uses state that the pH must be no less than 6.5 and no greater than 8.5 standard units, and may not vary more than 0.5 pH units from natural conditions. Since the pH of the effluent is similar to the pH of the receiving water, EPA does not expect the effluent to change the pH of the Nenana River by more than 0.5 standard units. No

mixing zone was requested. Therefore the most stringent water quality criterion must be met before the effluent is discharged to the receiving water. The draft permit requires that the effluent have a pH of no less than 6.5 and no greater than 8.5 standard units.

### ***Fecal coliform***

In the Environmental Assessment prepared for the Denali National Park Front Country Wastewater Facility, March 2008, the National Park Service notes its commitment to meet drinking water standards (p. 51). Alaska drinking water quality standards for fecal coliform require that in a 30 day period, the geometric mean may not exceed 20 FC/100 ml, and not more than 10% of the samples can exceed 40 FC/100 ml. No mixing zone was requested, so the draft permit requires that the effluent comply with a monthly geometric mean of 20 FC/100 ml and a weekly geometric mean of 40 FC/100 ml.

### ***Total Residual Chlorine***

The Alaska water quality standards contain criteria for the protection of aquatic life from the toxic effects of chlorine. No mixing zone was requested, so the draft permit requires that the effluent be protective of the water quality criteria at the end of the discharge pipe. Details regarding total residual chlorine reasonable potential and water quality based effluent limits are noted in Appendices D and E.

### ***Ammonia (no limit)***

The Alaska water quality standards contain criteria for the protection of aquatic life from the toxic effects of ammonia. The criteria are dependent on pH and temperature, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature. Therefore, the criteria become more stringent as pH and temperature increase.

Because this is a new facility, no effluent or ambient monitoring data are available. The draft permit requires effluent monitoring data for ammonia and ambient monitoring data for ammonia, pH, and temperature. These data will inform a reasonable potential determination during the next permit cycle.

## Appendix D: Reasonable Potential Calculations

The following describes the process EPA has used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to a violation of Alaska's federally approved water quality standards. EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (EPA, 1991) 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 criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit. In the case of Denali National Park Front Country facility, the permittee has not requested a mixing zone, so EPA compares the maximum projected effluent concentration directly to the numeric criteria for that pollutant. This section discusses how the reasonable potential determination was conducted.

### A. Mass Balance

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

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

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:

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

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with the receiving stream. If the mixing zone is based on less than complete mixing with the receiving water, the equation becomes:

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

where MZ is the fraction of the receiving water flow available for dilution. If the mixing zone is based on complete mixing of the effluent and the receiving water, and MZ is equal to unity (1). Therefore, Equation D-3 is equal to Equation D-2.

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

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

In other words, if a mixing zone is not allowed, EPA considers only the concentration of the pollutant in the effluent regardless of the upstream flow and concentration.

### **B. Maximum Projected Effluent Concentration**

The maximum projected effluent concentration ( $C_e$ ) is defined by the TSD as the 99<sup>th</sup> percentile of the effluent data. When there is facility data, this is calculated by multiplying the maximum reported effluent concentration by a reasonable potential multiplier (RPM). The RPM is based on the number of effluent data points and effluent variability. The procedure is described in TSD Section 3.3 “Determining the Need for Permit Limits with Effluent Monitoring Data.” Since the Denali Park facility is a new source, no effluent data exists. Therefore, the technology based maximum daily limitation is used as the maximum projected effluent concentration.

EPA used the technology-based total residual chlorine limit of 0.75 mg/L as the maximum projected effluent concentration. The technology-based effluent limit is used in this manner because water quality-based effluent limits are required only when a discharge of the pollutant at the technology-based limit has the reasonable potential to cause or contribute to water quality standards violations.

### **C. Reasonable Potential Determination**

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 exceeds the most stringent criterion for that pollutant.

The acute and chronic water quality criteria for are 19 µg/L and 11 µg/L, respectively. Because the maximum projected effluent concentration (0.75 mg/L) is greater than the criteria, a water quality-based effluent limit is necessary for total residual chlorine.

## Appendix E: WQBEL Calculations - Aquatic Life Criteria

The following calculations demonstrate how the water quality-based effluent limits (WQBELs) in the draft permit were calculated. The WQBELs for chlorine are intended to protect aquatic life criteria. The following discussion works through the calculations for the total residual chlorine WQBEL.

### A. Determine the Wasteload Allocations (WLAs)

Once EPA has determined that a WQBEL is required for the pollutant, the first step in developing the permit limit is development of a wasteload allocation (WLA) for that pollutant. A WLA is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water. WLAs and permit limitations were derived based on guidance in Chapters 4 and 5 of the TSD. For the draft Denali National Park permit, WLAs were established based on meeting Alaska water quality criteria at the end of the discharge pipe with no mixing zones.

Where the state authorizes a mixing zone, the WLA is calculated using the same mass balance equations used in the reasonable potential analysis (Equation D-1). To calculate the wasteload allocations,  $C_d$  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 F-1 presents the WLA calculation where mixing zones are allowed:

$$C_e = \text{WLA} = D \times (C_d - C_u) + C_u \quad (\text{Equation F-1})$$

In the case of the Denali National Park discharge, where no mixing zone is allowed, the criterion becomes the WLA.

In the case of total residual chlorine, for the acute criterion,

$$\text{WLA}_a = 19.0 \text{ } \mu\text{g/L}$$

For the chronic criterion,

$$\text{WLA}_c = 11.0 \text{ } \mu\text{g/L}$$

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 EPA’s *Technical Support Document for Water Quality-based Toxics Control* (TSD):

$$\text{LTA}_a = \text{WLA}_a \times \exp(0.5\sigma^2 - z\sigma) \quad (\text{Equation F-2})$$

$$\text{LTA}_c = \text{WLA}_c \times \exp(0.5\sigma_4^2 - z\sigma_4) \quad (\text{Equation F-3})$$

where,

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

$$\sigma = \sqrt{\sigma^2}$$

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

$$\sigma = \sqrt{\sigma_4^2}$$

$$z = 2.326 \text{ for } 99^{\text{th}} \text{ percentile probability basis}$$

In the case of total residual chlorine,

$$\sigma^2 = \ln(0.6^2 + 1) = 0.307$$

$$\sigma = \sqrt{\sigma^2} = 0.555$$

$$\sigma_4^2 = \ln(0.6^2/4 + 1) = 0.086$$

$$\sigma = \sqrt{\sigma_4^2} = 0.294$$

$$z = 2.326 \text{ for } 99^{\text{th}} \text{ percentile probability basis}$$

Therefore,

$$LTA_a = 19.0 \mu\text{g/L} \times \exp(0.5 \times 0.307 - 2.326 \times 0.555)$$

$$LTA_a = \mathbf{6.1 \mu\text{g/L}}$$

$$LTA_c = 11.0 \mu\text{g/L} \times \exp(0.5 \times 0.086 - 2.326 \times 0.294)$$

$$LTA_c = \mathbf{5.8 \mu\text{g/L}}$$

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits as shown below. For total residual chlorine, the chronic LTA of 5.8  $\mu\text{g/L}$  is more stringent.

### B. Derive the maximum daily and average monthly effluent limits

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

$$MDL = LTA \times \exp(z_m \sigma - 0.5 \sigma^2) \quad (\text{Equation F-4})$$

$$AML = LTA \times \exp(z_a \sigma_n - 0.5 \sigma_n^2) \quad (\text{Equation F-5})$$

where,

$$\sigma^2 = \ln(0.6^2 + 1) = 0.307$$

$$\sigma = \sqrt{\sigma^2} = 0.555$$

$$\sigma_{12}^2 = \ln(0.6^2/12 + 1) = 0.03$$

$$\sigma = \sqrt{\sigma_4^2} = 0.172$$

$$z_a = 1.645 \text{ for } 95^{\text{th}} \text{ percentile probability basis}$$

$$z_m = 2.326 \text{ for } 99^{\text{th}} \text{ percentile probability basis}$$

$$n = \text{number of sampling events required per month (minimum of 4)}$$

In the case of total residual chlorine,

$$MDL = 5.8 \mu\text{g/L} \times \exp(2.326 \times 0.555 - 0.5 \times 0.307)$$

$$MDL = \mathbf{18.1 \mu\text{g/L}}$$

$$AML = 5.8 \mu\text{g/L} \times \exp(1.645 \times 0.172 - 0.5 \times 0.03)$$

$$AML = \mathbf{7.6 \mu\text{g/L}}$$