Fact Sheet

Public Comment Start Date: July 18, 2006
Public Comment Expiration Date: August 17, 2006

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 the

City of Palmer
Wastewater Treatment Plant

and the State of Alaska Proposes to Certify the Permit

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EPA Proposes to Reissue NPDES Permit
EPA proposes to reissue an NPDES permit to the City of Palmer, Alaska. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to the Matanuska River, a water 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

Alaska State Certification
EPA is requesting that Alaska Department of Environmental Conservation (ADEC) certify the NPDES permit for this facility, under section 401 of the Clean Water Act. The state has already submitted a preliminary section 401 certification prior to the public notice. Comments regarding the certification should be directed to:

Renee Evans
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501 (renee_evans@dec.state.ak.us)

Public Comment
Persons wishing to provide comment on, or request a public hearing on 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 conditions in the draft permit will become final and the permit will become effective upon issuance. If comments are received, EPA will address the comments and issue the permit. The permit will become effective 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 permit, 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) 553-6251 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permits are also available at:

EPA Alaska Operations Office
Room 537 Federal Building
222 West 7th Avenue, #19,
Anchorage, Alaska 99513

and

Alaska Department of Environmental Conservation
Division of Water
555 Cordova Street
Anchorage, Alaska, 99501

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Acronyms

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
30B3	The lowest 30 day average flow based on a 3-year return interval
ADEC	Alaska Department of Environmental Conservation
AML	Average Monthly Limit
AWL	Average Weekly Limit
BOD_5	Biochemical oxygen demand, five-day
$^{>}C$	Degrees Celsius
CFR	Code of Federal Regulations
cfs	Cubic feet per second
City	City of Palmer
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
HUC	Hydrologic Unit Code
lbs/day	Pounds per day
LTA	Long Term Average
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
N	Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OWW	Office of Water and Watersheds

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
s.u.	Standard Units
TMDL	Total Maximum Daily Load
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UV	Ultraviolet
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WWTP	Wastewater treatment plant

I. Applicant

A. General Information

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

City of Palmer
Wastewater Treatment Plant
NPDES Permit No. AK-002249-7

Mailing Address:
231 West Evergreen Ave.
Palmer, Alaska 99645

Physical Address:
1316 Bonanza St.
Palmer, Alaska 99645

Contact:
Greg Wickham, Public Works Superintendent
(907) 745-3925

B. Cause for Reissuance

The current permit expired on October 31, 2005, and has been administratively extended since that time pursuant to 40 CFR 122.6(a). EPA received the application for reissuance on September 15, 2005.

II. Facility Information

A. General Information

The City of Palmer is located in the Matanuska-Susitna Borough, approximately 45 miles north-northeast of Anchorage, Alaska. The City owns and operates a municipal wastewater treatment plant (WWTP) that provides secondary treatment and disinfection of wastewater prior to discharge to the Matanuska River. The facility currently serves a population of 9,000, but the Palmer-Wasilla area is experiencing rapid population growth.

The plant receives domestic wastewater from residential and commercial sources. In addition, there is currently one industrial user on the collection system, Mount McKinley Meat and Sausage Company, which intermittently operates a slaughter house and meat packing company. Alaska Pollution Control (now owned by Emerald City) is a used oil/hazardous waste disposal company that was previously connected to Palmer's wastewater collection system. Aqueous waste from Emerald City are now trucked to Anchorage and discharged into their collection system. Palmer's collection system is 100 percent separate sanitary wastewater sewers.

The City is planning a major upgrade to their system which includes a new 5.5 mile extension to the City's collection system to accommodate the construction of a new regional hospital located near the Parks-Glenn highways interchange. This $10.3M project represents the largest public works project in Palmer's history, and upon completion in 2009, will upgrade the City's POTW to a major facility (>1mgd).

Waste collection from portable toilets stationed at state fair grounds each August are also dumped into Palmer's collection system; however, vacuum trucks cleaning septic systems haul wastes to Anchorage. Additional facility information is presented Appendix A.

B. Facility History and Treatment Train

The WWTP at Palmer began operation in 1972 as a single lagoon system. In 1985 their lagoon system was expanded to two alternately operated lagoon systems, and in 1995 plans were underway for a new facility upgrade. Completed upgrades included the installation of eight diffuser tubes in Pond #1, the construction of new aeration blowers and a blower building, dividing Pond #2 with a curtain baffle (now Pond #2A and #2B), the installation of 11 diffuser tubes in Pond #2 (7 in Pond #2A and 4 in Pond #2B), conversion from gaseous chlorine to sodium hypochlorite for disinfection, and upgrading plumbing and pond inlets/outlets. In 2001, additional upgrades included the construction of Pond #3 with baffled curtains to increase detention time, updated automatic samplers, and an enlarged chlorine contact chamber. In 2002, chlorine disinfection was replaced with an ultraviolet (UV) disinfection system. Sludge is periodically excavated from each of the ponds, amended with lime to raise the pH then mixed with top soil.

C. Permit History

1972	Palmer WWTP enters service
March 1976	Initial permit issuance – contained secondary treatment requirements. Expiration date: September 1980.
October 1980	Permit reissuance. Expiration date: October 1985.
January 1987	Permit reissuance. Expiration date: January 1992.
November 1991	Short-form application received for permit reissuance.
December 1991	Long-form application received for permit reissuance.
June 1994	Permit reissued. Expiration date: June 23, 1999.
September 1994	Permit Modified: pH limits changed from 6.0-9.0 to 6.5-8.5, fecal coliform monitoring changed from weekly to 5/month, pretreatment program requirements added, sludge management requirements added, and surface water runoff and erosion protection was added.
December 1998	Application received for permit reissuance.

September 2000 Permit reissued. Expiration date: October 31, 2005.

September 2005 Application received for permit reissuance.

D. Compliance History

The City of Palmer submits monthly discharge monitoring reports (DMRs) to EPA summarizing the results of effluent and ambient monitoring required by the permit. The following effluent violations were noted based upon a review of the DMRs from the past five years:

Table 1. Effluent Limit Violations Since 2001

Date	Pollutant	Permit Limit	Actual value	Units	% Over	Limit Type
May 2001	BOD_5	30	42.0	mg/l	40	Monthly
May 2001	BOD_5	45	51.5	mg/l	14	Weekly
May 2001	BOD_5	60	62.0	mg/l	3	Daily
June 2001	BOD_5	45	51.3	mg/l	14	Weekly
May 2001	BOD_5 (% removal)	83	85.0	%	2	Daily
February 2004	Ammonia (as N)	34	37.7	mg/l	11	Monthly
February 2005	Ammonia (as N)	34	44.0	mg/l	29	Monthly
March 2005	Ammonia (as N)	34	42.1	mg/l	24	Monthly
April 2005	Ammonia (as N)	34	35.7	mg/l	5	Monthly

The nine permit violations identified in Table 1 were summarized in a November 17, 2005 Notice of Violation from EPA's NPDES Compliance Unit to the City of Palmer. A brief review of this information indicates that the Palmer WWTP occasionally has trouble meeting its ammonia limits in the winter and early spring. Similarly, spring time BOD_5 violations were observed, and both are likely related to depleted oxygen levels resulting from algal mortality. While facility operators have indicated that increasing the aeration in the ponds will help reduce the likelihood of future violations, ammonia limit in the draft permit have been reduced from the 2000 permit issuance. To allow the City of Palmer time to address this situation, a compliance schedule for ammonia has been included in the draft permit.

III. Receiving Water

The Matanuska River is located in the Matanuska hydrologic basin (HUC 19020402). The river flows from the terminus of the Matanuska glacier, approximately 60 miles east

of Palmer, through the Matanuska Valley, and discharges into the Knik Arm of Cook Inlet. The Palmer WWTP outfall (Outfall 001) enters the Matanuska River approximately 5 miles northeast of tidewater at the head of the Knik Arm. There are no known point source wastewater discharges into the Matanuska upstream from Palmer.

In the vicinity of Outfall 001, the Matanuska River consists of a network of braided channels approximately 1 mile in total width from bank to bank. As with most glacial rivers of this type, channel avulsion is common during periods of high water and flooding where the number and location of individual channels can change from year to year. As shown in Appendix B, Outfall 001 discharges to a minor channel of the Matanuska located adjacent to the northern most bank of the river channel. This channel separates from the main flow of the Matanuska approximately 1 mile upstream of Outfall 001, and converges back with it about ½ mile downstream of the outfall (see Appendix B). Approximately five river miles upstream of the outfall at the Old Glenn Highway bridge, the entire flow of the Matanuska is confined to a single river channel which is the location of U.S. Geological Survey (USGS) Palmer Gauge (No. 15284000).

As with most glacial streams in Alaska, high flows in the Matanuska River typically peak in July and August and reach low flows from January through April. Record peak flow in the Matanuska as measured at the Palmer Gauge occurred on August 10, 1971 at a volume of 40,700 cubic feet/second (cfs). During most years, peak summer flows typically top out between 20,000 and 25,000 cfs. Winter low flow are typically between 300 and 350 cfs as the surface of the river is frozen, and flows are restricted to the deeper portions individual channels. Breakup usually occurs around the middle of April.

As noted above, Outfall 001 discharges to the northernmost channel of the Matanuska River which caries a relatively small percentage of the total river flow volume. During the 2000 permit issuance, ADEC estimated that that this channel caries approximately 20 percent of the total river volume (as measured at Palmer Gauge No. 15284000) for the purposes of calculating mixing zones. This practice is being continued in the current draft permit due to the large number of flow measurements collected at the Palmer Gauge (since 1949), and the uncertainty in the few flow measurements obtained in the actual discharge channel (n=19).

Typical of most braided glacial streams, the Matanuska contains a high sediment load and the river runs turbid throughout most of the year. However, the channel to which Outfall 001 discharges runs noticeably more clear and less turbid as compared to main channels located immediately to the south. Presumably, this side channel or slough receives a significant amount of groundwater discharge from seeps, springs and/or baseflow that keep it less turbid in addition to the lower stream velocity. As salmon generally prefer less turbid waters for migration and spawning, this discharge channel may represent a preferential pathway for these anadromous fish. During a site visit on August 10, 2005,

Chum salmon were observed spawning in the vicinity of Outfall 001 along with schools of newly hatched fry.

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 low-flow conditions for use in conducting a reasonable potential analysis and in calculating mixing zones for 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. However, because the chronic criterion for ammonia is a 30-day average concentration not to be exceeded more than once every three years, EPA uses the 30B3 flow for the chronic ammonia criterion instead of the 7Q10. The 30B3 is a biologically-based design flow intended to ensure an excursion frequency of once every three years for a 30-day average flow rate.

As noted above, the annual flow of the Matanuska River is characterized by low flows during the winter and peak flows during the summer due to glacial melts. Analyzing flow data from USGS Gauge #15284000 using the EPA program routine DFLOW, yields a 7Q10 flow of 359 cfs, a 1Q10 flow of 342 cfs, a 30B3 flow of 428 cfs, and a harmonic mean of 1,040 cfs (Table 2). During the previous permit issuance, EPA and ADEC assumed that 20 percent of these critical low flow volumes ran through the channel slough to which Outfall 001 actually discharges, and that 72 percent of this flow volume was available for mixing.

Table 2. Critical Low Flow Volumes Available for Mixing (20% of Gauge Volume)

1Q10 (cfs/mgd)	7Q10 (cfs/mgd)	30B3 (cfs/mgd)	Harmonic Mean (cfs/mgd)
68.4 / 44.2	71.8 / 46.4	85.6 / 55.3	208 / 134.4

As a condition of the 2000 permit issuance, the facility was required to conduct quarterly upstream monitoring upstream in the actual channel to which Outfall 001 discharges. These flow data, as reported on the DMRs, yield a mean flow of 22.8 mgd with minimum and maximum flow of 1.6 mgd and 22.8 mgd, respectively, based on 19 measurements. While these data indicate that 5 percent or less of the USGS gauge measurement should be used for mixing calculations, 72 percent of 20 percent of this flow is being retained for this permit issuance due to the small data set available, and the dynamic nature of the Matanuska River. Volumes of flow available for mixing (dilution) will be reassessed during the next permit issuance based upon upstream flow monitoring. Downstream monitoring is being retained in this permit to assure that water quality standards are not violated at the edge of the mixing zone.

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 use designations are listed for the Matanuska River in 18 AAC 70.230(e). In accordance with Alaska Water Quality Standards (18 AAC 70.050), unless a particular water body has been reclassified or redesignated, all fresh waters of the State of Alaska, including the Matanuska River, 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

C. Mixing Zones

The CWA allows mixing zones (or zones of dilution in the receiving water body) at the discretion of the state when their water quality standards allow them. Only the state can authorize a mixing zone which is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented. The State of Alaska water quality standards allow the exceedance of water quality criteria within a mixing zone authorized by ADEC when the receiving water quality meets or exceeds state water quality standards (18 AAC 70.240). The allowed mixing zone must not impair designated uses or the integrity of the water body as a whole, must not allow lethality to passing organisms, and must be as small as practicable. Mixing zones are only available for WQBELs, and can not be authorized in stream reaches where anadromous fish spawning is occurring during that specific time of the year [18 AAC70.255(h)(1)]. Because technology-based effluent limits represent the minimum level of treatment control that must be imposed under section 402 of the CWA, they are always applied as "end-of-pipe" criteria and can not include a compliance schedule since the statutory deadlines for technology based effluent limits have all passed [40 CFR 125.3(a)] (see Appendix C).

In the case of a state approved mixing zone, the wasteload allocation (WLA) is calculated as a mass balance based upon available dilution, background concentrations, and state

water quality standards. When a receiving water already exceeds the criterion for a pollutant, or the state has not authorized a mixing zone for a particular pollutant, there is no dilution available for the effluent and the water quality criteria becomes the WLA (i.e., end-of-pipe effluent limits). State regulations at 18 AAC 70.255(h)(1) prohibit ADEC from authorizing mixing zones in stream reaches when anadromous fish are spawning. Such is the case along the channel in which the Palmer WWTP discharges during the months of July and August, and the draft permit contains end-of-pipe effluent ammonia limits (i.e., no mixing zone) during this time.

During the remainder of the year, ADEC has authorized a mixing zone in their draft 401 certification. The mixing zone is the same as that included in the 2000 permit issuance and provides a dilution of 43:1. This is based upon 72% of the critical low flow volume (i.e., 1Q10, 7Q10 or 30B3) which was assumed to represent 20% of that measure from the USGS Palmer Gauge. Dilution modeling was performed in 2000 using the compute code COREMIX, and defined the mixing zone as the area beginning at the confluence of the discharge and the Matanuska River, and extending downstream for 1,600 meters. The maximum width of the mixing zone is 11 meters. If ADEC amends the mixing zone in the final 401 certification of the permit, then the reasonable potential determination and the permit limits will be recalculated for the final permit.

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. For each pollutant, the statutory, regulatory and scientific basis for the effluent limits proposed in the draft permit are provided in Appendix C.

B. Proposed Effluent Limitations

The proposed effluent limits in the draft permit are provided below:

1. The permittee must not discharge any floating solids, visible foam in other than trace amounts, oily wastes or petroleum hydrocarbons that produce a sheen, film or discoloration on the surface of the receiving water or adjoining shorelines. [18 AAC 70.020(b)(8)(C) and 18 AC 70.020(b)(5)B)].
2. Removal Requirements for BOD_5 and TSS: The monthly average effluent concentration for BOD_5 and TSS must not exceed 15 percent of the monthly average influent concentration (i.e., ≥85% removal). Percent removal of BOD_5 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.

Table 3 summarizes the proposed average monthly, average weekly, and maximum daily effluent limits.

Table 3: Proposed Effluent Limits

Parameter	Units	Effluent and Influent Limits		
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
Ammonia (as N)[1]	mg/L	8.7	---	18.5
	lbs/day	68.9	---	146.6
Ammonia (as N)[1] (July & August) [4]	mg/L	1.7	---	3.6
	lbs/day	13.5	---	28.5
BOD_5	mg/L	30	45	60
	lbs/day	258	357	475
	% Removal	≥ 85% (See Section IV.B.2.)		
DO	mg/L	≥2 at all times		
Fecal Coliform Bacteria [1]	FC/100 mL	100 [2]	---	200
Fecal Coliform Bacteria [1] (July & August)	FC/100 mL	20 [2]	---	40
Flow	mgd	---	---	0.95
pH	s.u.	6.5-8.5 at all times		
TSS	mg/L	30	45	60
	lbs/day	258	357	475
	% Removal	≥ 85% (See Section IV.B.2.)		
Residue	---	(See Section IV.B.1.)		
Petroleum Hydrocarbons	---	(See Section IV.B.1.)		
Total Residual Chlorine [1,3]	µg/L	1.7	---	3.4
	lbs/day	0.013	---	0.027

Footnotes:
1. Reporting is required within 24-hours if the maximum daily limit is violated.
2. Based on the geometric mean of all samples taken in that month.
3. The effluent limits for chlorine is not quantifiable using EPA approved analytical methods. The permittee will be in compliance with the effluent limits provided the total chlorine residual is at or below the compliance evaluation level of 0.100 mg/L (100µg/L). Limit only applies when chlorine disinfection is being used.
4. Mixing zones can not be authorized in stream reaches when anadromous fish are spawning [18 AAC 70.255(h) (1)].

C. Anti-Backsliding

The draft permit eliminates the current permit's effluent and influent monitoring requirements for cyanide and trace metals (including arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver, and zinc), and eliminates the effluent limits for total residual chlorine when chlorine is not used for disinfection. Effluent limitations

for all other pollutants are as stringent as, or more stringent than, those in the current permit.

Statutory Prohibitions on Backsliding

Section 402(o) of the Clean Water Act (CWA) prohibits "backsliding" in NPDES permits but provides limited exceptions to this prohibition. Section 402(o)(1) of the CWA states that a permit may not be reissued with less-stringent limits based on Sections 301(b)(1)(C), 303(d) or 303(e) (i.e. water quality-based limits or limits established in accordance with State treatment standards) except in compliance with Section 303(d)(4). Section 402(o)(1) also prohibits backsliding on technology-based effluent limits established using best professional judgment (i.e. based on Section 402(a)(1)(B)), but in this case, the permit conditions being revised are either water quality-based effluent limits (WQBELs) (i.e., chlorine), or monitoring requirements.

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, WQBELs may be revised as long as the revision is consistent with the State's antidegradation policy. Additionally, Section 402(o)(2) contains exceptions to the general prohibition on backsliding in 402(o)(1). According to the *U.S. EPA NPDES Permit Writers' Manual* (EPA-833-B-96-003) the 402(o)(2) exceptions are applicable to WQBELs (except for 402(o)(2)(B)(ii) and 402(o)(2)(D)) and are independent of the requirements of 303(d)(4). Therefore, WQBELs may be relaxed as long as either the 402(o)(2) exceptions or the requirements of 303(d)(4) are satisfied. At a minimum, the 402(o) exceptions are met for all backsliding proposed in the draft permit.

Even if the requirements of Sections 303(d)(4) or 402(o)(2) are satisfied, Section 402(o)(3) prohibits backsliding which would result in violations of water quality standards or effluent limit guidelines.

Basis for Backsliding on Cyanide and Metals Monitoring (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Silver, and Zinc)

One of the two industrial users of Palmer's WWTP, Alaska Pollution Control (now owned by Emerald City) has not discharged to the WWTP system since 2003 and will no longer discharge to the system. Monitoring requirements for cyanide and trace metals in the current permit are therefore being removed from the proposed permit. To ensure the removal of pretreatment monitoring is protective of Alaska's water quality standards, whole effluent toxicity (WET) testing requirements are added to the proposed permit for effluent monitoring. The draft permit also contains general pretreatment requirements and prohibitions against certain industrial effluents from entering the collection system.

Basis for Backsliding on Total Residual Chlorine

The City of Palmer WWTP has not used chlorine in its treatment process since the installation of an ultraviolet (UV) disinfection system in 2002. As a consequence of this modification in the treatment train, EPA has determined that the City of Palmer WWTP discharge no longer has the reasonable potential to cause or contribute to a water quality standards violation for total residual chlorine so long as the facility does not add chlorine

to the wastewater for disinfection. Therefore, the proposed permit does not contain effluent limits for total residual chlorine when chlorine is not added to the wastewater.

However, since the Palmer WWTP has no backup UV unit, the proposed permit authorizes the discharge of residual chlorine should the UV system fail and chlorine disinfection becomes necessary as a backup. EPA has retained the current permit limit for residual chlorine (1.7 mg/L average monthly limit, 3.4 mg/L maximum daily limit), and revised the average monthly load and maximum daily load to reflect the increased design flow rate.

The effluent limitations for total residual chlorine apply only if the permittee adds chlorine to the wastewater, and sampling for total residual chlorine is not required when the permittee does not add chlorine for disinfection.

Clean Water Act Sections 303(d)(4) and 402(o)(3) Requirements

The Matanuska River has not been listed on Alaska's "303(d) list" as not attaining, or not being expected to attain, water quality standards for any pollutants. EPA believes that the less stringent effluent limit and monitoring requirements will continue to be protective of Alaska's federally approved water quality criteria for the Matanuska River.

Because the less-stringent effluent limit and the deletion of certain monitoring requirements will continue to ensure that water quality standards are met and do not violate the "secondary treatment" effluent limits, the limits are consistent with Section 402(o)(3) of the CWA.

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 ambient surface water data to determine if additional effluent limitations are required in the future, 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 permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) or on the application for permit renewal, as appropriate, to EPA.

As noted in Section II.A., the Palmer WWTP will soon become a major municipal NPDES facility (i.e., >1 MGD design flow) , and will be subject to expanded effluent and whole effluent toxicity (WET) testing during their next application submittal,. As indicated Part D of NPDES application Form 2A, expanded effluent testing is required of all municipal WWTP whose design flow exceed 1 mgd. Expanded effluent testing

includes a full priority pollutant scan (40 CFR 131.36) along with some additional parameters. Since the application requires reporting the results from a minimum of three expanded effluent testing events with the application submittal, the draft permit requires this monitoring in the second, third and fourth year of the permit to avoid having three sampling events performed during a short time frame prior to application submittal. Similarly, because WET limits or monitoring are required of major municipal facilities, and the pretreatment metals monitoring has been removed from the draft permit, three WET effluent monitoring events have been included to be performed concurrent with the expanded effluent testing. To determine what seasonal variation in effluent there may be, sampling events must be performed in January, May and August during the second, third and fourth year of the permit, respectively. Results from the WET and expanded effluent testing should be submitted to EPA and ADEC with the application for permit reissuance at least 180 days before permit expiration.

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 are less than the effluent limits.

Table 4, below, presents the proposed effluent monitoring requirements for the City of Palmer WWTP. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. The monitoring samples must not be influenced by combination with other effluent. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

Table 4. Effluent Monitoring Requirements

Parameter	Units	Monitoring Requirements			
		Monitoring Location	Monitoring Frequency	Sample Type	Maximum ML
Ammonia (as N)[1]	mg/L	effluent	1/week	grab	0.05
	lbs/day				---
BOD_5	mg/L	effluent and influent	1/week	24-hour timed composite	---
	lbs/day				
	% Removal				
DO	mg/L	effluent	1/month	grab	---
Fecal Coliform Bacteria [1]	FC/100 mL	effluent	1/week	grab	1.0
Flow	mgd	effluent or influent	continuous	recording	---
pH	s.u.	effluent	5/week	grab	---
TSS	mg/L	effluent and influent	1/week	24-hour timed composite	1.0
	lbs/day				---
	% Removal				---
Residue [4]	---	effluent	1/week	visual	---

Table 4. Effluent Monitoring Requirements

Parameter	Units	Monitoring Requirements			
		Monitoring Location	Monitoring Frequency	Sample Type	Maximum ML
Petroleum Hydrocarbons [4]	---	effluent	1/week	visual	---
Temperature	C°	effluent	5/week	grab	---
Expanded Effluent Testing	---	effluent	3x/5 years [5]	grab	---
Whole Effluent Toxicity	TU_U	effluent	3x/5 years [5]	grab	---
Total Residual Chlorine [1, 2, 3]	µg/L	effluent	2/week [3]	grab	100
	lbs/day				---

Footnotes:
1. Reporting is required within 24-hours if the maximum daily limit is violated.
2. The effluent limits for chlorine is not quantifiable using EPA approved analytical methods. The permittee will be in compliance with the effluent limits provided the total chlorine residual is at or below the compliance evaluation level of 0.1 mg/L (100µg/L).
3. This monitoring is only required when the permittee uses chlorine to disinfect the effluent.
4. Residue and petroleum hydrocarbon monitoring (see Section IV.B.1) must occur at Outfall 001.
5. To be performed in January, May and August during the 2nd, 3rd and 4th year of the permit, respectively. Expanded effluent and WET testing must occur on the same day.

In general, the effluent monitoring requirements in the draft permit are the same as those in the previous permit. As noted above in Section V.A., three monitoring events (sampling rounds) have been included for expanded effluent and WET testing in years two, three and four of the permit.

C. Surface Water Monitoring

Table 5 presents the proposed surface water (i.e., receiving water) monitoring requirements for the draft permit. The City of Palmer should continue receiving water monitoring at the established locations in the Matanuska River unless otherwise directed by ADEC. All surface water monitoring results should be summarized in a report and submitted to EPA and ADEC along with application for permit renewal, no later than 180 days prior to permit expiration. The Surface Water Monitoring Report should be submitted in both hard copy and electronic spreadsheet.

Ambient surface monitoring requirements in the draft permit are similar to those in the 2000 permit. Downstream ammonia, and downstream and upstream dissolved oxygen (DO), pH, and temperature monitoring have increased from two to three sampling events per year to further assess the ammonia levels in the Matanuska River. Due to the uncertainty in background ammonia concentrations, and the variability of the existing data set (see Appendix C), upstream ammonia monitoring requirements have increased to once a month for the first two years of the permit and quarterly (i.e., every three months) thereafter. In addition, flow monitoring in the actual discharge channel has also been

increased from quarterly to monthly to provide more data on receiving water flows available for mixing.

Table 5. Ambient Receiving Water Monitoring Requirements

Parameter	Units	Sample Frequency	Sample Location	Sample Type	Maximum ML
Ammonia, total (as N)	mg/L	3/year[1]	downstream[4]	grab	0.05
Ammonia, total (as N)	mg/L	1/month for 2 years 1/3 months thereafter	upstream	grab	0.05
Dissolved Oxygen	mg/L	3/year	downstream[4]	grab	---
Fecal Coliform Bacteria (May 1 - September 31)	FC/100 mL	1/month	upstream & downstream[4]	grab	1.0
Fecal Coliform Bacteria (October 1 - April 30)	FC/100 mL	1/quarter[2]	upstream & downstream[4]	grab	1.0
Flow	mgd or cfs and ft/sec.	1/month	upstream	grab	---
Hardness (as $CaCO_3$)	mg/L	3/week[5]	downstream	grab	10
pH	s.u.	3/year[3]	upstream & downstream[4]	grab	---
Residue	---	1/quarter[2]	downstream[4]	visual	---
Temperature	^oC	3/year[3]	upstream & downstream[4]	grab	---

Footnotes:
1 This monitoring shall occur during the months of February, May, and August.
2 Quarterly monitoring shall occur during the months of February, May, August and November.
3 This monitoring must occur on the same day as ammonia ambient monitoring.
4 Monitoring must occur at two locations downstream of the discharge at or near the edge of the mixing zone. Sample locations must be approved by ADEC.
5 Sampling shall be for one week during the months of January 2008 and August 2008.

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 at a later date, as appropriate.

Until future issuance of a sludge-only permit, sludge management and disposal activities at the Palmer WWTP 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 complete, accurate and representative of

the environmental or effluent condition. The facility is required to update the Quality Assurance Plan (QAP) for the City of Palmer WWTP within 90 days of the effective date of the final permit. The QAP shall be prepared in accordance with EPA guidance documents EPA QA/R-5 (*EPA Requirements for Quality Assurance Project Plans*) and EPA QA/G-5 (*Guidance for Quality Assurance Project Plans*), and consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The QAP must be retained on site and made available to EPA and ADEC upon request.

B. Operation and Maintenance Plan

The permit requires the City to properly operate and maintain all facilities and systems of treatment and control in accordance with industry accepted engineering practices. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The City of Palmer is required to update its Operation and Maintenance Plan for their WWTP within 90 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.

C. Pretreatment Requirements

The previous permit required the permittee to complete an industrial survey, to submit its sewer use ordinance to EPA, and to sample the influent waste stream. The results of the industrial user survey showed that the City of Palmer WWTP previously received wastewater from two significant industrial users: 1) Mount McKinley Meat and Sausage Co.; and, 2) Alaska Pollution Control (now owned by Emerald City). Emerald City currently transports all of their wastewater to Anchorage for disposal while Mount McKinley Meat and Sausage Co. has upgraded their treatment process to reduce oxygen demanding pollutants from entering the City of Palmer's collection system. Since the design flow of the Palmer WWTP is less than 5 mgd, EPA does not believe it is necessary for the facility to develop a pretreatment program for EPA approval at this time. However, the permit contains conditions requiring that the City monitor and control industrial users on its collection system.

D Standard Permit Provisions

Sections II, III, and IV of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because they are 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. EPA has determined that issuance of this permit will not affect any of the threatened or endangered species in the vicinity of the discharge. In a letter dated October 12, 2005, the USFWS indicated that there were no listed species or critical habitats within the projected area and they did not anticipate the proposed activity to impact since none are located in the vicinity of the projected activity. The NOAA Fisheries, in a letter dated October 2, 2005, did not identify any endangered species in the vicinity of the discharge and indicated that they did not expect the proposed activity to threatened or endanger species in the projected area. Therefore, EPA has determined that the proposed discharge will have no effect and further consultation with services is not required.

B. Essential Fish Habitat

Essential fish habitat (EFH) are the waters and substrates (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. 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 F.

According to information from the NOAA Fisheries, the Matanuska River has been designated to support the following species for EFH: king, coho, pink and chum salmon. 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 NPDES permit to assure the permit meets state water quality standards, including the antidegradation policy (18 AAC 70.015). The state has authorized a mixing zone in its draft 401 certification. The mixing zone provides a dilution factor of 43:1 and is defined as the area beginning at the confluence of the discharge stream and the Matanuska River, and extending downstream for 1,600 meters. The maximum width of the mixing zone is 11 meters. If the State amends the mixing zone in the final 401 certification, then the reasonable potential determination and permit limits will be re-calculated for the final permit.

EPA received the State's the draft 401 certification for the City of Palmer draft NPDES permit on July 5, 2006 (Appendix G). As discussed in Section III.C, ADEC has authorized a mixing zone for those pollutants with WQBELs that provides for a 43:1 dilution. However, during the months of July and August when salmon are spawning in those reaches of the Matanuska River, WQBELs are applied end-of-pipe with no mixing zone. As further discussed in Appendix C, Alaska Water Quality Standards require that

the City of Palmer be given end-of-pipe effluent limits for ammonia and fecal coliform during anadromous fish spawning months. The draft State certification also required a flow limitation be placed on the facility corresponding to their design flow of 0.95 MGD.

D. Alaska Coastal Management Program

The applicant has certified that the activities authorized by the draft permit are consistent with the Alaska Coastal Management Plan (ACMP). On September 12, 2000, this project was found to be consistent with the ACMP. According to state regulations at 11 AAC 110.830, projects found to be consistent do not have to undergo another consistency determination process unless a modification is proposed.

Although the draft permit conditions are different from the conditions in the current permit, Alaska regulations state that modifications that are within the scope of the original project that was reviewed are not subject to further consistency review [11 AAC 110.820(k)(4)]. EPA believes that the modifications proposed from the current permit are within the scope of the previous project review and that another consistency review is not required. EPA will provide the ACMP with copies of the draft permit and fact sheet during the public notice period. Any comments received will be considered prior to the reissuance of the permit.

E. Permit Expiration

The permit will expire five years from the effective date.

IX. References

Alaska Administrative Code. 2003. *Water Quality Standards.* Alaska Department of Environmental Conservation, Title 18, Chapter 70.

Alaska Administrative Code. 2003. *Wastewater Disposal.* Alaska Department of Environmental Conservation, Title 18, Chapter 72.

Alaska Department of Environmental Conservation. 2003. *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances.*

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

EPA. 1995. DFLOW: A Tool for Low Flow Analysis. Version 3.0. http://epa.gov/waterscience/dflow/index.htm.

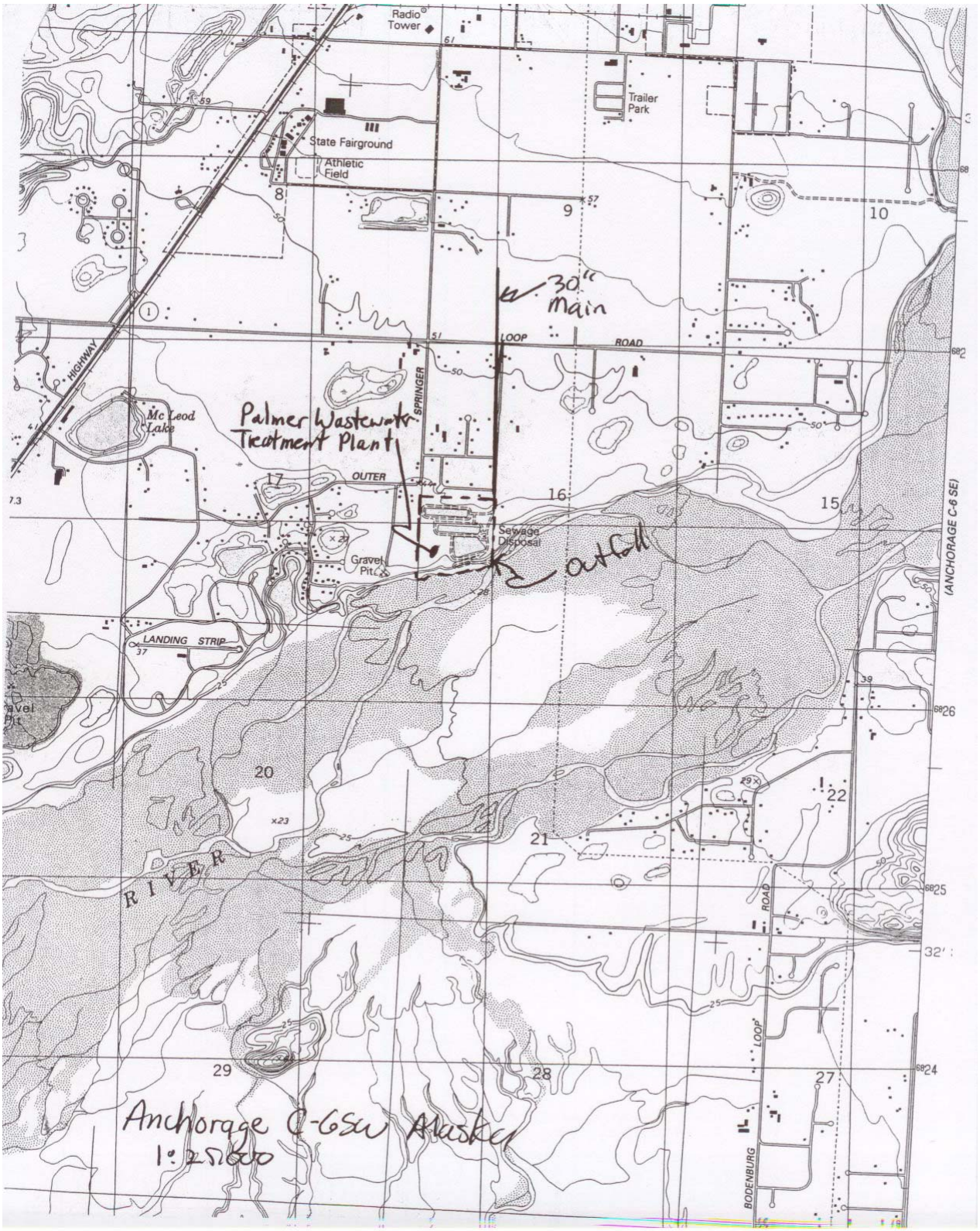
EPA. 2001. EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5. EPA/240/B-01/003. March 2001.

EPA. 2002. Guidance for Quality Assurance Project Plans, EPA QA/G-5. EPA/240/R-02/009. December 2002.

Appendix A: Facility Information

General Information	
NPDES ID Number:	AK-002249-7
Mailing Address:	231 West Evergreen Ave. Palmer, Alaska 99645
Facility Background:	The facility was originally issued an NPDES permit in March 1976 that included secondary treatment requirements. The current permit became effective on October 30, 2000, and has been administratively extended since October 31, 2005. The renewal application was received on September 15, 2005.
Collection System Information	
Service Area:	City of Palmer (6,000) and adjacent areas of Matanuska-Susitna Borough (3,000)
Service Area Population:	9,000
Collection System Type:	100% separate sanitary sewer
Facility Information	
Type of Facility:	Publicly Owned Treatment Works (POTW)
Treatment Train:	Bar screen, metering flume, two aeration lagoons, aerated polishing pond, and UV disinfection
Flow:	Design flow is 0.95 mgd. Long-term average flow is 0.57 mgd.
Discharge Frequency:	Year round
Outfall Location:	latitude 61°E 33’ 30” N; longitude 149°E 06’ 20” W
Receiving Water Information	
Receiving Water:	Matanuska River
Watershed:	Matanuska (HUC 19020402)
Beneficial Uses:	By default, the Matanuska river is protected for all beneficial uses.
Impairments:	None
Low Flow	20% of 7Q10 = 46.4 mgd, 20% 30B3 = 55.3 mgd (USGS Palmer gauge)
Additional Notes	
BOD_5 / TSS Limits	Principle treatment process is not a trickling filter or a waste stabilization pond, therefore, secondary treatment limits required. Facility previously qualified for reduced percent removal rates for TSS based upon low influent concentrations, but effective treatment process no longer requires this.

Appendix B: Facility Map



Appendix C: Basis for Effluent Limits

Effluent limitations were summarized in Section IV. of this fact sheet. 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 (WQBELs) in general, and Part C discusses facility specific WQBELs.

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. Technology based secondary treatment requirements 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_5, TSS, and pH. The federally promulgated secondary treatment effluent limits for POTW's are listed in Table C-1.

Table C-1. Secondary Treatment Effluent Limits (40 CFR 133.102)

Parameter	Average Monthly Limit	Average Weekly Limit	Range
BOD_5	30 mg/L	45 mg/L	---
TSS	30 mg/L	45 mg/L	---
Removal Rates for BOD_5 and TSS	85% (minimum)	---	---
pH	---	---	6.0 - 9.0 s.u.

State of Alaska Wastewater Disposal Regulations

In addition to the federal secondary treatment regulations in 40 CFR 133, the State of Alaska requires maximum daily limits of 60 mg/L for BOD_5 and TSS in its own secondary treatment regulations [18 AAC 72.990(59)]. Section 301(b)(1)(C) of the CWA requires that NPDES permits contain limits necessary to meet "treatment standards…established pursuant to any State law or regulations" in addition to water quality standards.

The following is a detailed description of each of the technology-based effluent limits included in the draft permit.

BOD_5

The City of Palmer WWTP is a secondary treatment facility that is subject to the federal technology-based requirements for BOD_5 as shown in Table C-1. In addition, the state secondary treatment regulations require that the daily maximum discharge shall not exceed 60

mg/L BOD_5. Secondary treatment requirements have been incorporated into the draft permit as both concentration limits, loading limits based on the design flow, and percent removals.

TSS

Historical data from the permittee indicates that the facility has not been able to comply with TSS limits while properly operating and maintaining the facility. The main reason for this is that the influent concentrations are low making it difficult to achieve the 85% removal rate for secondary treatment requirements. Consequently, the facility was eligible for equivalent to secondary treatment requirements. However, upgrades to the facility have resulted in better removal rates for TSS, the Palmer WWTP has not had a problem meeting 85% removal rates for TSS over the past 5 years. Consequently, secondary treatment standards found in 40 CFR 133.102 apply.

These requirements state that the 30-day average shall not exceed 30 mg/L, the 7-day average shall not exceed 45 mg/L, and the 30-day average percent removal shall not be less than 85 percent. In addition, the state secondary treatment regulations require that the daily maximum discharge shall not exceed 60 mg/L TSS. Therefore, secondary limitations are incorporated into the permit as both concentration limits, loading limits, and percent removal rates.

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:

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

Notes: [1] conversion factor with units (lb × L)/(mg × gallon × 106)

Dissolved Oxygen (DO)

The Alaska water quality standards require the surface DO concentration in fresh water to be greater than or equal to 7.0 mg/L, and greater than or equal to 5.0 to a depth of 20 centimeters in the interstitial waters of gravel used by anadromous or resident fish for spawning [18 AAC 70.020(b)(3)(C)]. Furthermore, DO concentrations may not exceed 17 mg/L or 110% of saturation at any point of sample collection.

There is no data available to indicate that there is a DO problem in the Matanuska River. However, ADEC has requested that the permit retain a DO limit of 2 mg/L. This limit essentially serves as a best professional judgment, technology-based effluent limit as an indicator of a properly operated and maintained treatment plant. A review of the facility performance over the past year indicates that the Palmer WWTP will be able to meet this limit.

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 and protect state 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.

NPDES 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 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 decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume, and the receiving water meets the criteria necessary to protect the designated uses of the water body. Mixing zones must be authorized by ADEC. Based on the previous permit and the current draft certification, the water quality-based effluent limits in this permit have been calculated using a mixing zone. If ADEC does not grant a mixing zone, the water quality-based effluent limits will be recalculated such that the criteria are met before the effluent is discharged to the receiving water.

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, or the state does not authorize one, the criterion (i.e., the water quality standard) 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 developed, EPA calculates effluent limits which are protective of the WLA using statistical procedures described in Appendix E of this fact sheet, and in Chapter 5 of the TSD.

C. Facility-Specific Water Quality-based Effluent Limits

pH

The most stringent water quality criteria for pH are for the protection of aquatic life and aquaculture water supply [18 AAC 70.020(b)(6)]. 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. The limits proposed in the draft permit are the same as those in the current permit, and a review of the facility performance over the past year indicates that the facility will be able to meet these limits. Therefore, it is anticipated that the facility will be able to comply with these limits.

Ammonia, Total (as Nitrogen)

The Alaska water quality standards contain criteria for the protection of aquatic life from the toxic effects of ammonia. Because the Matanuska River is known to support salmonids, EPA has applied ammonia criteria which are protective of aquatic life, including early life of stages of salmonids [18 AAC 70.020(b)(11)(C)]. 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. Fresh water ammonia criteria in Alaska are calculated according to the equations in Table C-2.

Table C-2. Water Quality Criteria for Ammonia

Acute Criterion	Chronic Criterion
$\frac{0.275}{1+10^{7.204-\text{pH}}}+\frac{39}{1+10^{\text{pH}-7.204}}$	$\left(\frac{0.0577}{1+10^{7.688-\text{pH}}}+\frac{2.487}{1+10^{\text{pH}-7.688}}\right)\times \text{MIN}\left(2.85, 1.45\times 10^{0.028\times(25-T)}\right)$

EPA used the mean temperature (7.61^{o}C), and the 95th percentile pH (8.07 s.u.) for the Matanuska River upstream of the facility to calculate the ammonia criterion. The mean value instead of the 95th percentile value for temperature was used because receiving water temperature data is only available for February and August. Due to this limited information, EPA feels that the mean temperature value would be more representative of the receiving water condition. However, an examination of the equations in Table C-2 indicates that chronic ammonia criteria are essentially independent of temperature at ambient water temperatures below 14.5°C (58°F) which is the case for the Matanuska year round. Using the equations in Table C-2, the acute

ammonia criteria for the Matanuska River at Palmer is 4.64 mg/L while the chronic criteria is 2.1 mg/L.

In the 2000 permit issuance, no ambient ammonia data existed for the Matanuska River, and these concentrations were assumed to be zero for the purposes of conducting a reasonable potential analysis and calculating effluent limitations. A small ambient data monitoring set is now available from the 200 permit (n=9) for the months of February and August (2001 through 2005), and is presented in Table C-3. It should be noted that while there are no know point sources of ammonia in the Matanuska River upstream of Palmer, agriculture runoff and septic leachate may be impacting water quality.

Table C-3. Ambient Background Ammonia Monitoring Data

Ammonia Concentration	Sample date
0.20	2/28/2001
0.15	8/31/2001
0.1199	2/28/2002
0.346	8/31/2002
0.0621	2/28/2003
1.171	8/21/2003
1.956	2/29/2004
10.1 *	8/31/2004
1.769	2/28/2005

* Outlying value was excluded from the data evaluation

As shown in Table C-3, a background ammonia concentration of 10.1 mg/L was measured in August 2004 that appears to be an outlier from the remainder of the data set. If a mean ambient ammonia concentration were calculated assuming a delta-lognormal data distribution (as described in Appendix E of the TSD), a background ammonia concentration of 2.09 mg/l is obtained. However, EPA has decided to ignore the apparent outlying value of 10.1 mg/L ammonia, and calculate the 95th percentile of the remaining eight data points. This yields a background ammonia concentration of 1.89 mg/L that was used for calculating reasonable potential and effluent limitations. The resulting reasonable potential calculation showed that the City of Palmer WWTP discharge does have the potential to cause or contribute to a violation of the water quality criteria for ammonia (see Appendix D). Consequently, the draft permit contains a water quality-based effluent limit for ammonia. The draft permit also requires that the permittee continue monitoring the receiving water (both upstream and downstream) for ammonia, pH and temperature. In addition to collecting more data on ambient conditions in the Matanuska River, monitoring downstream conditions will ensure that water quality standards are being met at the edge of the mixing zone, in part due to the uncertainty in the low volume flow through the channel that Outfall 001 discharges.

Both the proposed average monthly limit (8.7 mg/L) and maximum daily limit (18.5 mg/L) for ammonia are more stringent than the current permit limits (34 mg/L and 71 mg/L, respectively). The new upstream receiving water ammonia data is the main factor that contributed to the more stringent permit limit. This new data, combined with updated river flow, effluent, pH and temperature data collected under the previous permit were used to calculate the new ammonia limits. See Appendices D and E for further discussion on the determination of reasonable potential for and derivation of effluent ammonia limits.

Chlorine

Chlorine is often used to disinfect municipal wastewater prior to discharge. The City of Palmer WWTP now uses ultraviolet (UV) disinfection, which does not add chlorine or any other pollutants to the wastewater. However, the draft permit authorizes the discharge of chlorine as an alternative method of disinfection, in case the UV disinfection system should fail. The current disinfection system has no backup UV.

The most stringent state water quality criteria for total residual chlorine to protect designated uses requires that concentrations may not exceed 19 µg/L for acute aquatic life and 11.0 µg/L for chronic aquatic life [18 AAC 70.020(b)(11)(c)]. An analysis performed during the last permit issuance indicated that total residual chlorine had reasonable potential to violate water Alaska quality standards. ADEC had authorized a dilution factor of 43:1; however, EPA did not incorporated the dilution in the development of the proposed limits because it was EPA's position that the residual chlorine should be limited in the effluent to reduce toxicity effect to fish species in the receiving water. Therefore, reasonable potential was established with no dilution, and limits were imposed on the effluent based on the most limiting criterion of chronic aquatic life. In the 2000 permit issuance, these limits were 1.7 µg/L (monthly average) and 3.4 µg/L (daily maximum). Since these chlorine limits are not quantifiable using EPA approved analytical methods, the facility was determined to be in compliance provided the total residual chlorine concentration was at or below the below the detection limit of 0.1 mg/L (100 µg/L).

The acute criteria for residual chlorine was recently revised upward from 2.0 mg/L to 11.0 mg/L. The effluent limitations in the draft permit are being retained from the 2000 permit which were based on the lower water quality criteria because the facility has had no problem meeting these stricter limits in the past. EPA has determined that these effluent limits are sufficiently stringent to meet water quality standards. Effluent limits and monitoring requirements for chlorine are in effect whenever chlorine is being added to the waste stream.

Residues and Petroleum Hydrocarbons

The Alaska water quality standards [18 AAC 70.020(b)(8)] require that surface waters "may not 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". Therefore, EPA has included a narrative limitation prohibiting the discharge of such residues.

Similarly, 18 AAC 70.020(b)(5) require that surface waters be virtually free from floating oil, film, sheen or discoloration; and there can be no deleterious concentrations of petroleum

hydrocarbons, animal fats, or vegetable oils in shoreline or bottom sediments. Along with the residue standard, EPA has included a narrative effluent limit prohibiting such discharges. The permittee must visually inspect the effluent at the outfall for floating solids, visible foam and sheens once per month, and report the results to EPA.

Fecal Coliform

Fecal coliform is a non-pathogenic indicator species whose presence suggests the likelihood that pathogenic bacteria are present. For the protection of drinking water sources, Alaska water quality standards require that the instream concentration of fecal coliform bacteria not exceed 20 FC/100 mL based on the geometric mean of all samples taken in a 30-day period, and not more than 10% of the samples may exceed 40 FC/100 mL. In the current permit, the requirement that 10% of the samples not exceed 40 FC/100 mL was interpreted as a maximum daily limit. Since the facility was able to comply with this limitation in their current permit, they do not meet the requirements for antibacksliding. ADEC has authorized that the effluent discharged from the facility not exceed a 30-day geometric mean of 100 FC/100 mL and a daily maximum of 200 FC/100 mL based on a dilution of 43:1. These limits are retained from the existing permit, and DMR data suggests that the facility will have no problem complying with these limits. During times of salmon spawning in July and August, ADEC requires end-of-pipe effluent limits for fecal coliform [20 FC/100 mL (average monthly) and 40 FC/100 mL (maximum daily)]

Monitoring of the receiving water, both upstream and downstream of the outfall, has been retained in the draft permit to ensure that the water quality standards have been met at the edge of the mixing zone. This is due in part to the uncertainty in the low flow volume available for mixing through the side channel to which Outfall 001 discharges.

Appendix D: Reasonable Potential Calculations

This Section describes the process EPA has used to determine if the discharge from Plamer's WWTP 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 [40 CFR 122.44(d)(1)(i)]. This section discusses how the maximum projected receiving water concentration is determined.

A. Mass Balance

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

$$C_dQ_d = C_eQ_e + C_uQ_u \qquad \text{(Equation D-1)}$$

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) For acute criteria, 1Q10 = 44.19 MGD; for chronic criteria, 30B3 = 55.3 MGD

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

$$C_d = \frac{C_eQ_e + C_uQ_u}{Q_e + Q_u} \qquad \text{(Equation D-2)}$$

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:

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

where MZ is the fraction of the receiving water flow available for dilution. In this case, the mixing zone is based on incomplete mixing of the effluent and the receiving water, and was assumed to be 72% of 20% of the critical low flow volume as measured on the USGS Palmer gauge. The allowed mixing is a percent of the critical flow or a dilution ratio (dilution:1), where

the dilution ratio is 43:1 based upon modeling conducted during the 2000 permit issuance. Where mixing is rapid and complete, MZ is equal to 1 and equation D-2 is equal to equation D-3 (i.e., all of the critical low flow volume is available for mixing)

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

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

In other words, if a mixing zone is not allowed (either because the stream already exceeds water quality standards or the state does not allow one), EPA considers only the concentration of the pollutant in the effluent regardless of the upstream flow and concentration. If the concentration of the pollutant in the effluent is less than the water quality standard, the discharge cannot cause or contribute to a water quality violation for that pollutant. In this case the mixing or dilution factor (%MZ) is equal to zero and the mass balance equation is simplified to $C_d = C_e$.

Equation D-2 can be simplified by introducing a "dilution factor,"

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

There are three values for the dilution factor: one based on the 1Q10 flow rate in the receiving stream and used to determine reasonable potential and wasteload allocations for acute aquatic life criteria, one based on the 7Q10 flow rate to determine reasonable potential and wasteload allocations for chronic aquatic life criteria and conventional pollutants including fecal coliform, and one based on the 30B3 flow rate to determine reasonable potential and wasteload allocations for the ammonia criteria. The dilution factor is calculated with the effluent flow rate set equal to the design flow of 0.95 mgd. Dilution factors for ammonia and fecal coliform are 43 and 36, respectively, based upon 72% of the appropriate critical low flow volume (i.e., 20% of the 30B3 or 7Q10 at the USGS Palmer Gauge).

After the dilution factor simplification, Equation D-2 becomes:

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

Equation D-3 is the form of the mass balance equation which was used to determine reasonable potential and calculate wasteload allocations for the Palmer WWTP.

B. Maximum Projected Effluent Concentration

To calculate the maximum projected effluent concentration, EPA used the procedure described in section 3.3 of the TSD, "*Determining the Need for Permit Limits with Effluent Monitoring Data*." In this procedure, the 99th percentile of the effluent data is the maximum projected effluent concentration in the mass balance equation.

Since there are a limited number of data points available, the 99th percentile is calculated by multiplying the maximum reported effluent concentration by a "reasonable potential multiplier"

(RPM). The RPM is the ratio of the 99th percentile concentration to the maximum reported effluent concentration, and accounts for the statistical uncertainty in the effluent data. The RPM is calculated from the coefficient of variation (CV) of the data and the number of data points. The CV is defined as the ratio of the standard deviation of the data set to the mean. When fewer than 10 data points are available, the TSD recommends making the assumption that the CV is equal to 0.6.

Using the equations in Section 3.3.2 of the TSD, the reasonable potential multiplier (RPM) is calculated based on the CV and the number of samples in the data set as follows. The following discussion presents the equations used to calculate the RPM, and also works through the calculations for the ammonia RPM as an example.

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

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

where,
p_n = the percentile represented by the highest reported concentration
n = the number of samples
confidence level = 99% = 0.99

The data set contains 59 ammonia effluent samples collected from the effluent, therefore:

$p_n = (1-0.99)^{1/59}$
$p_n = 0.925$

This means that we can say, with 99% confidence, that the maximum reported effluent ammonia concentration is greater than the 92nd percentile.

The reasonable potential multiplier (RPM) is the ratio of the 99th percentile concentration (at the 99% confidence level) to the maximum reported effluent concentration. This is calculated as follows:

$RPM = C_{99}/C_p$ (Equation D-9)

Where,
$C = \exp(z\sigma - 0.5\sigma^2)$ (Equation D-10)

Where,
$\sigma^2 = \ln(CV^2 + 1)$ (Equation D-11)
$\sigma = \sqrt{\sigma^2}$
CV = coefficient of variation = (standard deviation) ÷ (mean)
z = the inverse of the normal cumulative distribution function at a given percentile

In the case of ammonia:

CV = coefficient of variation = 0.68
$\sigma^2 = \ln(CV^2 + 1) = 0.3833$
$\sigma = \sqrt{\sigma^2} = 0.6191$
z = 2.326 for the 99th percentile = 1.439 for the 92nd percentile

$C_{99} = \exp(2.326 \times 0.6191 - 0.5 \times 0.3833) = 3.485$
$C_{92} = \exp(1.439 \times 0.6191 - 0.5 \times 0.3833) = 2.012$

$RPM = C_{99}/C_{92} = 3.485/2.012$
RPM = 1.73

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

$C_e = (RPM)(MRC)$ (Equation D-12)

where MRC = Maximum Reported Concentration

In the case of ammonia,

$C_e = (1.73)(48.1\ mg/L) =$ **83.21 mg/L** (maximum predicted effluent concentration)

C. Maximum Projected Receiving Water Concentration

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 (or in the receiving water) exceeds the most stringent criterion for that pollutant. The maximum projected receiving water concentration for ammonia is calculated from Equation D-3:

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

The acute receiving water concentration is, in milligrams per liter:

$$C_d = \frac{(83.31 \times 0.95 + 1.89(44.19 \times 0.72)}{0.95 + (44.19 \times 0.72)}$$
$$= 4.25$$

And the chronic receiving water concentration is, in milligrams per liter:

$$C_d = \frac{(83.31 \times 0.95 + 1.89(55.3 \times 0.72)}{0.95 + (55.3 \times 0.72)}$$
$$= 3.79$$

The acute and chronic water quality criteria for ammonia are **4.64 mg/L** and **2.1 mg/L**, respectively. Because the projected ammonia receiving water concentration is greater than the chronic criteria (i.e., 3.79 > 2.1), a water quality based effluent limit for ammonia is necessary.

Appendix E: WQBEL Calculations - Aquatic Life Criteria

At this point, the reasonable potential analysis has determined the need to derive a water quality-based effluent limit (WQBEL) for ammonia. The following calculations demonstrate how the WQBELs in the draft permit were calculated. The WQBELs for ammonia are intended to protect aquatic life criteria. The following discussion presents the general equations used to calculate the water quality-based effluent limits, then works through the calculations for the ammonia WQBEL

A. Calculate the Wasteload Allocations (WLAs)

A wasteload allocation is the maximum allowable pollutant concentration that can be discharged in the effluent (after accounting for available dilution) without causing a instream water quality violation. Where the state does not authorize a mixing zone, or when dilution is not available, the criteria becomes the wasteload allocation. Such is the case in the Matanuska River during July and August when salmon are spawning in the discharge channel of the Palmer WWTP. Wasteload allocations (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 (Equations D-3). To calculate a wasteload allocation, C_d is set equal to the acute or chronic criterion and the equation is solved for C_e (i.e., the WLA). The calculated C_e is the acute or chronic WLA. Equation D-3 is rearranged to solve for the WLA, becoming:

$$C_e = WLA = \frac{C_d\,(Q_u \times \%MZ) + C_d Q_e}{Q_e} - \frac{[C_u Q_u \times \%MZ)]}{Q_e} \qquad \text{(Equation E-1)}$$

In the case of total ammonia, for the acute criterion,

$$WLA_a = \frac{4.64\,(44.19 \times 0.72) + 4.64 \times 0.95}{0.95} - \frac{[1.89 \times 44.19 \times 0.72)]}{0.95}$$

$$\mathbf{WLA_a = 96.72\ mg/l}$$

For the chronic criterion,

$$WLA_c = \frac{2.1\,(55.30 \times 0.72) + 2.1 \times 0.95}{0.95} - \frac{[1.89 \times 55.30 \times 0.72)]}{0.95}$$

$$\mathbf{WLA_c = 10.88\ mg/l}$$

The next step is to compute the "long term average" (LTA) concentrations which will be protective of the WLAs. This is done using the following equations from Section 5.4 of the TSD:

$$LTA_a = WLA_a \times \exp(0.5\sigma^2 - z\,\sigma) \qquad \text{(Equation E-2)}$$

$$LTA_c = WLA_c \times \exp(0.5\,\sigma_4^2 - z\,\sigma_4) \qquad \text{(Equation E-3)}$$

where,

$\sigma^2 = \ln(CV^2 + 1)$
$\sigma = \sqrt{\sigma^2}$
$\sigma_4^2 = \ln(CV^2/4 + 1)$
$\sigma = \sqrt{\sigma_4^2}$
z = 2.326 for 99th percentile probability basis

In the case of total ammonia,

$\sigma^2 = \ln(0.68^2 + 1) = 0.38$
$\sigma = \sqrt{\sigma^2} = 0.62$
$\sigma_4^2 = \ln(0.68^2/4 + 1) = 0.11$
$\sigma = \sqrt{\sigma_4^2} = 0.33$
z = 2.326 for 99th percentile probability basis

Therefore,

$LTA_a = 96.72 \text{ mg/L} \times \exp(0.5 \times 0.38 - 2.326 \times 0.62)$
$\mathbf{LTA_a = 27.75 \text{ mg/L}}$

$LTA_c = 10.88 \text{ mg/L} \times \exp(0.5 \times 0.11 - 2.326 \times 0.33)$
$\mathbf{LTA_c = 5.31 \text{ mg/L}}$

The LTAs are compared and the more stringent is used to develop the daily maximum (MDL) and monthly average (AML) permit limits as shown below. For total ammonia, the chronic LTA of 1.29 mg/L is more stringent.

B. Derive the maximum daily and average monthly effluent limits

Using the equations in Section 5.4 of the TSD, the MDL and AML effluent limits are calculated as follows:

$MDL = LTA \times \exp(z_m \sigma - 0.5 \sigma^2)$ (Equation E-4)
$AML = LTA \times \exp(z_a \sigma_n - 0.5 \sigma_n^2)$ (Equation E-5)

where σ, and σ^2 are defined as they are for the LTA equations (E-2 and E-3) and,

$\sigma_n^2 = \ln(CV^2/n + 1)$
$\sigma = \sqrt{\sigma_n^2}$
z_a = 1.645 for 95th percentile probability basis
z_m = 2.326 for 99th percentile probability basis
n = number of sampling events required per month (minimum of 4 regardless of the monitoring frequency)

In the case of total ammonia,

$$MDL = 5.31\ mg/L \times \exp(2.326 \times 0.62 - 0.5 \times 0.38)$$
MDL = 18.5 mg/L

$$AML = 5.31\ mg/L \times \exp(1.645 \times 0.33 - 0.5 \times 0.11)$$
AML = 8.7 mg/L

During the months of July and August when ADEC has not authorized a mixing zone due to the due to the presence of spawning salmon in the discharge reach, the MDL becomes **3.6 mg/L** while the AML is **1.7 mg/L**.

Appendix F: 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 Matanuska River has been designated to support the following species for EFH: king, sockeye, coho, pink and chum salmon.

B. Description of the Facility and Discharge Location

The activities and sources of wastewater at the City of Palmer waste water treatment facility 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 state water quality standards. 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 City of Palmer'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 Water Quality Standards. 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 Water Quality Standards
- 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 proposed permit has been developed to protect aquatic life species in the Matanuska River in accordance with the Alaska water quality standards, 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 G: Draft 401 Certification

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

A Draft Certificate of Reasonable Assurance, as required by Section 401 of the Clean Water Act, has been requested by the Environmental Protection Agency for discharge of disinfected secondary treated wastewater from the City of Palmer Wastewater Treatment Facility.

The activity is located at Latitude 61° 33' 30" N, Longitude 149° 06' 20" W, near Palmer, Alaska with discharges to the Matanuska River.

Water Quality Certification is required for the proposed activity, because the activity will be authorized by an Environmental Protection Agency permit identified as NPDES Permit No. AK-002249-7 and a discharge will result from the proposed activity.

After review of the public comments received in response to the public notice, the Alaska Department of Environmental Conservation will need to certify that there is reasonable assurance that the activity and the resulting discharge is in compliance with the requirements of Section 401 of the Clean Water Act, which includes the Alaska Water Quality Standards, 18 AAC 70, and the Standards of the Alaska Coastal Management Program, 11 AAC 12, provided that the following stipulations are adhered to: These stipulations were adopted pursuant to 11 AAC 12 (Project Consistency with the Alaska Coastal Management Program) and are necessary to ensure that the project is consistent with the ACMP:

1. The ADEC will require effluent limitations for biochemical oxygen demand and total suspended solids. The limitations shall be 30 mg/L (monthly average), 45 mg/L (weekly average) and 60 mg/L (daily maximum) for biochemical oxygen demand and 45 mg/L (monthly average and 65 mg/L (weekly average) for total suspended solids.

Rationale: In accordance with and 18 AAC 72.050(3) and 72.990(59, D) the minimum required level of treatment for this discharge is secondary treatment.

2. The ADEC will require that the treated wastewater discharged from this facility shall not exceed a daily maximum of 0.950 million gallons per day.

Rationale: In accordance with State Regulations 18 AAC 70.045, the Department will consider the characteristics of the effluent, including flow rate, when determining the appropriateness and size of a mixing zone. Restricting the amount of flow will assure that the size of the mixing zone is appropriate and that the treatment capacity of the facilities is not exceeded.

3. The ADEC designates a mixing zone for fecal coliform bacteria, dissolved oxygen, temperature, total chlorine residual, pH, metals, nutrients, ammonia and whole effluent toxicity, (WET), contained in the discharge from the City of Palmer Wastewater Treatment Facility, when salmon spawning is not occurring in the Matanuska River where the discharge is occurring.

The mixing zone for this discharge provides for a minimum of a 43:1 dilution factor, and is defined as the area beginning at the confluence of the discharge stream and the Matanuska River, and extending downstream for 1600 meters, terminating with an 11 meter width. The receiving area in the Matanuska River is braided and for this reason the flow amounts are subject to change over time. If the flow decreases significantly in the future, the applicant must inform the department.

Rationale: In accordance with State Regulations 18 AAC 70.240, the Department has authority to designate mixing zones in permits or certifications. This mixing zone will ensure that the most stringent water quality standard limitations for: fecal coliform bacteria, (20 FC/100 ml, 30 day geometric mean, not more than 10% of the samples may exceed 40 FC/100 ml.); dissolved oxygen, (7 mg/l); pH, (6.5 to 8.5 and may not vary more that 0.5 pH units from natural conditions); total chlorine; metals; nutrients; ammonia; temperature and WET are met at all points outside of the mixing zone.

4. The ADEC requires that the number of fecal coliform bacteria in the secondary treated effluent discharged from the Palmer Wastewater Treatment Facility shall not exceed a 30 day geometric mean of 100 per 100 milliliters of sample and the daily maximum shall not exceed 200 per 100 milliliters of sample. During times of salmon spawning the ADEC requires that the number of fecal coliform bacteria in the secondary treated effluent discharged from the Palmer Wastewater Treatment Facility shall not exceed a 30 day geometric mean of 20 per 100 milliliters of sample and not more than 10% of the samples may exceed 40 per 100 milliliters.

Rationale: In accordance with State Regulations 18 AAC 72.240, the Department has authority to require that the effluent discharged from this facility is treated using the most effective and technologically and economically feasible methods. These effluent limitations shall provide some assurance to the Department that these standards are being met and will also promote the use of other methods of disinfection, (such as ultraviolet light) which eliminate and/or minimize the use of disinfection chemicals.

5. The ADEC will require monitoring at the outside edge of the mixing zone for fecal coliform bacteria. The samples must be collected from a minimum of two downstream/down current locations at the outer edge of the mixing zone, (or as close to it as is practical due to site and access limitations), once per month during the months of May, June and September, and twice during the remainder of the year, (November 1 through April 30). The monitoring may be discontinued after two years if the results indicate that State of Alaska Water Quality Standards have not been exceeded due to the quality of the discharge. The monitoring must start again if the method of disinfection is changed and may also be discontinued after two years if the results indicate that State of Alaska Water Quality Standards have not been exceeded outside of the mixing zone due to the quality of the discharge.

Rationale: In accordance with State Regulations 18 AAC 70.245, the Department has authority to ensure that existing uses of the waterbody outside the mixing zone are maintained and fully protected. The specified monitoring will provide evidence to the Department that the treatment and mixing zone size is adequate and also provide assurance to receiving water users that they may conduct their activities outside of the mixing zone without fear of damaging effects caused by the discharge.

6. The ADEC requires that a sign, or signs be placed on the shoreline near the mixing zone and outfall line. The sign, or signs should state that treated domestic wastewater is being discharged, the name and owner of the facility and the approximate location and size of the mixing zone. The sign, or signs should inform the public that a mixing zone exists and that certain activities should not take place in the mixing zone and give a facility contact telephone number for additional information.

Rationale: In accordance with AS 46.03.110, (d), the department may specify in a permit the terms and conditions under which waste material may be disposed of. The notification requirement is intended to inform and provide assurances to the public that the wastewater is being treated in accordance with State of Alaska Water Quality Standards, (18 AAC 70).

_____ _____

Date

Program Manager
Wastewater Discharge Program