



FACT SHEET

**The United States Environmental Protection Agency (EPA)
Plans To Reissue A National Pollutant Discharge Elimination System (NPDES) Permit to:**

**City of Plummer
Wastewater Treatment Plant**

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EPA Proposes To Reissue NPDES Permit

EPA proposes to reissue an NPDES permit to the City of Plummer. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility.

This Fact Sheet includes:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions
- technical material supporting the conditions in the permit

401 Certification

Since the Plummer Wastewater Treatment Plant's discharge is located within the Coeur D'Alene Indian Reservation, EPA will certify the permit under Section 401 of the Clean Water Act.

Public Comment

Persons wishing to comment on, or request a Public Hearing for the draft permit 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 reissuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If 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 (see address below). The draft permit and fact sheet can also be found by visiting the Region 10 website at "www.epa.gov/r10earth/waterpermits.htm."

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1200 Sixth Avenue, OWW-130
Seattle, Washington 98101
(206) 553-0523 or 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permit are also available at:

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1435 North Orchard Street
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(208) 378-5746

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2110 Ironwood Pkwy
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ACRONYMS

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
AML	Average Monthly Limit
BOD ₅	Biochemical oxygen demand, five-day
BE	Biological evaluation
°C	Degrees Celsius
cfs	Cubic feet per second
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
E. coli	escherichia coli
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
IDEQ	Idaho Department of Environmental Quality
I/I	Inflow and Infiltration
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
MPN	Most Probable Number
N	Nitrogen
NMFS	National Marine Fisheries Service
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
s.u.	Standard Units
TMDL	Total Maximum Daily Load
TRE	Toxicity Reduction Evaluation
TSD	Technical Support document (EPA, 1991)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service

USGS	United States Geological Services
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WWTP	Wastewater treatment plant

I. APPLICANT

This fact sheet provides information on the draft NPDES permit for the City of Plummer Wastewater Treatment Plant (Plummer WWTP), NPDES Permit Number ID-002278-1.

II. FACILITY INFORMATION

The draft permit is for the discharge of effluent from a municipal wastewater treatment plant. The facility treats primarily residential and commercial wastewater.

The treatment train consist of aerated lagoons followed by sand filtration and chlorination. Additional facility information is provided in Appendix A.

III. PERMIT COMPLIANCE HISTORY

The facility's previous permit was issued in August 1982. The facility has had challenges meeting their current limitations for Total Suspended Solids (TSS) percent removal requirements. Monitoring data for the past five years for biochemical oxygen demand, five-day (BOD₅) and TSS are presented graphically in Appendix B. Since 2001, the City of Plummer has been under a compliance order from EPA to reduce inflow and infiltration (I/I) in the collection system and upgrade their treatment facility. The I/I reduction work, which included manhole replacement/rehabilitation and rehabilitation of sewer main, has been completed. The City intends to complete treatment plant upgrades by January 1, 2007.

IV. RECEIVING WATER

The Plummer WWTP is allowed to discharge to Plummer Creek during the months of December through April. Plummer Creek flows to Chatcolet Lake, located just south of Lake Coeur D'Alene. The remainder of the year, the facility land applies treated effluent.

A. Low Flow Conditions

Flow information from the United States Geological Survey (USGS) was used to determine the flow conditions for Plummer Creek in the vicinity of the outfall. The nearest gauging station is USGS 12415250 (Plummer Creek near Plummer, Idaho). The station has flow data from 1991 through 1992 and is now inactive. Because of the limited monitoring data, EPA calculated the design flows using a correlation between the Plummer Creek flow data and a nearby station with a long-term record (USGS 12415350 Wolf Lodge Creek near Coeur D'Alene Idaho). Based on this analysis, the 1 day, 10 year low flow (1Q10) and the 7 day, 10 year low flow (7Q10) were calculated to be 0.2 mgd and 0.3 mgd during the period from December 1 through April 30.

B. Water Quality Standards

An NPDES permit must ensure that the discharge from the facility complies with the state/tribe's water quality standards. A state/tribe's water quality standards¹ 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 cold water biota, contact recreation, etc.) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary, by the state/tribe, 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.

The Plummer WWTP discharges to the Coeur D'Alene Tribal waters. The Tribe has not yet adopted water quality standards. In this case, EPA's practice is to apply adjacent or downstream standards to the water body for the purpose of developing permit limitations and conditions. Therefore, the State of Idaho's water quality standards were applied to the permit. The beneficial uses for Plummer Creek are cold water communities, secondary contact recreation, and salmonid spawning.

Because the effluent limits in the draft permit are based on current water quality criteria or technology-based limits that have been shown to not cause or contribute to an exceedence of water quality standards, the discharge as authorized in the draft permit will not result in degradation of the receiving water.

C. Water Quality Limited

Any waterbody for which the water quality does not, and/or is not expected to meet, applicable water quality standards is defined as a "water quality limited segment."

Section 303(d) of the Clean Water Act (CWA) requires states to develop a Total Maximum Daily Load (TMDL) management plan for water bodies determined to be water quality limited segments. The TMDL documents the amount of a pollutant a waterbody can assimilate without violating a state's/tribe's water quality standards and allocates that load to known point sources and nonpoint sources. The allocations for point sources are then incorporated into the NPDES permit. Neither Plummer Creek or Lake Chatolet are listed as water quality limited water segments, Idaho Department of Environmental Quality (IDEQ) has classified them as waters with insufficient data and information to determine if

¹ Idaho's water quality standards are contained in *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 58.01.02.)

standards are attained.

V. EFFLUENT LIMITATIONS

A. Basis for Permit Effluent Limits

In general, the CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent 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 of a waterbody are being met. The water quality-based effluent limits may be more stringent than technology-based effluent limits. The basis for the proposed effluent limits in the draft permit are provided in Appendix C.

B. Proposed Effluent Limitations

Table 1, below presents the proposed average monthly, average weekly, and instantaneous maximum effluent limits for 5-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), chlorine, and escherichia coli (E. coli). The effluent concentration limit for chlorine is not quantifiable using EPA approved methods. Therefore, EPA will use the minimum level (ML) of 0.1 mg/L as the compliance evaluation level.

In addition to the limits in Table 1, the following limits are in the draft permit:

1. The pH range must be between 6.5 to 9.0 standard units.
2. There must be no discharge of any floating solids, visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water.
3. For each month, the monthly average effluent concentration for BOD₅ and TSS shall not exceed 15 percent of the monthly average influent concentration.

Table 1: Monthly, Weekly and Instantaneous Maximum Effluent Limitations			
Parameters	Average Monthly Limit	Average Weekly Limit	Instantaneous Maximum Limit
BOD ₅ Concentration	30 mg/L	45 mg/L	---
BOD ₅ Mass-Based Limits	33 lbs/day	49 lbs/day	---
TSS Concentration	30 mg/L	45 mg/L	---
TSS Mass-Based Limits	33 lbs/day	49 lbs/day	---
E. coli Bacteria (colonies/100 ml)	126 ¹	---	576
Chlorine Concentration	0.01 mg/L ²	0.03 mg/L ²	---
Chlorine Mass-Based Limits	0.01 lbs/day ²	0.03 lbs/day ²	---
Notes: 1 Based on the geometric mean of all samples taken during the month. 2 The average monthly and maximum daily concentration limits for chlorine are not quantifiable using EPA approved test methods. The permittee will be in compliance with the effluent limits for chlorine provided the average monthly and maximum daily total chlorine residual level is at or below the compliance evaluation level of 0.1 mg/L, with a average monthly and maximum daily loading is at or below 0.1 lbs/day.			

VI. MONITORING REQUIREMENTS

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) to the EPA. Additional discussion on the basis of monitoring requirements in the draft permit is provided in Appendix C.

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. Any additional samples taken are

included in the calculation of average effluent concentrations if they are conducted using EPA approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits (MDLs) are less than the effluent limits.

Tables 2 presents the monitoring requirements in the draft permit. The effluent sampling location must be after the last treatment unit and prior to discharge to the receiving water. If no discharge occurs during the reporting period, “no discharge” shall be reported on the DMR.

Table 2: Effluent Monitoring Requirements				
Parameter	Unit	Sample Location	Sample Frequency	Sample Type
Flow	mgd	Effluent	5/week	measure
BOD ₅	mg/L	Influent and Effluent	1/month	8-hour composite
	lbs/day	Influent and Effluent	1/month	calculation ¹
	% Removal	--	–	calculation ²
TSS	mg/L	Influent and Effluent	1/month	8-hour composite
	lbs/day	Influent and Effluent	1/month	calculation ¹
	% Removal	--	–	calculation ²
pH	standard units	Effluent	1/week	grab
E. coli Bacteria	colonies/100 ml	Effluent	5/month	grab
Chlorine	mg/L	Effluent	1/week	grab
	lbs/day	Effluent	1/week	calculation ¹
Total Ammonia as N ³	mg/L	Effluent	1/month	8-hour composite
Total Phosphorus as P, mg/L ³	mg/L	Effluent	1/month	8-hour composite
Notes:				
1 Maximum daily loading is calculated by multiplying the concentration in mg/L by the average daily flow and a conversion factor of 8.34.				
2 Percent removal is calculated using the following equation: (influent - effluent) ÷ influent.				
3 Monitoring is required for one year only.				

C. Surface Water Monitoring

Table 3 presents the proposed surface water monitoring requirements for the draft permit.

Table 3: Surface Water Monitoring Requirements			
Parameter	Sample Location	Sample Frequency	Sample Type
Total Ammonia as N	Upstream of treatment plant outfall	See note	grab
pH, standard units	Upstream of treatment plant outfall	See note	grab
Total Phosphorus as P	Upstream of treatment plant outfall	See note	grab
Temperature, °C	Upstream of treatment plant outfall	See note	grab
Note: Monitoring must occur once during each of the following periods: December - January, February - March, and April.			

VII. SLUDGE (BIOSOLIDS) REQUIREMENTS

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

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

VIII. OTHER PERMIT CONDITIONS

A. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the Permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The Permittee is required to develop and implement

a Quality Assurance Plan within 180 days of the effective date of the final permit. The Quality Assurance Plan shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan shall be retained on site and made available to EPA and IDEQ upon request.

B. Operation and Maintenance Plan

The permit requires the Permittee to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The Permittee is required to develop and implement an operation and maintenance (O&M) plan for the WWTP within 180 days of the effective date of the final permit. An existing O&M for the treatment plant may be modified accordingly to fulfill these requirements. The plan shall be retained on site and made available to EPA and IDEQ upon request.

C. Additional Permit Provisions

Sections II, III, and IV of the draft permit contains 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, reporting requirements, compliance responsibilities, and other general requirements.

IX. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. EPA has evaluated the potential effects of the discharge from the treatment facility on listed endangered and threatened species in the vicinity. The results of this evaluation have determined that issuance of this permit will not affect any of the threatened or endangered species in the vicinity of the discharge.

B. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with the National Marine Fisheries Service (NMFS) when a proposed

discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. The EPA has tentatively determined that the issuance of this permit will not affect any EFH species in the vicinity of the discharges, therefore consultation is not required for this action.

C. Section 401 Certification

Because the Plummer WWTP discharges to tribal waters, EPA will certify the permit under section 401 of the CWA.

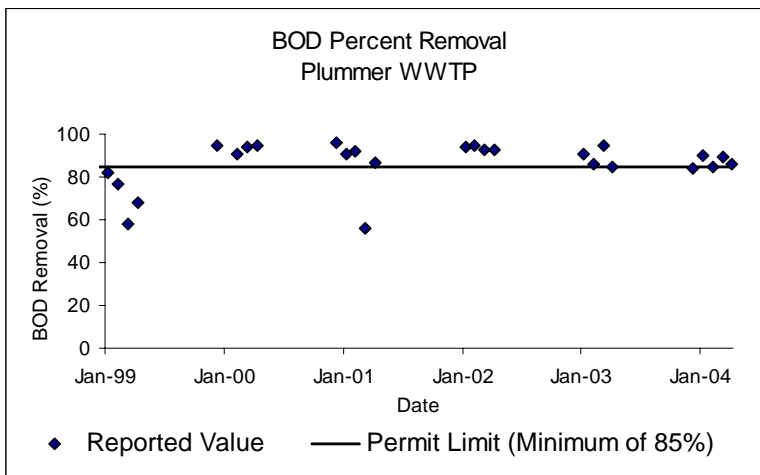
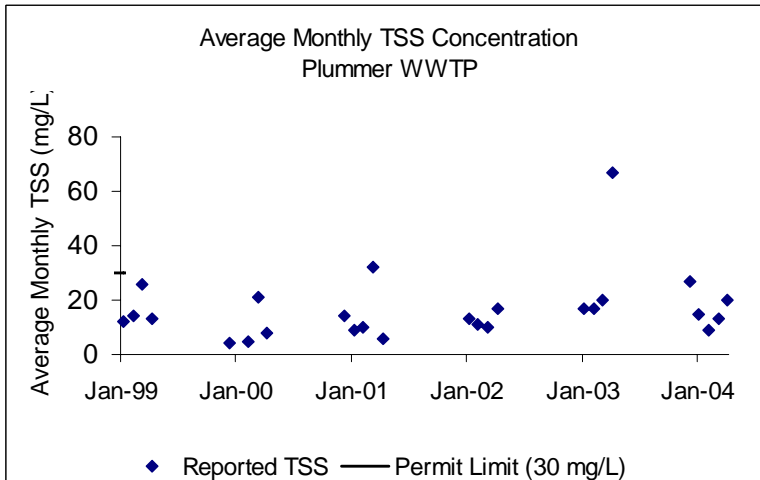
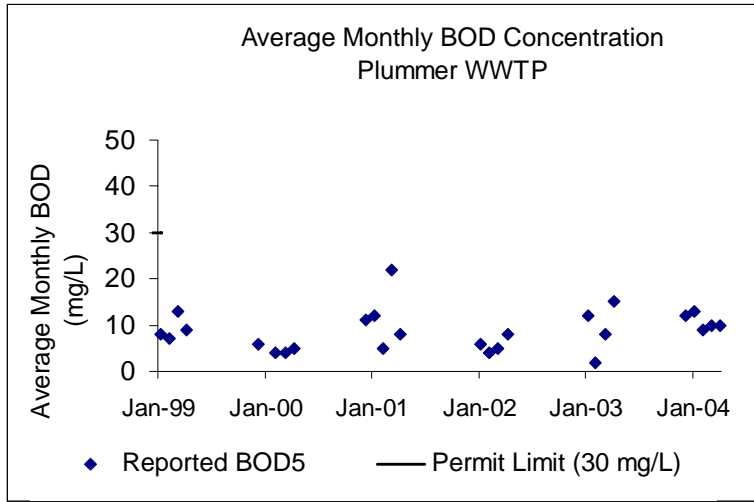
D. Permit Expiration

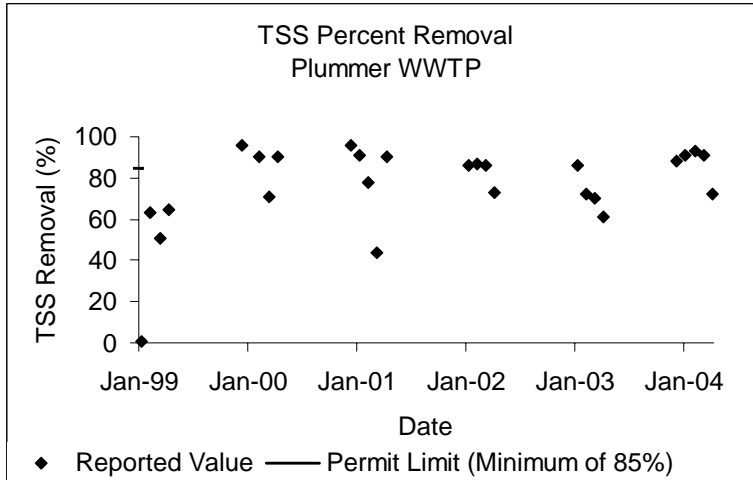
The permit will expire five years from the effective date of the permit.

Appendix A - Additional Facility Information

Facility:	City of Plummer Wastewater Treatment Plant
NPDES ID Number:	ID-002278-1
Mailing Address:	P.O. Box B Plummer, Idaho 83851
Facility Background:	The facility's existing permit became effective August 1982. The current permit application was received in September 2001.
<u>Collection System Information</u>	
Service Area:	City of Plummer
Service Area Population:	990
Collection System Type:	100% separated sanitary sewer
<u>Facility Information</u>	
Treatment Train:	aerated lagoons followed by sand filtration and chlorination
Design Flow:	0.13 mgd
Existing Flow:	0.10 mgd (average daily flow rate)
Land application:	This facility land applies treated effluent to 27 acres of land. The annual average daily volume is 0.36 mgd.
Months when Discharge Occurs:	December through April
Outfall Location:	latitude: 47° 20' 27"N, longitude: 116° 52' 10"W
<u>Receiving Water Information</u>	
Receiving Water:	Plummer Creek
Subbasin:	St. Joe (HUC 17010304)
Beneficial Uses:	Cold water communities, secondary contact recreation, salmonid spawning.
Water Quality Limited Segment:	This segment is not listed
Low Flow:	1Q10 = 0.2 mgd, 7Q10 = 0.3 mgd (December to May)
<u>Additional Notes</u>	
Discharge Location:	This facility is located on the Coeur D'Alene Reservation

Appendix B -BOD₅ and TSS Data





Appendix C - Basis for Effluent Limitations

The Clean Water Act (CWA) requires Publicly Owned Treatment Works (POTW) to meet effluent limits based on available wastewater treatment technology. These types of effluent limits are called secondary treatment effluent limits. EPA may find, by analyzing the effect of an effluent discharge on the receiving water, that secondary treatment effluent limits are not sufficiently stringent to meet water quality standards. In such cases, EPA is required to develop more stringent water quality-based effluent limits which are designed to ensure that the water quality standards of the receiving water are met.

Secondary treatment effluent limits may not limit every parameter that is in an effluent. For example, secondary treatment effluent limits for POTWs have only been developed for five-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), and pH, yet effluent from a POTW may contain other pollutants such as bacteria, chlorine, ammonia, or metals depending on the type of treatment system used and the service area of the POTW (i.e., industrial facilities as well as residential areas discharge into the POTW). When technology based effluent limits do not exist for a particular pollutant expected to be in the effluent, EPA must determine if the pollutant may cause or contribute to an exceedance of the water quality standards for the water body. If a pollutant causes or contributes to an exceedance of a water quality standard, water quality-based effluent limits for the pollutant must be incorporated into the permit.

The following discussion explains in more detail the derivation of technology based effluent limits, and water quality based effluent limits. Part A discusses technology based effluent limits and Part B discusses water quality based effluent limits.

A. Technology Based Effluent Limits

1. BOD₅, TSS and pH

Secondary Treatment:

The CWA requires POTWs to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as “secondary treatment,” that all POTWs were required to meet by July 1, 1977. EPA developed “secondary treatment” regulations which are specified in 40 CFR 133. These technology-based effluent limits apply to all municipal wastewater treatment plants, and identify the minimum level of effluent quality attainable by secondary treatment in terms of BOD₅, TSS, and pH. The secondary treatment effluent limits are listed in Table C-1.

Table C-1: Secondary Treatment Effluent Limits			
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%	---	---
pH	---	---	6.0 - 9.0 s.u.

Treatment Equivalent to Secondary:

The regulations include special considerations, referred to as “treatment equivalent to secondary”, for waste stabilization ponds and trickling filters. The regulations allow alternative limits for BOD₅ and TSS for facilities using trickling filters or waste stabilization ponds provided the following requirements are met (40 CFR 133.101(g), and 40 CFR 133.105(d)):

- The BOD₅ and TSS effluent concentrations consistently achievable through proper operation and maintenance of the treatment works exceed the minimum level of the effluent quality described above (Secondary Treatment Effluent Limits).
- A trickling filter or waste stabilization pond is used as the principal treatment process.
- The treatment works provide significant biological treatment of municipal wastewater (i.e., a minimum of 65% reduction of BOD₅ is consistently attained).

Reduced Percent Removal Requirements for Less Concentrated Influent Wastewater:

In accordance with 40 CFR § 133.103 (d), treatment works that receive less concentrated wastes from separate sewer systems can qualify to have their percent removal limits reduced provided that all of the following conditions are met:

- The facility can consistently meet its permit effluent concentration limits but cannot meet its percent removal limits because of less concentrated influent water
- The facility would have been required to meet significantly more stringent limitations than would otherwise be required by the concentration-based standards and
- The less concentrated influent is not the result of excessive inflow/infiltration (I/I).

Draft Permit Limits:

DMR data and compliance history for the Plummer WWTP were evaluated to determine if any considerations were necessary in designating effluent limits for BOD₅ and TSS (such as treatment equivalent to secondary limits or reduced percent removal requirements).

As illustrated in the Appendix B, the facility currently meets secondary treatment levels for BOD₅ and TSS concentration. Therefore, the facility does not qualify for treatment equivalent to secondary limits. As summarized above, the regulations allow the BOD₅ and TSS percent removal requirements to be reduced provided all three conditions in 40 CFR § 133.103 (d) are met. The permittee just recently completed I/I reduction measures, which should impact treatment plant efficiency (i.e. percent removal). Therefore, at this time, there is insufficient data to determine if the facility will still be unable to meet its percent removal limits. Therefore, the draft permit retains the 85% removal requirements for BOD₅ and TSS.

2. Chlorine

A technology-based average monthly chlorine effluent limitation of 0.5 mg/L for wastewater treatment plants is derived from standard operating practices. The Water Pollution Control Federation's Chlorination of Wastewater (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after 15 minutes of contact time. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/L limit on a monthly average basis. In addition to average monthly limits (AMLs), NPDES regulations require effluent limits for POTWs to be expressed as average weekly limits (AWLs) unless impracticable. The AWL is derived as 1.5 times the AML, resulting in an AWL for chlorine of 0.75 mg/L.

3. Mass-based Limits

The federal regulation at 40 CFR § 122.45 (f) require BOD₅, TSS, and chlorine limitations to be expressed as mass based limits using the design flow of the facility. The mass based limits are expressed in lbs/day and are calculated as follows:

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

B. Water Quality-Based Effluent Limits

The following discussion is divided into four sections. Section 1 discusses the statutory basis for including water quality based effluent limits in NPDES permits, section 2 discusses the procedures used to determine if water quality based effluent limits are needed in an NPDES permit, section 3 discusses the procedures used to develop water quality based effluent limits, and section 4 discusses the specific water quality based limits.

1. Statutory Basis for Water Quality-Based Limits

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to state/tribal waters must also comply with limitations imposed by the state/tribe as part of its certification of NPDES permits under section 401 of the CWA.

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 both numeric and narrative criteria for water quality.

The regulations require that this evaluation be made 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 established through a TMDL.

2. Reasonable Potential Analysis

When evaluating the effluent to determine if water quality-based effluent limits are needed based on chemical specific numeric criteria, a projection of the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern is made. The chemical specific concentration of the effluent and receiving water and, if appropriate, the dilution available from the receiving water are factors used to project the receiving water concentration. If the projected concentration of the receiving water exceeds the numeric criterion for a specific chemical, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it is appropriate to allow a small area of 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 is below the chemical specific numeric criterion necessary to protect the designated uses of the water body. EPA has determined that allowing a mixing zone with 25 percent of the stream flow (based on Idaho water quality standards) would be protective of downstream beneficial uses.

3. Procedure for Deriving Water Quality-Based Effluent Limits

The first step in developing a water quality based permit 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 because either the receiving water already exceeds the criterion or the receiving water flow is too low to provide dilution, the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permittee will not contribute to an exceedance of the criterion.

4. Specific Water Quality-Based Effluent Limits

(a) Toxic Substances

The Idaho Water Quality Standards require surface waters of the state to be free from toxic substances in concentrations that impair designated uses. Because there are no significant industrial discharges to the facility, and concentrations of priority pollutants from cities without a significant industrial component are low, it is anticipated that toxicity will not be a problem.

(b) Floating, Suspended or Submerged Matter/Oil and Grease

The Idaho Water Quality Standards require surface waters of the state to be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions that may impair designated beneficial uses. A narrative condition is proposed for the draft permit that states there must be no discharge of floating solids or visible foam or oil and grease other than trace amounts.

(c) Excess Nutrients - Phosphorous and Nitrogen

The Idaho Water Quality Standards require surface waters of the state be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses.

Plummer Creek is not listed as water quality limited for nutrients. However, during review of the preliminary draft permit, the Coeur D'Alene Tribe expressed concern of the impacts of the WWTP's discharge on phosphorus levels in Plummer Creek. At this time, the EPA believes there is insufficient data to assess the impacts of the WWTP discharge on nutrients levels in Plummer or to support phosphorus limits in the draft permit. Because of the Tribe's concern, the draft permit requires monitoring of the effluent and receiving water for phosphorus. This data may be used to evaluate the need for future permit limits.

(d) Sediment/Total Suspended Solids (TSS)

The draft permit includes technology-based limits for TSS.

(e) pH

The Idaho Water Quality Standards require surface waters of the state to have a pH value within the range of 6.5 - 9.5 standard units. The technology-based effluent limits for pH require the effluent to be in the range of 6.0 - 9.0 standard units. These limits must be met before the effluent is discharged to the receiving water. To ensure that both water quality-based requirements and technology-based requirements are met, the draft permit incorporates the lower range of the water quality standards (6.5 standard units) and the upper range of the technology-based limits (9.0 standard units).

(f) Dissolved Oxygen (DO)

The Idaho Water Quality Standards require the level of DO to exceed 6 mg/L at all times for water bodies that are protected for aquatic life use. Further, during salmonid spawning and incubation periods, the one day minimum intergravel DO must exceed 5 mg/L and the seven day average intergravel DO must exceed 6 mg/L.

Plummer Creek is not listed as water quality-limited for DO. The draft permit does not include effluent limits or monitoring for DO.

(g) Temperature

The Idaho Water Quality Standards require ambient water temperatures of

22°C or less with a maximum daily average of no greater than 19°C for cold water biota protection. In addition, water temperatures of 13°C or less with a maximum daily average not greater than 9°C are required for salmonid spawning use during the spawning and incubation periods.

Plummer Creek is not listed as water quality-limited for temperature. The draft permit does not include effluent limits or monitoring for temperature.

(h) Ammonia

The Idaho Water Quality Standards contain water quality criteria to protect aquatic life, including salmonids, against short term and long term adverse impacts from ammonia. Currently, there are no ammonia data for the facility to determine if ammonia may cause or contribute to a water quality standard violation. Since the data are not available to determine if water quality-based effluent limits are required for ammonia, the draft permit does not propose effluent limits for ammonia. However, the draft permit requires effluent sampling for ammonia, and surface water sampling for ammonia, pH, and temperature. These data will be used to determine if an ammonia limit is needed for the effluent discharge for the next permit.

(i) Escherichia Coli (E. coli) Bacteria

According to the Idaho Water Quality Standards, waters designated for secondary contact recreation are not to contain E. coli bacteria significant to the public health in concentrations exceeding:

- a. A single sample of five hundred and seventy six (576) E. coli organisms per one hundred ml; or
- b. A geometric mean of one hundred and twenty six (126) E. coli organisms per one hundred ml based on a minimum of five samples taken, every three to five days, over a thirty day period.

The water quality-based effluent limits in the draft permit includes an average monthly limit of 126 organisms/100 ml and an instantaneous maximum limit of 576 organisms/100 ml because the facility discharges to waters designated for secondary contact recreation.

(j) Total Residual Chlorine

The Idaho Water Quality Standards contain water quality criteria to protect aquatic life against short term and long term adverse impacts from chlorine. Because the facility uses chlorine disinfection, a reasonable potential analysis was conducted to determine if the discharge has the potential to exceed Idaho Water Quality Standards for chlorine. The results indicated that the facility has the potential to exceed water quality criteria. Because the water quality based effluent limits are more stringent than the technology based effluent limits for chlorine, the draft permit includes water quality based effluent permit limitations for chlorine. Appendices C and D provide the reasonable potential and effluent limit calculations.

Appendix D - Reasonable Potential Determination

To determine if a water quality based effluent limitation is required, the receiving water concentration of pollutants is determined downstream of where the effluent enters the receiving water. If the projected receiving water concentration is greater than the applicable numeric criterion for a specific pollutant, there is reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard and an effluent limit must be incorporated into the NPDES permit. The receiving water concentration is determined using the following mass balance equation:

$C_d * Q_d = (C_e * Q_e) + (C_u * Q_u)$, which can be rearranged as follows:

$$C_d = \frac{(C_e * Q_e) + (C_u * Q_u)}{Q_d}$$

C_d = receiving water concentration downstream of the effluent discharge

Q_d = receiving water flow downstream of the effluent discharge ($Q_e + Q_u$)

C_e = maximum projected effluent concentration

Q_e = maximum effluent flow

C_u = upstream concentration of pollutant

Q_u = upstream low flow

Flow Conditions / Mixing Zones

The Idaho *Water Quality Standards and Wastewater Treatment Requirements* at IDAPA 58.01.02.060(01)(e) allow twenty-five percent (25%) of the receiving water to be used for dilution for aquatic life criteria. The flows used to evaluate compliance with the criteria are:

- The 1 day, 10 year low flow (1Q10). This flow is used to protect aquatic life from acute effects. It represents the lowest daily flow that is expected to occur once in 10 years.
- The 7 day, 10 year low flow (7Q10). This flow is used to protect aquatic life from chronic effects. It the lowest 7 day average flow expected to occur once in 10 years.

The reasonable potential calculations are based on an assumed mixing zone of 25% for aquatic life.

When a mixing zone (%MZ) is allowed, the mass balance equation becomes:

$$C_d = \frac{(C_e * Q_e) + (C_u * (Q_u * \%MZ))}{Q_e + (Q_u * \%MZ)}$$

Maximum Projected Effluent Concentration

The CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits or water quality-based limits. The technology-based chlorine limit is 0.5 mg/L (average monthly limit). At a minimum, a facility must meet the technology-based effluent limit. When doing a reasonable potential calculation to determine if the technology-based chlorine limit would be protective of water quality standards it was assumed that the maximum projected effluent concentration was 0.5 mg/L (500 µg/L).

Reasonable Potential Calculations

The following are the calculations used to determine if chlorine in the Plummer WWTP discharge has the reasonable potential to cause or contribute to an exceedance of the IDEQ water quality standard.

Facility information and assumptions:

- Facility is discharging at a maximum chlorine concentration of 500 µg/L (C_e)
 - Wastewater Treatment Plant Design Flow = 0.13 mgd (Q_e)
 - Low Flow Conditions (Q_u):
 - 1Q10 = 0.37 cfs = 0.24 mgd (used to evaluate acute conditions)
 - 7Q10 = 0.44 cfs = 0.28 mgd (used to evaluate chronic conditions)
 - The upstream concentration of chlorine is assumed to be zero since there are no sources of chlorine upstream of the discharge (C_u).
 - Percent of the river available for mixing is 25%
- (1) Determine if there is a reasonable potential for the acute aquatic life criterion to be violated.

$$MZ = 25\% (0.25)$$

$$C_e = 500 \mu\text{g/L}$$

$$Q_e = 0.13 \text{ mgd}$$

$$C_u = 0 \mu\text{g/L}$$

$$Q_u = 0.24 \text{ mgd}$$

$$C_d = \frac{(500 * 0.13) + (0 * (0.24 * 0.25))}{0.13 + (0.24 * 0.25)} = 343 \mu\text{g/L}$$

Since 343 µg/L is greater than the acute aquatic life criterion (19 µg/L), there is a reasonable potential for the effluent to cause an exceedance to the water quality standard. Therefore, a water quality based effluent limit for chlorine is required.

- (2) Determine if there is a reasonable potential for the chronic aquatic life criterion to be violated.

$$MZ = 25\% (0.25)$$

$$C_e = 500 \mu\text{g/L}$$

$$Q_e = 0.13 \text{ mgd}$$

$$C_u = 0 \mu\text{g/L}$$

$$Q_u = 0.28 \text{ mgd}$$

$$C_d = \frac{(500 * 0.13) + (0 * (0.28 * 0.25))}{0.13 + (0.28 * 0.25)} = 323 \mu\text{g/L}$$

Since 323 $\mu\text{g/L}$ is greater than the chronic aquatic life criterion (11 $\mu\text{g/L}$), there is a reasonable potential for the effluent to cause an exceedance to the water quality standard. Therefore, a water quality based effluent limit for chlorine is required.

Appendix E - Effluent Limit Calculation

To support the implementation of EPA's regulations for controlling the discharge of toxicants, EPA developed the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001, March 1991). The following is a summary of the procedures recommended in the TSD in deriving water quality-based effluent limitations for pollutants. This procedure translates the water quality criteria for chlorine to "end of the pipe" effluent limits.

Step 1- Determine the WLA

The acute and chronic aquatic life criteria are converted to acute and chronic waste load allocations (WLA_{acute} or $WLA_{chronic}$) for the receiving waters based on the following mass balance equation:

$$Q_d C_d = Q_e C_e + Q_u C_u$$

$$Q_d = \text{downstream flow} = Q_u + Q_e$$

$$C_d = \text{aquatic life criteria that cannot be exceeded downstream}$$

$$Q_e = \text{effluent flow}$$

$$C_e = \text{concentration of pollutant in effluent} = WLA_{acute} \text{ or } WLA_{chronic}$$

$$Q_u = \text{upstream flow}$$

$$C_u = \text{upstream background concentration of pollutant}$$

Rearranging the above equation to determine the effluent concentration (C_e) or the wasteload allocation (WLA) results in the following:

$$C_e = WLA = \frac{Q_d C_d - Q_u C_u}{Q_e} = \frac{C_d (Q_u + Q_e) - Q_u C_u}{Q_e}$$

when a mixing zone is allowed, this equation becomes:

$$C_e = WLA = \frac{C_d (Q_u \times \%MZ) + C_d Q_e - Q_u C_u (\%MZ)}{Q_e}$$

Step 2 - Determine the LTA

The acute and chronic WLAs are then converted to Long Term Average concentrations (LTA_{acute} and $LTA_{chronic}$) using the following equations:

$$LTA_{acute} = WLA_{acute} \times e^{[0.5\sigma^2 - z\sigma]}$$

where,

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

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

$$CV = \text{coefficient of variation} = \text{standard deviation/mean}$$

$$LTA_{\text{chronic}} = WLA_{\text{chronic}} \times e^{[0.5\sigma^2 - z\sigma]}$$

where,

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

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

$$CV = \text{coefficient of variation} = \text{standard deviation/mean}$$

Step 3 - Most Limiting LTA

To protect a waterbody from both acute and chronic effects, the more limiting of the calculated LTA_{acute} and LTA_{chronic} is used to derive the effluent limitations. The TSD recommends using the 95th percentile for the Average Monthly Limit (AML) and the 99th percentile for the Maximum Daily Limit (MDL).

Step 4 - Calculate the Permit Limits

The maximum daily limit (MDL) and the average monthly limit (AML) are calculated as follows (assuming the LTA_{chronic} is the more restrictive limitation):

$$MDL = LTA_{\text{chronic}} \times e^{[z\sigma - 0.5\sigma^2]}$$

where,

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

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

$$CV = \text{coefficient of variation}$$

$$AML = LTA_{\text{chronic}} \times e^{\left[\frac{z\sigma}{n} - \frac{0.5\sigma^2}{n}\right]}$$

where,

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

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

$$CV = \text{coefficient of variation} = \text{standard deviation/mean}$$

$$n = \text{number of sampling events required per month for chlorine (either 4 or 20 depending on design flow)}$$

Table E-1 below summarizes input values and results of the chlorine effluent limit calculations for the Plummer WWTP.

Table E-1. Chlorine Effluent Limits Calculations, City of Plummer	
Acute Criteria	19 ug/L
Chronic Criteria	11 ug/L
CV	0.6
Q _u , 1Q10	0.37 cfs = 0.24 mgd
Q _u , 7Q10	0.44 cfs = 0.28 mgd
MZ	25%
Q _e	0.13 mgd
C _u	0 µg/L
WLA, Acute	28 ug/L
WLA, Chronic	17 ug/L
LTA, Acute	9 ug/L
LTA, Chlorine	9 ug/L
MDL	28 ug/L
AML	11 ug/L

