Fact Sheet

The U.S. Environmental Protection Agency (EPA)

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

City of Puyallup Wastewater Treatment Plant

1602 18th St NW

Puyallup, WA 98371

NPDES Permit Number: WA0037168

Public Notice Start Date: ******, 2014

Public Notice Expiration Date: ******, 2014

Technical Contact: John Drabek 206-553-8257

1-800-424-4372 ext. 3-8257 (within Region 10)

Email: drabek.john@epa.gov

The EPA Proposes To Reissue NPDES Permit

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

Puyallup Tribe Certification

The EPA will request that the Puyallup Tribe to certify the NPDES permit for this facility, under Section 401 of the Clean Water Act. Comments regarding the certification should be directed to:

Puyallup Tribe
Environmental Department
2002 28th Street
Tacoma, WA 98404
253 573-7851

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 Notice. All comments or requests for a public hearing should include the name, address and telephone number of the commentator and a concise statement of the exact basis of any comment and the relevant facts upon which it is based. All comments and requests for a public hearing must be in writing and should be submitted to EPA as described in the Public Comments Section of the attached Public Notice.

If no significant 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 33 days after the issuance date, unless a request for an evidentiary hearing is submitted within 33 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).

United States Environmental Protection Agency
Region 10
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:

EPA Washington Operations Office
300 Desmond Drive SE
Lacey, WA 98503
360 753-9080

Puyallup Tribe
Environmental Department
3009 E. Portland Ave,
Tacoma, WA 98404
253 573-7851

Washington Department of Ecology
300 Desmond Drive SE
Lacey, WA 98503
360 407-6275

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LIST OF ACRONYMS AND ABBREVIATIONS

AML	Average monthly limit
BMP	Best management practices
BOD5	Five-day biochemical oxygen demand
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CWA	Clean Water Act
DMR	Discharge monitoring report
CV	Coefficient of variation
Ecology	Washington State Dept. of Ecology
EPA	United States Environmental Protection Agency
lb/day	Pounds per day
LTA	Long term average
MDL	Maximum daily limit or method detection limit
mgd	Million gallons per day
mg/L	Milligrams per liter
ml	Milliliters
MOA	Memorandum of agreement
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and maintenance
POTW	Publicly owned treatment works
RP	Reasonable potential
TMDL	Total maximum daily load
TSD	*Technical Support Document for Water Quality-based Toxics Control*, (EPA1991)
TSS	Total suspended solids
USGS	United States Geological Survey
WWTP	Wastewater treatment plant
WLA	Wasteload allocation
µg/L	Micrograms per liter

I. APPLICANT

Facility Name:	City of Puyallup Wastewater Treatment Plant
NPDES Permit No:	WA0037168
Location:	1602 18th St NW, Puyallup, WA 98371
Facility Contact:	Don Lange, Wastewater Treatment Plant Supervisor

II. FACILITY ACTIVITY

The City of Puyallup owns and operates a municipal treatment facility that provides secondary treatment and disinfection of domestic and industrial wastes prior to discharge to the Puyallup River. The maximum month design flow of the facility is 13.98 million gallons per day (mgd). In the period from August 2003 through December 2011, the treatment plant had an average annual flow of 4.07 mgd, and a maximum monthly average flow of 8.81 mgd. Biosolids generated during the treatment process are hauled by a private contractor to a land application site in eastern Washington.

See Appendix A for a map of the location of the treatment plant and discharge. Appendix B contains additional information on the treatment processes and waste streams.

III. RECEIVING WATER

A. Discharge Location.

The Puyallup Wastewater Treatment Plant (WWTP) discharges to the Puyallup River (latitude 47^{O} 12' 26" N, longitude 122^{O} 19' 11" W) located within the 1873 survey area of the Puyallup Reservation. The Puyallup Tribe of Indians is the beneficial owner of the bed and banks (to the mean high water mark) of the Puyallup River within the 1873 survey area of the Puyallup Reservation, which the United States holds in trust for the Tribe.

B. Beneficial Uses.

The Puyallup Tribe's Water Quality Standards designate beneficial uses for waters of the Reservation. The current tribal standards for the Puyallup River designate the river as Class A in the vicinity of the outfall. Characteristic uses include the following: domestic, industrial and agricultural water supply, stock watering, fish and shellfish (including salmonids, crustaceans and other shellfish, and other fish), wildlife habitat, ceremonial and religious water use, commerce, navigation, and primary and secondary recreation.

C. Existing or Potential Impairments of Water Quality.

A 1994 Ecology water quality study of the river identified the potential for future problems in meeting the dissolved oxygen criteria if existing NPDES facilities reached their design capacity. As a result, Ecology established a seasonal preventative total maximum daily load (TMDL) for ammonia and five-day biochemical oxygen demand (BOD5) for the Puyallup River basin and tributaries effective May 1 through October 31 (Ecology, 1993 and 1994). Subsequent Puyallup WWTP permits also incorporated a BOD/ammonia trade as allowed in the 1993 Puyallup River TMDL. See section IV of Appendix C for details.

The Puyallup River is also one of many in the State of Washington that contain naturally-occurring arsenic in amounts that may be greater than human health criteria for arsenic. The

Department of Ecology determined in 2002[1] that arsenic concentrations in Washington rivers and streams are typically in the range of 0.2 - 1.0 ug/L, whereas concentrations greater than 2 to 5 ug/L may indicate contamination from anthropogenic sources. Upstream Puyallup River arsenic levels from Ecology's Puyallup river monitoring station #10A070 were found in the range of 0.47 - 1.14 ug/L (data from August 2001 - August 2006). See Section IX.B. for information about arsenic monitoring required by the draft permit.

IV. FACILITY BACKGROUND

A. Treatment System

The original collection system for the City's wastewater was constructed in 1905 as a gravity sewer system discharging directly into the Puyallup River. In 1955, a 6.0 mgd sewage treatment plant providing primary treatment and disinfection was constructed at the present site. In 1984, the treatment plant was upgraded to a secondary treatment system utilizing rotating biological contactors (RBCs). A sewer system rehabilitation project completed in 1981 significantly reduced inflow and infiltration. In April 1999, the RBCs were replaced by an activated sludge system and chlorination was replaced by ultraviolet disinfection. Although the original collection system was built as a combined storm and sanitary system, the system is now 100 percent separated.

B. Permit Background

In 1997, EPA, the Puyallup Tribe, and Ecology signed a memorandum of agreement (MOA) regarding implementation of the NPDES permit program on the Puyallup Reservation. The MOA recognized that the federal government has the authority to issue NPDES permits for discharges to waters of the Reservation.

A draft permit for the facility was proposed in June 2000. Because changes were made to the proposed effluent limits following public notice of the draft permit (because of additional background and monitoring data), a new draft permit was prepared and was issued in August 2003. The permit was then modified in April 2008 to include language instituting the facility's new pretreatment program.

An NPDES application for permit issuance was submitted by the permittee on December 17, 2007. The EPA determined that the application was timely and complete. Therefore, pursuant to 40 CFR 122.6., the permit has been administratively extended and remains fully effective and enforceable.

C. Compliance Status

Table 1, below, summarizes the reported effluent limit violations for the Puyallup WWTP based on Discharge Monitoring Reports (DMRs) between August 2003 and December 2011.

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[1] http://www.ecy.wa.gov/pubs/0203045.pdf, Publication No. 02-03-045.

TABLE 1. E90 Report – Reported Effluent Limit Violations 2003 Through 2011

Monitoring Period End Date	Code Expansion for Parameter Code	Concentration Average Value	Concentration Maximum Value	Average Limit Concentration	Maximum Limit Concentration	Effluent Violation Code for Parameter Measurement	Code Expansion for Effluent Violation Code for Parameter Measurement	Quantity Average Value	Quantity Maximum Value	Average Quantity Limit	Maximum Quantity Limit
30-Nov-06	ZINC TOTAL RECOVERABLE	72.4	72.4	70	102	E90	NUMERIC VIOLATION NUMERIC VIOL	1.8	1.8	8.2	11.9
31-Jul-09	MERCURY TOTAL RECOVERABLE	0	>0.0001	0.052	0.072	E90	NUMERIC VIOLATION NUMERIC VIOL	>0	>0	0.006	0.008
30-Jun-06	NITROGEN, AMMONIA TOTAL (AS N)	5	6	4.2	12	E90	NUMERIC VIOLATION NUMERIC VIOL	14	27	490	792
30-Apr-08	LEAD TOTAL RECOVERABLE	0.5	0.5	6.1	10.5	E90	NUMERIC VIOLATION NUMERIC VIOL	0.02	2	0.71	1.22

V. EFFLUENT LIMITATIONS

EPA followed the Clean Water Act (CWA), tribal and federal regulations, and EPA's 1991 Technical Support Document for Water Quality-Based Toxics Control (TSD) to develop the proposed effluent limits. In general, the CWA requires that the effluent limits for a particular pollutant are the more stringent of either the technology-based or water quality-based limits. Appendix C provides the basis for the development of technology-based and water quality-based effluent limits. Technology-based limits are set based on the level of treatment that is achievable using readily available technology. For publicly owned treatment works, federal regulations include technology-based limits for three parameters: five-day biochemical oxygen demand (BOD5), total suspended solids (TSS), and pH. Puyallup Tribal standards have also specified a technology-based limit for fecal coliform bacteria.

EPA evaluates the technology-based limits to determine whether they are adequate to ensure that water quality standards are met in the receiving water. If the limits are not adequate, EPA must develop additional water quality-based limits. These limits are designed to prevent exceedances of the Puyallup Tribe's water quality standards in the Puyallup River. The proposed permit includes water quality-based limits for BOD5, ammonia, and copper. Limits for lead, mercury, and zinc were not carried through from the previous permit based on the lack of reasonable potential to exceed water quality criteria. New information not available during the development of the previous permit formed the basis for removing these limits without backsliding or risking negative impacts water quality. The new information came in the form of a larger data set obtained using consistent and correct sampling and analytical methods. This change is consistent with language in Clean Water Act section 303(d)(4)(B) regarding the revision of certain effluent limits. Appendix D provides an example calculation for the development of a water quality-based permit limit.

Table 2 compares the limits in the existing permit with those in the draft permit. The draft permit specifies more stringent limits for pH and ammonia during the winter. Recent monitoring data for all other parameters were below the draft permit limits.

Table 2
Outfall 001 Effluent Limits Comparison

Parameters	Average Monthly Limit		Average Weekly Limit		Maximum Daily Limit	
	Draft Permit (2013)	Existing Permit[2]	Draft Permit (2013)	Existing Permit[2]	Draft Permit (2013)	Existing Permit[2]
BOD_5						
mg/L	30	30	45	45	---	---
lbs/day[1]	2,179	2,179	3,268	3,268	---	---
Minimum Percent Removal	85	85	85	85	---	---
TSS						
mg/L	30	30	45	45	---	---
lbs/day[1]	2,333	2,333	3,499	3,499	---	---
Minimum Percent Removal	85	85	85	85		
Fecal Coliform #/100 mL[3]	100	100	---	---	---	---
Total Ammonia as N: November 1 - April 30						
mg/L	5.4	6.8	---	---	16.1	17.6
lb/day	793	793	---	---	2,622	2,862
Total Ammonia as N: May 1 - October 31						
mg/L	4.2	4.2	---	---	12.0	12.0
lb/day	490	490	---	---	792	792

Table 2 Outfall 001 Effluent Limits Comparison						
Parameters	Average Monthly Limit		Average Weekly Limit		Maximum Daily Limit	
	Draft Permit (2013)	Existing Permit[2]	Draft Permit (2013)	Existing Permit[2]	Draft Permit (2013)	Existing Permit[2]
Copper, Total Recoverable						
µg/l	8.5	8.5	---	---	13.7	13.7
lb/day	0.99	0.99	---	---	1.60	1.60
Lead, Total Recoverable						
µg/l	NA	6.1	---	---	NA	10.5
lb/day	NA	0.71	---	---	NA	1.22
Mercury						
µg/l	NA	0.052	---	---	NA	0.072
lb/day	NA	0.006	---	---	NA	0.008
Zinc, Total Recoverable						
µg/l	NA	70	---	---	NA	102
lb/day	NA	8.2	---	---	NA	11.9
pH, std units[4]					6.4 – 9.0	6.4 – 9.0

1. Mass-based loadings are based on a design flow of 13.98 mgd, (or 19.5 mgd for winter ammonia loadings). See Appendix C Basis for Effluent Limits.
2. The existing permit limits were issued in 2003.
3. The draft permit requires that no more than 10% of samples over a 30-day period may exceed 200/100 mL.
4. The draft permit requires that the pH be within the specified range of 6.4 to 9.0 at all times.

In addition to the limits for specific parameters, the draft permit authorizes the discharge of only those pollutants resulting from facility processes, waste streams, and operations that have been clearly identified in the permit application process. The draft permit also requires that the discharge be free from floating solids, visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water.

VI. PRETREATMENT PROGRAM

Section 301(b) of the CWA requires that industrial users who discharge to publicly owned treatment works comply with pretreatment requirements established under section 307 of the CWA. The objectives of the pretreatment program are: 1) to prevent the introduction of pollutants to the treatment system that will interfere with the plant's operation, that could pass untreated through the system and contribute to water quality problems, or otherwise be incompatible with the treatment plant, and 2) to improve opportunities to reclaim and recycle municipal and industrial waste water and sludge.

The previous permit was modified in April 2008 to introduce a pretreatment program developed by the City in accordance with the general pretreatment regulations under 40 CFR §403. The modified permit required a local limits evaluation for pollutants of concern, the institution of a local sewer use ordinance, and the preparation of policies and procedures necessary to run the program properly. The draft permit includes language addressing ongoing pretreatment operations in the City.

The previous and draft permit require that metals analyses be conducted using the most sensitive EPA-approved methods, unless a less sensitive method is approved by EPA's Pretreatment Coordinator. This provision ensures that the City will use the most sensitive EPA-approved analytical method currently available when influent or effluent concentrations for a particular pollutant are near or below the lowest method detection limit without imposing the financial burden of using these methods when a less sensitive method will provide quantifiable data.

VII. MUNICIPAL SEWAGE SLUDGE/BIOSOLIDS MANAGEMENT

Currently, dewatered sludges are hauled to eastern Washington for land application.

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

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

VIII. MONITORING REQUIREMENTS

A. Effluent Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require that monitoring be included in permits to determine compliance with effluent limitations. Monitoring may also be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality. The City of Puyallup is responsible for conducting the monitoring and for reporting results to EPA on DMRs. Table 3 compares the proposed monitoring requirements in the draft permit to those in the 2003 permit. Monitoring frequency is based on the minimum sampling necessary to adequately monitor the facility's performance as well as the monitoring requirements in the 2003 permit.

Continuous temperature monitoring is required to better characterize temperature. The State of Washington Department of Ecology Permit Writer's Manual, December 2011, (Publication no. 92-109), page VI-55, states recommended analytic protocol for temperature is continuous. The EPA, Tribe, USFWS and NOAA concur continuous temperature monitoring is necessary.

Table 3: Outfall 001 Monitoring Requirements

Parameter	Draft Sample Frequency	2003 Sample Frequency
BOD5, mg/L, lb/day, percent removal1	5/Week	5/Week
TSS, mg/L, lb/day, percent removal1	5/Week	5/Week
Fecal Coliform Bacteria, #/100 mL	5/Week	5/Week
Total Ammonia as N, mg/L	2/Week	2/Week
Copper, Total Recoverable, ug/L	Monthly	Monthly
pH, standard units2	Continuous	Continuous
Flow, mgd	Continuous	Continuous
Temperature, °C	Continuous[5]	Daily
Chronic Whole Effluent Toxicity Testing	Annual	Annual
Hardness, mg/L CaCO3	Monthly	Monthly
Acute Whole Effluent Toxicity	Annual	Annual
Arsenic, Total	**Quarterly for 5 yrs (influent and effluent), coinciding where possible with quarterly arsenic**	**NA**

	monitoring in the receiving water (Table 4)	
Arsenic, Inorganic	**Quarterly for 5 yrs (effluent only), coinciding where possible with quarterly arsenic monitoring in the receiving water (Table 4)**	**NA**
Total Kjeldahl Nitrogen, mg/L	**Monthly**	**NA**
Nitrogen, NO2+NO3, mg/L	**Monthly**	**NA**
Total Phosphorus, mg/L	**Monthly**	**NA**

Notes:

1. The draft permit and the 2003 permit require influent and effluent monitoring to determine compliance with effluent limitations and percent removal requirements.

2. The draft permit requires the City to report the number and duration of pH excursions during the month.

3. **Monitoring requirements for new parameters (bold text).**

4. **Arsenic monitoring includes quarterly upstream ambient monitoring to help evaluate arsenic partitioning and inorganic arsenic reasonable potential (see Table 4).**

5. Continuous temperature monitoring must begin no later than six months after the effective date of the permit.

New nutrients monitoring requirements are being added in light of findings from the South Puget Sound Dissolved Oxygen Study. The need for this study became evident when, in their 2008 Water Quality Assessment, the Washington State Department of Ecology found 24 locations in South Puget Sound that were impaired due to a lack of dissolved oxygen. The South Puget Sound Dissolved Oxygen Study evaluated a number of different sources for nitrogen, as nitrogen is the main pollutant responsible for the low marine dissolved oxygen levels. The study identified the Puyallup River as a source of nitrogen loading into Puget Sound. EPA determined that the City of Puyallup should conduct monitoring of nutrient species in their effluent to better characterize their contribution of these pollutants to the Puyallup River throughout the year given that both nitrogen and phosphorus contribute to a loss of dissolved oxygen in receiving waters. Under the authority of Clean Water Act Section 308, this increased monitoring has been included in the draft permit.

B. Method Detection Limits

EPA's regulations require that Permittees monitor for compliance with effluent limits using methods promulgated by EPA at 40 CFR Part 136. For all pollutants, the draft permit requires the City to use an EPA-approved method with an MDL 0.1 times the effluent limitation or the most sensitive EPA-approved method, whichever is greater. This provision ensures that, to the extent possible, data can be used to accurately determine compliance with permit limits without imposing an undue burden on the City where a less sensitive method will give accurate data.

Mercury

An August 23, 2007, memorandum from James A. Hanlon to the Water Division Directors clarifies and explains that, in light of existing regulatory requirements for NPDES permits, only the most sensitive methods, such as Methods 1631E and 245.7, are appropriate in most instances for use in deciding whether to set a permit limitation for mercury and for sampling and analysis of mercury pursuant to the monitoring requirements within a permit. See *Analytical Methods for Mercury in National Pollutant Discharge Elimination System (NPDES) Permits*, which is available at http://www.epa.gov/npdes/pubs/mercurymemo_analyticalmethods.pdf.

The permit requires Methods 1631E or 245.7 for mercury monitoring.

C. Whole Effluent Toxicity

Federal regulations at 40 CFR 122.44(d)(1) require that permits contain limits on whole effluent toxicity when a discharge has reasonable potential to cause or contribute to an exceedance of a water quality standard. Section 5, paragraphs 1 and 2 of the Puyallup water quality standards prohibit the discharge of toxic substances in toxic amounts and require that toxicity testing be used to determine compliance with this prohibition.

Whole effluent toxicity tests are laboratory tests that replicate to the greatest extent possible the total effect and actual environmental exposure of aquatic life to effluent toxicants without requiring the identification of specific toxicants. Whole effluent toxicity tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. There are two different durations of toxicity tests: acute and chronic. Acute toxicity tests measure survival over a 48- or 96-hour exposure. Chronic toxicity tests measure reductions in survival, growth, and reproduction over a 7-day exposure.

The City of Puyallup's 2003 permit required annual acute and chronic toxicity testing. This testing showed no reasonable potential to cause or contribute to exceedances of water quality standards. The draft permit continues the annual WET testing frequency required by the previous permit.

D. Receiving Water Monitoring

Receiving water monitoring is used to evaluate if the effluent is causing or contributing to an instream excursion of the water quality criteria. The draft permit requires the Permittee to conduct ambient monitoring using test methods that achieve the same MDLs as are necessary for effluent sampling. To the extent practicable, receiving water monitoring must occur on the same day as effluent sample collection and during low river flow conditions. Upstream and downstream monitoring must also occur on the same day to enable a comparison of downstream concentrations with background concentrations. The proposed receiving water monitoring requirements for the draft permit are provided in Table 4. The monitoring frequency has been reduced for this permit cycle based on data collected in the previous permit cycle that confirmed water quality criteria are being met in the receiving water. However, for the same reasons stated for continuous temperature monitoring of the effluent, continuous temperature monitoring is required for the receiving water.

Table 4: Receiving Water Monitoring Requirements in the Puyallup River

Parameter	Units	Upstream Sampling Frequency	Downstream Sampling Frequency	Sampling Method
Total Ammonia as N	mg/L	Once/year	Once/year	Grab
Temperature	C	Continuous	Continuous	Recording[2]
pH	standard units	Once/year	Once/year	Grab
Hardness as $CaCO_3$	mg/L	Once/year	Once/year	Grab
Arsenic (total, dissolved, and inorganic)	µg/L	Quarterly[1]	Quarterly[1]	Grab
Copper	µg/L	Once/year	Once/year	Grab

Note: [1]Ambient arsenic monitoring for 5 years as part of Special Condition II. B., Arsenic Monitoring.

[2]Continuous temperature monitoring must begin no later than six months after the effective date of the permit.

E. Outfall Evaluation

In early 1998 the City modified the existing diffuser to prevent damage by gravel and rocks. The diffuser ports are now angled downstream with a "Tide Flex" valve connected with a neoprene sleeve and flange. To ensure that the new diffuser is not damaged by sediment deposition, the draft permit requires the City to conduct an annual outfall evaluation.

F. Infiltration and Inflow Evaluation

In the past, significant rainfall events have been a source of primary-treated overflows to the Puyallup River from the outfall. Infiltration and inflow to the conveyance system might include rainwater entering manholes, roof drain connections, combined stormwater and sewage piping, infiltration through leaky underground pipes, etc. The draft permit requires that the Permittee conduct a comprehensive study that includes a preliminary evaluation of the sewerage facility and a system-wide inventory/evaluation survey that identifies the causes of the untreated/primary-treated overflows and contains deadlines for correcting the problems. This report is due three years from the effective date of the permit.

G. Representative Sampling

Federal regulations require representative sampling whenever a bypass, spill, or non-routine discharge of pollutants occurs, if the discharge may reasonably be expected to cause or contribute to a violation of an effluent limit under the permit (40 CFR 122.41[j]). If such a discharge occurs, the City must conduct additional, targeted monitoring to quantify the effects of the discharge on the final effluent. This provision is included in the draft permit because routine monitoring could easily miss a permit violation or water quality standard exceedance resulting from a bypass, spill, or non-routine discharge.

IX. OTHER PERMIT CONDITIONS

A. Quality Assurance Plan

Federal regulations require Permittees to properly operate and maintain their facilities, including "adequate laboratory controls and appropriate quality assurance procedures" (40 CFR 122.41(e)). To implement this requirement, the draft permit requires that the City update the Quality Assurance Plan (QAP) required by the previous permit to reflect any substantive changes in monitoring requirements. An up-to-date QAP will help to ensure that monitoring data are accurate and to explain data anomalies if they occur. The City is required to implement the plan within 120 days of the effective date of the draft permit. The QAP must include standard operating procedures the City will follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

B. Arsenic Monitoring

Section 308(a)(3)(A) of the Clean Water Act authorizes EPA to require reports, monitoring equipment or methods, expanded sampling, or any other information that would help establish or determine compliance with effluent limits, prohibitions, effluent standards, pretreatment standards, or standards of performance under the CWA. Further monitoring is necessary in order to investigate the effluent from the City of Puyallup wastewater treatment plant with respect to the Puyallup Tribal human health standard for arsenic of 0.018 ppb. The permit includes influent, effluent and receiving water monitoring.

Figure 1, below, depicts the amount of total recoverable arsenic in the Puyallup WWTP effluent. While this amount of arsenic does not threaten aquatic life, the inorganic portion may be present in sufficient quantities to exceed the human health standard for arsenic given the consumption of both water and aquatic organisms together. Consequently, the permit requires the Permittee to conduct a limited round of inorganic arsenic monitoring to determine whether or not there should be a follow up study to determine if arsenic in the treatment plant effluent is naturally-occurring arsenic, or if it is of commercial or industrial origin.

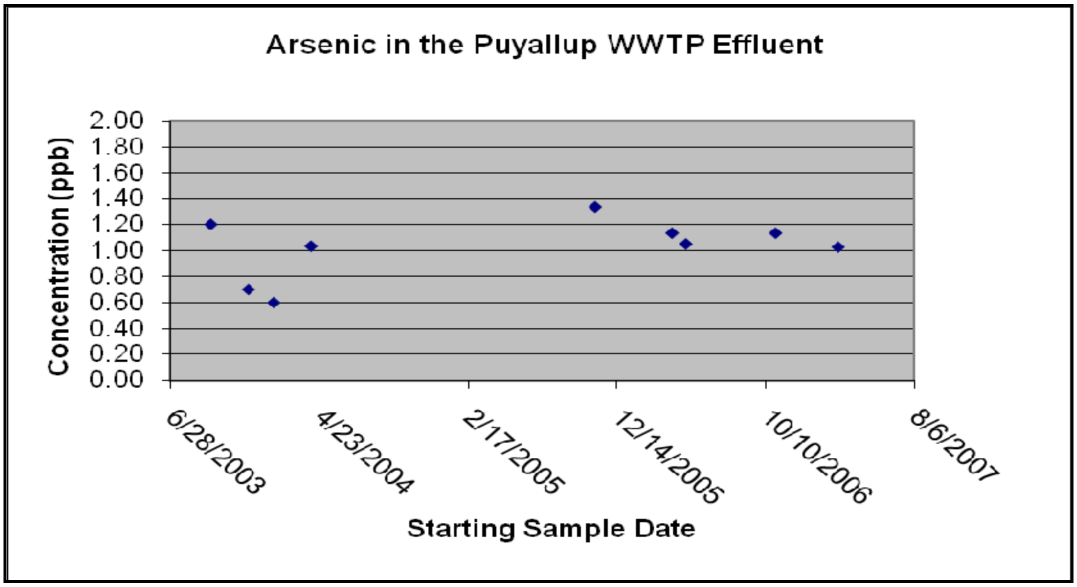


Figure 1: Total Recoverable Arsenic in Puyallup Wastewater Treatment Plant Effluent

Arsenic has been found in ambient river samples taken upstream of the Puyallup WWTP discharge. According to a 2002 Department of Ecology report titled *Results and Recommendations from Monitoring Arsenic Levels in 303(d) Listed Rivers in Washington*[2], during low flows arsenic concentrations in the Puyallup River range from approximately 0.76 to over 1.5 ug/L (ppb). Ecology argues in the report against the inclusion of the Puyallup River in a 303(d) list for arsenic due to the likelihood that the arsenic is naturally-occurring. Table 5 below contains ambient arsenic data collected for the 2002 Ecology report.

TABLE 5: Ambient Arsenic in the Puyallup River

Location	Date	Arsenic (ug/L)	Temperature (°C)	Conductivity (umhos/cm)	TSS (mg/L)
Puyallup R. above Electron	9/26/2001	0.76	7.7	62	371
Puyallup R. above Carbon River	9/26/2001	1.2	9.3	56	558

[2] Ecology publication number 02-03-045, also available online at (accessed 5/2009): http://www.ecy.wa.gov/biblio/0203045.html

Carbon River	9/26/2001	1.0	10.8	66	717
Puyallup R. above White River	9/26/2001	1.5	10.2	65	1000
White River	9/26/2001	1.3	13.0	112	92
Puyallup R. @ Meridian St.	9/26/2001	1.0	11.5	79	313

The potable water supply for the City of Puyallup is a series of groundwater wells and springs, as well as a tie-in with the City of Tacoma water supply. The City of Tacoma obtains much of their water from the Green River. Recent water quality reports from the Cities of Puyallup and Tacoma detail the amount of arsenic in the potable water supply. The reports indicate that the maximum arsenic concentration in the Puyallup system was 6 ppb, and in Tacoma the maximum concentration was 7 ppb[3]. Neither system exceeds the federal drinking water standard of 10 ppb. However, this information about the potable water supply could explain the source of arsenic in the Puyallup WWTP effluent.

As described in the permit, the Permittee must conduct quarterly arsenic monitoring. The results will be used to determine if there is reasonable potential for inorganic arsenic to exceed the human health standard.

C Electronic Submission of Discharge Monitoring Reports

The draft permit requires that the permittee submit DMR data electronically using NetDMR within six months of the effective date of the permit. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application. NetDMR allows participants to discontinue mailing in paper forms under 40 CFR 122.41 and 403.12. Under NetDMR, all reports required under the permit are submitted to EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it is no longer required to submit paper copies of DMRs or other reports to EPA or the Department of Ecology. Paper submissions to the Puyallup Tribe shall continue for the duration of the permit.

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

[3] Puyallup water supply report for 2006 (accessed 5/2009): http://www.cityofpuyallup.org/files/library/5c171d6575f6b030.pdf. Tacoma water supply report for 2007 (accessed 5/2009): http://www.mytpu.org/files/library/2007-water-quality_002.pdf.

D. Operation and Maintenance Plan

Section 402 of the CWA and federal regulations 40 CFR 122.44(k)(2) and (3) authorize EPA to require best management practices, or BMPs, in NPDES permits. BMPs are measures for controlling the generation of pollutants and their release to waterways. For municipal facilities, these measures are typically included in the facility's Operation & Maintenance (O&M) plan. These measures are important tools for waste minimization and pollution prevention.

The draft permit requires the City of Puyallup to update existing or incorporate new BMPs as appropriate into their O&M plan within 180 days of permit issuance. Specifically, the City must consider spill prevention and control, optimization of chemical use, public education aimed at controlling the introduction of household hazardous materials to the sewer system, and water conservation. To the extent that any of these issues have already been addressed, the City need only reference the appropriate document in its O&M plan. The O&M plan must be revised as new practices are developed. As part of proper operation and maintenance, the draft permit requires the City to develop a facility plan when the annual average flow exceeds 85% of the average annual design flow of the plant (9.46 mgd). This plan requires the City to develop a strategy for remaining in compliance with effluent limits in the permit.

E. Additional Permit Provisions

In addition to facility-specific requirements, Sections IV, V, and VI of the draft permit contain "boilerplate" requirements. Boilerplate is standard regulatory language that applies to all Permittees and must be included in NPDES permits. Because the boilerplate requirements are based on regulations, they cannot be challenged in the context of an NPDES permit action. The boilerplate covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and general requirements.

X. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

Section 7 of 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) to insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. In order to begin the consultation process the EPA requested lists of threatened and endangered species that may be present in the project area in phone conversations with the NMFS and USFWS (hereafter referred to as the Services). In a phone call on March 26, 2009, Andrea LaTier with the USFWS identified bull trout (*Salvelinus confluentus*) as threatened and indicated that the bald eagle (*Haliaeetus leucocephalus*) had been delisted since preparation of the previous biological evaluation (BE). In a phone call on March 31, 2009, Dan Guy with NMFS identified Chinook salmon (*Oncorhynchus tshawytscha*) and Puget Sound steelhead trout (*O. mykiss*) as threatened species that would need to be considered in future BE's for this discharge.

The EPA submitted a BE to the Services for the bull trout, Chinook salmon, and steelhead along with a request for informal consultation on February 17, 2011. The EPA determined that issuance of the NPDES permit was not likely to adversely affect the bull trout, Chinook salmon, or steelhead trout. Subsequent to this determination the EPA received letters of nonoccurrence from NMFS and USFWS on May 4, 2011and May 13, 2011, respectively. The Services requested additional information including an analysis of unregulated pharmaceuticals, PBDE's, and other compounds including an analysis of effects on an additional species, the Southern Resident Killer Whale (*Orcinus orca*). After further consultation with the Services and discussions with the Puyallup Tribe of Indians, the EPA prepared a revised BE and requested formal consultation with the Services on March 30, 2012.

USFWS BO

A biological opinion (BO) from the USFWS dated May 17, 2013 concluded that the issuance of the NPDES permit would result in incidental take in the form of harassment of adult and subadult bull trout from the Puyallup River core area. The Service concluded that take would result from the discharge of treated and disinfected water causing degraded surface water quality. The BO stated the continuous source of ammonia and dissolved metals create a plume within which bull trout are exposed to elevated temperature, unionized ammonia, dissolved zinc and dissolved copper. These degraded water quality conditions are a source of metabolic stress for exposed bull trout and are reasonably certain to significantly disrupt normal bull trout behaviors (i.e. the ability to successfully feed, move, and shelter). The USFWS BO also stated that temperature is the most important abiotic factor influencing metabolic rate in fish. The BO also concluded that the level of anticipated take is not likely to result in jeopardy to bull trout.

The following reasonable and prudent measures (RPMs) were stipulated for the City of Puyallup in the BO as necessary and appropriate to minimize the impact of incidental take to bull trout:

a) The City of Puyallup must provide an annual report to the Service by February 15 each year of the permit term (2012-2017). The annual report shall compile and summarize data and information from Discharge Monitoring Reports submitted by the City of Puyallup, and shall include the following:

    (i) A summary of maximum reported effluent discharge concentrations.

    (ii) A summary of any reported effluent limit violations.

    (iii) A summary of any reported emergency and/or non-compliance events, including any instances when the WWTP discharged under bypass or upset conditions.

    (iv) A summary of surface/receiving water monitoring data.

    (v) Results of annual Whole Effluent Toxicity testing.

    (vi) A summary of any significant revisions to the facility operation and maintenance (O&M) plan.

b) The City of Puyallup shall submit annual reports to the Washington Fish and Wildlife Office in Lacey, Washington (Attn: Federal Activities Branch, Division of Consultation and Conservation Planning).

c) In substitute for any part of the annual report, the City of Puyallup may instead choose to send an electronic (e-mail) notification directing our office to specific, relevant information which is available on-line (e.g., the EPA's Envirofacts web-site). Email notification shall be given once annually, on or around February 15 each year of the permit term (2012-2017), to the Federal Activities Branch, Division of Consultation and Conservation Planning. Please identify Reference No. 13410-2011-F-0148.

These RPMs are included in the permit.

NMFS BO

A BO from the NMFS dated December 14, 2012 determined that the effects of the proposed permit reissuance will harm ESA-listed fish by causing decreased fitness and disorientation, leading to increased predation risk. Therefore, incidental take (in the form of harm) of Puget Sound Chinook salmon and Puget Sound steelhead is reasonably certain to occur.

NMFS also anticipates that the effects of the proposed permit will harm some ESA-listed fish due to sublethal effects as a result of exposure to low concentrations of contaminants and elevated temperatures. However, the BO also concluded that the proposed action is not likely to jeopardize the continued existence of Puget Sound Chinook salmon and Puget Sound Steelhead, or destroy or adversely modify designated critical habitat for Puget Sound Chinook salmon. Finally, the NMFS BO concluded the reissuance of the permit may affect, but not likely adversely affect the Southern Resident Killer Whale, the Humpback Whale (*Megaptera novaeangliae)* and Steller sea lions (*Eumetopias jubatus*).

The BO stated water temperature is a key factor influencing salmon survival.

In a meeting between the Puyallup tribe, the USFWS, NMFS and the EPA it was agreed discharges must be characterized for temperature by continuous monitoring and a temperature monitoring plan. The permit requires continuous monitoring of temperature in both the effluent and upstream of the discharge in the Puyallup River and a temperature monitoring plan.

A second RPM is to require the City to provide NMFS with annual monitoring reports of regulated discharge constituent concentrations at the outfall and rapidly inform NMFS of any exceedances of permit limits. The permit requires the same reporting requirement to NMFS as it does to the USFWS as stated above.

B. The Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) (MSA) requires the EPA to consult with NOAA National Marine Fisheries Service when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) Essential Fish Habitat. Essential fish habitat (EFH) includes the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed or grow to maturity. The EFH regulations define an adverse effect as any impact which reduces quality 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.

Based on information provided in the BE and the analysis of effects presented in the ESA portion of the BO, the NMFS BO concluded that the proposed action will result in long-term degradation of EFH. NMFS concluded, "Effects from elevated temperature and contaminants would occur in the Puyallup River, affecting water column EFH for the life of the structure. Decreased water quality would be found in the mixing zone, covering an area approximately 400 feet in length and 50 feet in width throughout the water column, or roughly 0.5 acres, reducing rearing, foraging, and spawning success of pink, Chinook, and Coho salmon".

Section 305(b) of the MSA requires NMFS to recommend measures that may be taken by the action agency to conserve EFH.

C. Certification

Section 401 of the CWA requires EPA to seek certification from the Tribe that the permit is adequate to meet Tribal water quality standards before issuing a final permit. The regulations allow for the Tribe to stipulate more stringent conditions in the permit, if the certification cites the CWA or Tribal law provisions upon which that condition is based. In addition, the regulations (40 CFR 124.53(e)(3)) require a certification to include statements of the extent to which each condition of the permit can be made less stringent without violating the requirements of Tribal law. Part of the Tribe's certification is authorization of a mixing zone. The draft permit contains a mixing zone based on the provisions in the Puyallup Water Quality Standards. If the Tribe authorizes a different mixing zone in its final certification, EPA will recalculate the effluent limitations based on the dilution available in the final mixing zone. If the Tribe does not certify the mixing zone, EPA will recalculate the permit limitations based on meeting water quality standards at the point of discharge. The Tribe stipulated conditions of the draft permit and fact sheet as part of the pre-certification. A copy of the Tribe's pre-certification is provided in Appendix F.

D. Permit Expiration

This permit will expire **five years from the effective date**.

REFERENCES

City of Puyallup, 1995. *Final Effluent Ammonia, Copper and Mercury Evaluation.* May 1995.

EPA 1991. *Technical Support Document for Water Quality-based Toxics Control* Office of Water Enforcement and Permits, Office of Water Regulations and Standards. Washington, D.C., March 1991. EPA/505/2-90-001.

Gray and Osborne, 1996. *City of Puyallup Wastewater Facility Plan.* June 1996.

Washington State Department of Ecology, 1993. *Puyallup River Total Maximum Daily Load for Biochemical Oxygen Demand, Ammonia, and Residual Chlorine.* June 1993.

Washington State Department of Ecology, 1994*. Addendum to the 1993 Puyallup River TMDL Report.* July 1994.

EPA 1999. *Update of Ambient Water Quality Criteria for Ammonia.* Office of Water. Washington, D.C., December 1999. EPA-822-R-99-014.

US Department of Interior, Fish and Wildlife Service, *Biological Opinion, City of Puyallup Wastewater Treatment Plant, NPDES Permit Reissuance*. May 17, 2013. Reference: 13410-2011-F-0148,

US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, *Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation City of Puyallup Wastewater National Pollution Discharge Elimination System Re-issuance. Pierce County, Washington State.* December 14, 2012, NMFS Consultation Number: 2012/01103

APPENDIX A – CITY OF PUYALLUP FACILITY LOCATION

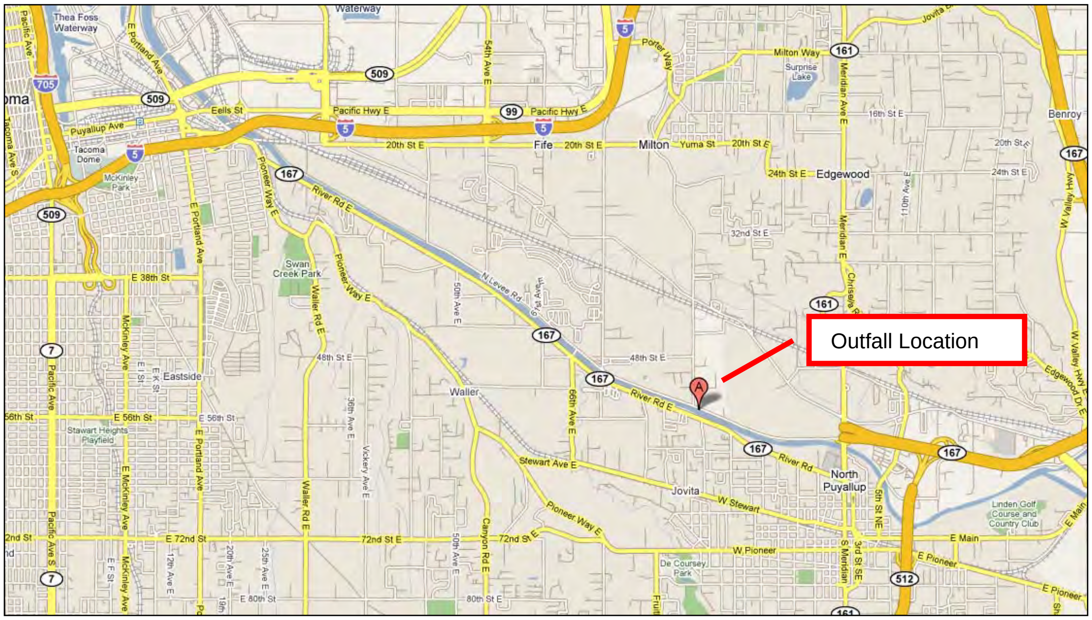


Figure A-1: Puyallup Wastewater Treatment Facility Outfall Location

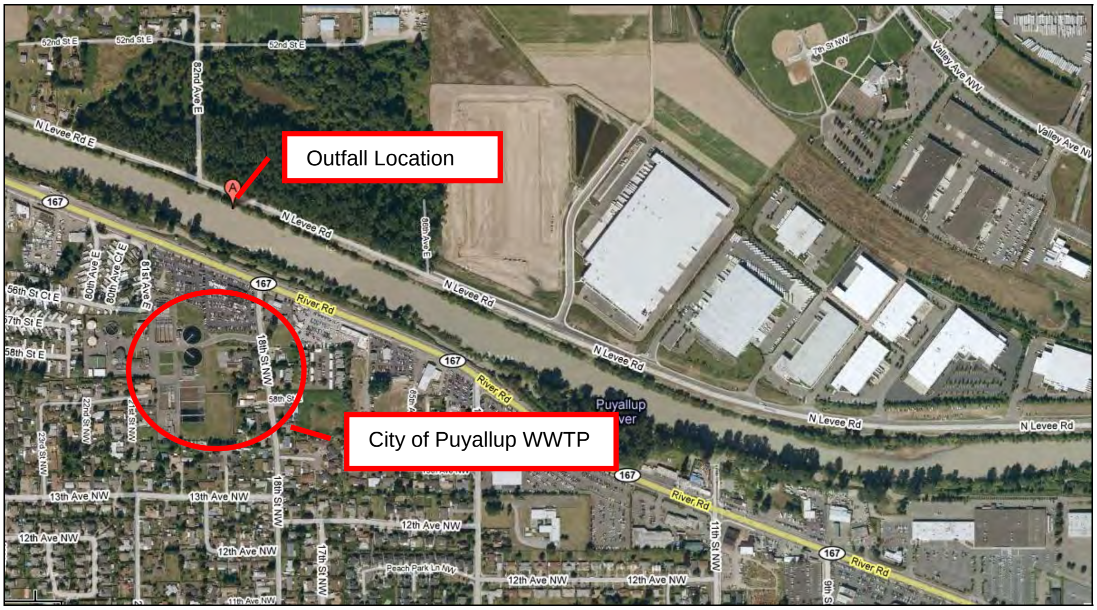


Figure A-2: Puyallup Wastewater Treatment Facility Aerial Photo

The Puyallup Wastewater Treatment Plant (WWTP) discharges to the Puyallup River (latitude 47^{O} 12' 26" N, longitude 122^{O} 19' 11" W) located within the 1873 survey area of the Puyallup Reservation. The discharge point is marked on Figures A-1 and A-2 above.

APPENDIX B – CITY OF PUYALLUP WASTE STREAMS AND TREATMENT PROCESSES

Effluent Characterization

In determining the pollutants present in the discharge and their maximum concentrations, EPA considered the City's NPDES application, discharge monitoring reports, and priority pollutant scans (collected as part of the City's pretreatment requirements). Table B-1 lists the maximum concentration of pollutants reported by the City as being detected in its discharge. The toxic and conventional pollutant categories are defined in the regulations (40 CFR 401.15 and 401.16, respectively). The category of nonconventional pollutants includes all pollutants not included in either of the other categories.

Table B-1: Pollutants Detected in Discharge (2003 to 2011)

Pollutant Type	Parameter	Maximum Reported Concentration
Conventional[1]	BOD5, monthly average	8.97 mg/L
	TSS, monthly average	12.41 mg/L
	pH, min - max	6.3 - 7.6 s.u.
	Fecal Coliform Bacteria, monthly average	57 /100 mL
Toxic[2,3]	Arsenic, daily maximum	1.38 ug/L
	Cadmium, daily maximum	0.18 ug/L
	Chromium, daily maximum	2.70 ug/L
	Copper[1], daily maximum	20.9 ug/L
	Endosulfan II, daily maximum	0.05 ug/L
	Lead[1], daily maximum	1.00 ug/L
	Mercury[1], daily maximum	0.02 ug/L
	Nickel, daily maximum	3.00 ug/L
	Selenium, daily maximum	1.10 ug/L
	Silver, daily maximum	0.30 ug/L
	Toluene-d8, daily maximum	97 ug/L

	Zinc[1], daily maximum	72.04 ug/L
Non-conventional[1]	Ammonia, daily maximum Ammonia, max unionized	9.25 mg/L 93 ug/L
	Temperature	23.60 ^{o}C (summer) 18.40 ^{o}C (winter)
Notes: 1. Values determined from monthly discharge monitoring reports submitted to EPA (2003-2011). 2. Values determined from Permittee electronic submittal following initial paper permit application. 3. Metals concentrations are reported as total recoverable metals. 4. Maximum concentrations do not include statistical outliers. 5. Unionized ammonia estimated at less than 1% of total ammonia.		

Treatment Processes

Preliminary treatment:

- Solids removal (fine screen)
- Dewatering and landfilling removed solids

Primary treatment:

- Primary Clarification
- Sludge / grit centrifugal separation
- Grit disposal to landfill

Secondary treatment:

- Activated Sludge
- Secondary Clarification
- UV Disinfection

Final Discharge:

- Design Flow (Maximum Month) - 13.98 mgd
- Max Monthly Average Flow - 8.81 mgd (DMR data 2003-2010)
- Average Annual Flow - 4.06 mgd (DMR data 2003-2010)

Biosolids (sludge) handling:

- Anaerobic digestion
- Belt filter press
- Hauling by private contractor for land application

APPENDIX C – BASIS FOR EFFLUENT LIMITATIONS

I. Statutory and Regulatory Basis for Limits

Sections 101, 301(b), 304, 308, 401, 402, and 405 of the Clean Water Act (CWA) provide the basis for the effluent limitations and other conditions in the draft permit. The EPA evaluates discharges with respect to these sections of the CWA and the relevant NPDES regulations to determine which conditions to include in the draft permit.

In general, the EPA first determines which technology-based limits must be incorporated into the permit. EPA then evaluates the effluent quality expected to result from these controls, to see if it could result in any exceedences of the water quality standards in the receiving water. If exceedences could occur, EPA must include water quality-based limits in the permit. The draft permit limits reflect whichever requirements (technology-based or water quality-based) are more stringent. A table of the limits that EPA is proposing in the draft permit is found in section V of this fact sheet. This Appendix describes the technology-based and water quality-based evaluations for the City of Puyallup WWTP.

II. Technology-based Evaluation

The 1972 CWA required publicly owned treatment works (POTWs) to meet performance-based requirements based on available wastewater treatment technology. Under Section 301(b)(1)(B) of the CWA, EPA was required to develop a performance level referred to as “secondary treatment” for POTWs.

Based on this statutory requirement, EPA developed secondary treatment regulations which are specified in 40 CFR Part 133.102. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of five-day biochemical oxygen demand (BOD5), total suspended solids (TSS), and pH. Section IV of this Appendix discusses the details of the evaluation for each of these pollutants.

III. Water Quality-based Evaluation

In addition to the technology-based limits discussed above, EPA evaluated the discharge to determine compliance with Section 301(b)(1)(C) of the CWA. This section requires the establishment of limitations in permits necessary to meet water quality standards by July 1, 1977.

The regulations at 40 CFR 122.44(d)(1) implement section 301(b)(1)(C) of the CWA. These regulations require that NPDES 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 water quality standard, including State narrative criteria for water quality.” These regulations also apply to Tribal water quality standards. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation (WLA).

In determining whether water quality-based limits are needed and developing those limits when necessary, EPA uses the approach outlined below:

a. Determine the appropriate water quality criteria

b. Determine whether there is “reasonable potential” to exceed the criteria

c. If there is “reasonable potential”, develop a WLA

d. Develop effluent limitations based on the WLA

Appendix D provides example calculations to illustrate how these steps are implemented.

A. Determine Water Quality Criteria

The first step in developing water quality-based limits is to determine the applicable water quality criteria. The applicable criteria are determined based on the beneficial uses of the receiving water as identified in section III of the Fact Sheet. For any given pollutant, different uses may have different criteria. To protect all beneficial uses, the permit limits are based on the most stringent of the water quality criteria applicable to those uses.

B. Reasonable Potential Evaluation

To determine if there is “reasonable potential” to cause or contribute to an exceedence of the water quality criteria for a given pollutant, EPA compares applicable water quality criteria to the maximum projected downstream concentrations for a particular pollutant, Cd. If the projected downstream concentration exceeds the criteria, there is “reasonable potential” and a water quality-based effluent limit must be included in the permit.

EPA used the recommendations in Chapter 3 of the *Technical Support*

Document for Water Quality-based Toxics Control (TSD) to conduct this “reasonable potential” analysis for the City of Puyallup WWTP.

The maximum projected downstream concentration, Cd, is determined using the following mass balance equation.

$$\mathbf{Cd = \frac{(Ce \times Qe) + (Cu \times Qu)}{Qd}}$$

where,

Cd = receiving water concentration downstream of the effluent discharge (at the edge of the mixing zone)

Ce = maximum projected effluent concentration

Qe = design flow

Cu = upstream concentration of pollutant

Qu = upstream flow

Qd = receiving water flow downstream of the effluent discharge = Qe + Qu

Substituting the equality:

$$D = (Qu + Qe) / Qe$$

where,

D = dilution factor

the equation becomes:

$$\mathbf{Cd = ((Ce - Cu) / D) + Cu}$$

For most of the metals of concern, the aquatic life water quality criteria are expressed as dissolved. Effluent concentrations are expressed as total recoverable metals. The dissolved metal is the concentration of an analyte that will pass through a 0.45 micron filter. Total metal is the concentration of an analyte in an unfiltered sample. To account for the differences between total effluent concentrations and dissolved criteria, "translators" are used in the reasonable potential (and permit limit derivation) equations. Additional discussion on the translators is provided in Section IV of this appendix. Pollutant Specific Analysis of this appendix. In order to compare metals with criteria expressed as dissolved, the downstream concentration must be converted to the dissolved fraction via the translator.

Cd (dissolved) = Cd (total) * translator

Paragraphs 1 through 3 below discuss each of the factors used in the mass balance equation to calculate Cd.

1. Effluent Concentration

The maximum projected effluent concentration (Ce) in the mass balance equation is based on the 99th percentile, calculated using the statistical approach recommended in the TSD. The calculation incorporates a "reasonable potential multiplier" which accounts for uncertainty in the data. The multiplier decreases as the number of data points increases and variability of the data decreases. Variability is measured by the coefficient of variation (CV) of the data. When there are not enough data to reliably determine a CV, the TSD recommends using 0.6 as a default value. A partial listing of reasonable potential multipliers can be found in Table 3-1 of the TSD.

Maximum reported effluent concentrations, CVs, and RPMs used in the reasonable potential calculations were based on data collected by the City (DMR data and other monitoring) since August 2003.

2. Upstream (Ambient) Concentration

The ambient concentration in the mass balance equation is based on a reasonable worst-case estimate of the pollutant concentration upstream from the City of Puyallup's discharge. For criteria that are expressed as maxima (for example, copper, ammonia), Ecology guidance (Publication Number 92-109) allows for the use of the 90th percentile of critical period ambient data as a conservative estimate. For criteria that are expressed as minima (for example, dissolved oxygen) the 10^{th} percentile can be used. These percentiles were calculated based on data obtained from Ecology's River and Stream Water Quality Monitoring Program (Station 10A070). Because of changes to collection and analytical methods, metals data collected prior to May 1994 were not included in the evaluation.

3. Dilution

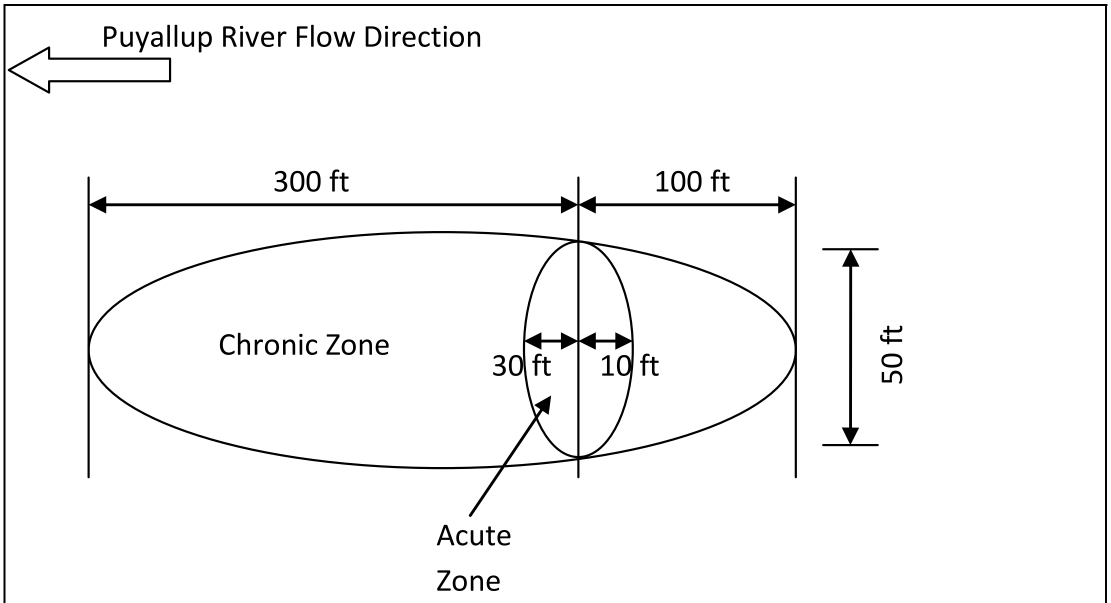
Under the Tribe's water quality standards, dischargers are not authorized to use the entire upstream flow for dilution of their effluent. Instead, the standards contain the following restrictions on mixing zones for determining compliance with chronic criteria:

The size may be up to 300 feet plus the depth of water over the discharge ports, 100 feet upstream, and 25 percent of the width of the river at the 7Q10[4] flow;

The mixing zone may not be more than 25 percent of the volume of the 7Q10 flow.

The Tribe's water quality standards require that the acute mixing zone be the same width and 10 percent of the length of the chronic mixing zone. In addition, the acute mixing zone is limited to 10 percent of the volume of the chronic mixing zone, or 2.5 percent of the 7Q10 flow.

The Puyallup mixing zone is depicted below with the maximum dimensions allowed by applicable water quality standards. The horizontal length of the diffuser according to the 2007 Outfall Inspection Report is 50 feet. The river is about 207 ft wide during low flows according to a 1995 Cosmopolitan Engineering dilution memo (25% of 207 ft is about 52 ft for the upper bound of the mixing zone width).



NOTES:
Drawing not to scale.
The river is approximately 207 ft wide during low flows (1995 Cosmopolitan Engineering Memo).
The existing diffuser is approximately 50 ft in length (2007 Outfall Inspection Report).

Figure C-1: Mixing Zone

The 1996 Facility Plan for the treatment plant (Gray and Osborne, 1996) provided the dilution factors under these conditions. These factors, which were used in calculating the water-quality based effluent limits, are summarized in Table C-1.

[4] The 7Q10 (7-day, 10-year low flow) is the 7-day average low flow that has a 10 percent chance of occurring in any given year. The 7Q10 was calculated based on the Log Pearson Type III distribution using United States Geological Survey (USGS) data. According to the 1996 Facility Plan, the 7Q10 flow for the Puyallup River is 757 cubic feet per second (cfs).

Table C-1: Dilution Factors at Critical Mixing Conditions				
Mixing Zone	**Dilution Factor**	**River flow Conditions**	**Percent of River Flow Available for Effluent Mixing**	**Effluent Flow (mgd)[1]**
Acute aquatic life	1.9	7Q10 (757 cfs)	2.5%	14.1
Chronic aquatic life	13.6	7Q10 (757 cfs)	25%	9.7
Notes: 1. This effluent flow estimate does not include the former Microchip flow allocation due to their cessation of operations, the expiration of their permit, and the complete closure of the associated permit file at the request of the new facility owners. The acute effluent flow for Puyallup was determined by subtracting 1.88 mgd from 16 mgd (the effluent flow assumption used in the previous dilution model per the facility plan). Similarly, the chronic flow was obtained by subtracting 1.88 mgd from 11.6 mgd.				

In accordance with the Puyallup Tribe's water quality standards, only the Tribe may authorize mixing zones. In its pre-certification, the Tribe authorized a mixing zone for metals (copper), pH, and ammonia. The mixing zone was contingent on monitoring of the receiving water that demonstrated attainment of water quality criteria for these parameters. The Tribe has agreed to a reduction of the receiving water monitoring frequency, now calling for ambient monitoring once per permit cycle. If the Tribe authorizes a different sized mixing zone in its final 401 certification, EPA will recalculate the reasonable potential and effluent limits based on the revised mixing zone. If the Tribe does not authorize a mixing zone in its 401 certification, EPA will recalculate the limits based on meeting water quality criteria at the point of discharge. After Cd is determined, it is compared to the applicable water quality criterion. If it is greater than the criterion, there is "reasonable potential" and a water quality-based effluent limit is developed for that parameter. Table D-1 summarizes the "reasonable potential" calculations for the Puyallup WWTP discharge. When all effluent data for a particular pollutant were below the detection limit (e.g. toluene), EPA assumed that there was no reasonable potential.

C. Wasteload Allocation Development

Once EPA has determined that a water quality-based limit is required for a pollutant, the first step in developing a permit limit is development of a wasteload allocation (WLA) for the pollutant. A WLA is the concentration (or loading) of a pollutant that the Permittee may discharge without causing or contributing to an exceedence of water quality standards in the receiving water. WLAs for this permit were determined in three ways: based on a mixing zone for parameters such as pH and copper; based on a WLA established as part of a preventative TMDL such as for ammonia; and based on meeting water quality criteria at "end-of-pipe" for fecal coliform.

1. Mixing zone-based WLA

Where the Tribe authorizes a mixing zone for the discharge, the WLA is calculated as a mass balance, based on the available dilution, background concentrations of the pollutant(s), and the water quality criteria. The mass balance equation is the same as that used to calculate reasonable potential, with the acute or chronic criterion substituted for Cd and the WLA substituted for Ce.

Because acute aquatic life, chronic aquatic life, and human health criteria apply over different time frames and may have different mixing zones, it is not possible to compare them directly to determine which criterion results in more stringent limits. For example, the acute criteria are applied as a one-hour average and have a smaller mixing zone, while the chronic criteria are applied as a four-day average and have a larger mixing zone.

To allow for comparison, the acute, chronic, and human health WLAs are statistically converted to long-term average WLAs. The most stringent long-term average WLA resulting from these conversions is used to calculate the permit limits.

2. TMDL-based WLA

Where the receiving water quality does not meet water quality standards, the WLA is generally based on a TMDL developed by the state or EPA. A TMDL is a determination of the amount of a pollutant, from point, nonpoint, and natural background sources, including a margin of safety that may be discharged to a water body without causing the water body to exceed the criterion for that pollutant. Any loading above this capacity would violate water quality standards. Section 303(d) of the CWA requires states to develop TMDLs for waterbodies that will not meet water quality standards after the imposition of technology-based effluent limitations, to ensure that these waters will come into compliance with water quality standards.

The first step in establishing a TMDL is to determine the assimilative capacity (the loading of pollutant that a water body can assimilate without exceeding water quality standards), accounting for seasonal variation, if appropriate. The next step is to divide the assimilative capacity into allocations for non-point sources (called load allocations), point sources (called WLAs), natural background loadings, and a margin of safety to account for any uncertainties. Permit limitations are then developed for point sources that are consistent with the WLAs.

Ecology established a seasonal preventative TMDL for ammonia and BOD5 for the Puyallup River basin and tributaries effective May 1 through October 31 (Ecology, 1993 and 1994). The terms of this preventative TMDL were used in establishing limits for BOD5 and ammonia in the draft permit (see Sections IV.A and IV.D of Appendix C).

3. “End-of-Pipe” WLA

In some cases, there is no dilution available. For example, the Tribe may decide not to authorize a mixing zone for a particular pollutant, or the receiving water may exceed the criterion for a particular pollutant, leaving no “clean” upstream water available for dilution. When there is no dilution, the criterion becomes the WLA.

D. Permit Limit Derivation

Once the WLA has been developed, EPA applies the statistical permit limit derivation approach described in Chapter 5 of the TSD to obtain daily maximum and monthly average permit limits. This approach takes into account effluent variability (through the CV), sampling frequency, and the difference in time frames between the monthly average and daily maximum limits.

The daily maximum limit is based on the CV of the data and the probability basis, while the monthly average limit is dependent on these two variables and the monitoring frequency. As recommended in the TSD, EPA used a probability basis of 95 percent for monthly average limit calculation and 99 percent for the daily maximum limit calculation. As with the reasonable potential calculation, when there were not enough data to calculate a CV, EPA assumed a CV of 0.6 for both monthly average and daily maximum calculations. Where limits were necessary for specific pollutants, the CVs in Table D-1 were used. Appendix D provides an example permit limit calculation.

E. Antidegradation

In addition to water quality-based limitations for pollutants that could cause or contribute to exceedences of numeric or narrative criteria, EPA must consider the Tribe's antidegradation policy. This policy is designed to protect existing water quality when the existing quality is better than that required to meet the standard and to prevent water quality from being degraded below the standard when existing quality just meets the standard.

For waters that are at the level of the standard (known as "Tier 1" waters), the antidegradation policy requires that water quality standards continue to be met. For waters with better quality than the standards (known as "high quality" or "Tier 2" waters), antidegradation requires that no lowering of water quality be allowed unless the Tribe finds that allowing lower water quality is necessary to accommodate important economic or social development before any lowering of water quality is authorized. The Tribe may also designate waters as "Tier 3," in which case no lowering of water quality is allowed. The Tribe has no implementation guidance for their antidegradation policy. Therefore, the Puyallup River in the vicinity of the City's discharge has not been assigned to any tier. However, the limits in the permit ensure that uses are protected and water quality standards are met.

IV. Pollutant-specific Analysis

This section outlines the basis for each of the effluent limitations in the City of Puyallup's draft permit.

A. Biochemical Oxygen Demand

The federal regulations at 40 CFR 133.102(a)(1)-(3) specify technology-based requirements for BOD5 for POTWs. These requirements are based on the effluent quality attainable by secondary treatment and are equal to the following:

Monthly Average Concentration: 30 mg/L

Weekly Average Concentration: 45 mg/L

Monthly Average Percent Removal: 85% Minimum

The technology-based concentration and percent removal limits have been incorporated into the draft permit for BOD5.

Under 40 CFR 122.45(f), permits must contain mass-based limitations. The concentration requirements may be converted to mass limits by multiplying the technology-based concentrations times the design flow (13.98 mgd) and a conversion factor of 8.34. The resulting monthly and weekly average loadings are 3,498 lbs/day and 5,247 lbs/day respectively. These loading limits are less stringent than water quality-based BOD5 loading limits. Therefore, loading limits in the draft permit are water quality-based.

Ecology developed a preventative TMDL for BOD5 and ammonia throughout the Puyallup River basin and tributaries effective May 1 through October 31 (Ecology, 1993 and 1994). The TMDL also provides an option for dischargers to reduce the WLA for ammonia in order to increase the WLA for BOD5, since both parameters together influence dissolved oxygen. For each pound of ammonia reduction, the WLA for BOD5 may increase by 13.4 lb/day. The net effect of this exchange in the allocation is considered negligible.

The BOD5 TMDL WLA is applied only during the critical season (May - October).

The recommended Waste Load Allocations (WLAs) for BOD5 and ammonia from May -

October given in the preventative TMDL for the Puyallup WWTP are:

BOD5: 2,085 lbs/day maximum weekly average

Ammonia: 880 lbs/day maximum daily load

In their comments on the previous draft permit, the City of Puyallup requested the following BOD5 loading limits:

Average monthly = 2,179 lbs/day

Average weekly = 3,268 lbs/day

The requested increase in the BOD5 average weekly WLA is equal to 1,183 lbs/day, i.e.: 3,268 - 2,085 = 1,183 lbs/day. With the increase in the average weekly BOD5 loading limit, the average monthly BOD5 loading limit increases to 2,179 lbs/day, based on an average weekly:average monthly factor of 1.5 (i.e. 3,268 ÷ 1.5 = 2,179 lbs/day.) The revised average monthly BOD5 loading limit corresponds to 85% removal of the BOD5 loading design criteria for the treatment plant (of 14,525 lbs/day), i.e. 14,525 x 0.15 = 2,179 lbs/day. The basis for the requested trade may be seen in the influent BOD5 loading criterion for the treatment plant, which is 14,525 lbs/day. Assuming 85% removal, the average monthly mass-based effluent limit for BOD5 is 2,179 lbs/day (i.e. 14,525 x 0.15 = 2,179 lbs/day). Assuming an average weekly:average monthly ratio of 1.5, the resulting average weekly mass-based effluent limit is 3,268 lbs/day. These limits are more stringent than mass-based limits calculated from the effluent concentration limits and the facility design flow (of 13.98 MGD).

Table C-2 outlines the BOD5 limits in the draft permit. The draft limits are the same as the limits in the previous permit.

Table C-2: BOD5 Draft Limits

	Concentration (mg/L)	Loading (lb/day)	Minimum Percent Removal (%)
Average Monthly	30	2,179	85
Average Weekly	45	3,268	--

B. Total Suspended Solids

The federal regulations at 40 CFR 133.102(a)(1)-(3) specify technology-based requirements for TSS for POTWs. These requirements are based on the effluent quality attainable by secondary treatment and are equal to the following:

Monthly Average Concentration: 30 mg/L

Weekly Average Concentration: 45 mg/L

Monthly Average Percent Removal: 85% Minimum

These technology-based concentration and percent removal limits have been incorporated into the TSS draft permit limits.

The concentration requirements may be converted to mass limits by multiplying the concentrations times the design flow (13.98 mgd) and a conversion factor of 8.34. The resulting monthly and weekly average loadings are 3,498 lbs/day and 5,247 lbs/day respectively. However, the previous permit established the TSS mass-based limits on 85% removal of the TSS design load. The TSS design loading of the upgraded treatment plant is 15,550 lbs/day. Assuming 85 percent removal of the influent TSS, and applying a 1.5 factor to convert from the maximum monthly loading to the maximum weekly loading, results in the following TSS mass-based limits:

Maximum Monthly Average 2,333 lbs/day

Maximum Weekly Average 3,499 lbs/day

These limits have been incorporated into the draft permit. Table C-3 outlines the TSS limits in the draft permit.

Table C-3: TSS Draft Limits

	Concentration (mg/L)	**Loading (lb/day)**	**Minimum Percent Removal (%)**
Average Monthly	30	2,333	85
Average Weekly	45	3,499	--

C. Fecal Coliform Bacteria

The Puyallup Tribe's water quality standards state that the geometric mean of fecal coliform bacteria may not exceed 100 colonies/100 ml and no more than 10 percent of the samples used to calculate the mean may exceed 200 colonies/100 ml. Fecal coliform counts in the Puyallup River upstream of the City's discharge sometimes exceed these criteria. When the upstream water quality exceeds the criteria, there is no "clean" water to mix with the discharge to enable the water to meet the criterion downstream. As a result, the discharge must meet the criteria at the point of discharge. The criteria have been incorporated directly into the draft permit as a monthly average limit and a requirement that no more than 10 percent of samples exceed 200/100 ml.

D. Ammonia

Low concentrations of ammonia can be toxic to freshwater fish, particularly salmonids. Un-ionized ammonia (NH3) is the principal toxic form of ammonia.

The ammonium ion (NH4+) is much less toxic. The relative percentages of these two forms of ammonia in the water vary as the temperature and pH vary. As the pH and temperature increase, the percentage of ammonia that is in the un-ionized form increases, causing increased toxicity. Because the toxicity of ammonia is dependent upon pH and temperature, the criteria are also pH and temperature dependent (EPA, 1999). In keeping with the previous permit, seasonal criteria and concentration limits were developed for ammonia. The receiving water pH and temperature and corresponding ammonia criteria are presented in Table C-4. Data for the Puyallup River were from Ecology's River and Stream Water Quality Monitoring Program (Station 10A070) and data collected as part of the TMDL report (Ecology, 1993). Reasonable worst-case pH and temperature conditions were calculated from the 90th percentile of samples obtained from 1990 through 2007. Although earlier data exist for the monitoring location (from 1960 to 1981), previous analysis of the data indicated that the pH conditions of the river have changed. Therefore, to represent the existing river conditions to which the treatment plant discharges, only the more recent years of data were used.

Table C-4: Unionized Ammonia Criteria

Time Period	Receiving Water Conditions[1]		Acute Criteria (mg/L)	Chronic Criteria (mg/L)
	pH	Temperature (°C)		
November 1 – April 30	7.67	9.0	0.085	0.019
May 1 – October 31	7.70	15.9	0.140	0.031

Note:
1. Based on the 90th percentile of the receiving water data collected from 1990 to 2007. Criteria were determined using the Puyallup Tribe's water quality standards.

Although it is the un-ionized form that is toxic, the criteria are expressed as total ammonia. As effluent mixes with receiving water, the temperature and pH change, making it difficult to predict how much of the total ammonia in the discharge will convert to the un-ionized form. Therefore, the limits in the draft permit are expressed as total ammonia, not un-ionized ammonia. Using the statistical permit derivation method in the TSD, EPA calculated seasonal daily maximum and monthly average concentration limits. Mass-based loadings corresponding to these limits were calculated based on the design flow of 13.98 mgd.

In addition to potential toxicity, ammonia can contribute to dissolved oxygen depression. Ecology developed a preventative TMDL for ammonia and BOD5 to address dissolved oxygen concerns in the Puyallup River. The preventative TMDL established a WLA for ammonia for the City's WWTP (880 lb/day) and allowed conversion of ammonia loading into BOD5. Recall that the requested increase in the BOD5 average weekly WLA was equal to 1,183 lbs/day, and that for each pound of ammonia reduction the WLA for BOD5 was allowed to increase by 13.4 lb/day. Based on the conditions of the preventative TMDL then, the ammonia maximum daily WLA decreases to 792 lbs/day, i.e.: 880 - (1,183 ÷ 13.4) = 792 lbs/day. This decreased loading was set as the effluent limit for ammonia from May 1 through October 31. This limitation was also used in the previous permit. Table C-5 summarizes the ammonia limitations in the draft permit.

Table C-5: Total Ammonia Limits

	Daily Maximum		**Monthly Average**	
Time Period	**Concentration (mg/L)**	**Loading (lb/day)**	**Concentration (mg/L)**	**Loading (lb/day)**
November 1 – April 30[1]	16.1	2,622	5.4	793
May 1 – October 31[2]	12.0	792	4.2	490

Notes:
1. Water quality-based effluent limits (see Table D-1 in Appendix D).
2. MDL loading limit based on preventative TMDL.

E. Metals

In the Puyallup Tribe's water quality standards, the most stringent criteria applicable to the permit for metals other than arsenic are the criteria for the protection of aquatic life. For arsenic, the most stringent criterion is for protection of human health. This section discusses the calculation of the metals criteria and the conversion of these criteria to limits in the draft permit.

1. Criteria calculation

In evaluating whether limits for specific metals were appropriate and in calculating the necessary limits, EPA considered only metals that were detected in the effluent. Table C-6 lists the most stringent criteria for the metals of concern. Except for mercury, the Tribe's aquatic life criteria for these metals are expressed as a function of hardness, measured in milligrams per liter calcium carbonate (mg/L CaCO3). As the hardness of the receiving water increases, the toxicity decreases, and the numerical value of the criteria increases.

The hardness-dependent metals criteria were calculated based on the combination of historical receiving water hardness and effluent hardness data. The same hardness values used in the previous permit cycle were used to calculate effluent limits for the new permit. A hardness value of 43.5 mg/L as CaCO3 was used as the projected hardness at the edge of the acute mixing zone. A hardness value of 25.50 mg/L CaCO3 was used as the projected hardness at the edge of the chronic mixing zone. Receiving water hardness data is provided in Appendix E.

In addition to the calculation for hardness, the Tribe's criteria include a "conversion factor" to convert from total recoverable to dissolved criteria. Total recoverable metals analysis measures both the particulate and the dissolved fraction of the metal. Conversion factors address the relationship between the total amount of metal in the water column (total recoverable metal) and the fraction of that metal that causes toxicity (bioavailable metal). Conversion factors are included in Table C-6.

Table C-6: Metals Criteria for the Puyallup River

Parameter		Conversion Factor	Criterion Formula	Criterion (ug/L)	
				Dissolved	Total
Cadmium	Acute	0.865	exp(1.128*(ln[hardness]) - 3.828)	1.33	--
	Chronic	0.865	exp(0.7852*(ln[hardness]) - 3.49)	0.34	--
Chromium	Acute	--	exp(0.8190*ln[hardness] + 3.688)	878.21	--
	Chronic	--	exp(0.8190*ln[hardness] + 1.561)	67.59	--
Copper	Acute	0.862	exp(0.9422*ln[hardness] - 1.464)	6.97	--
	Chronic	0.862	exp(0.8545*ln[hardness] - 1.465)	3.17	--
Lead	Acute	0.687	exp(1.273*ln[hardness] - 1.460)	19.44	--
	Chronic	0.687	exp(1.273*ln[hardness] - 4.705)	0.38	--
Mercury	Acute	N/A [1]	N/A [1]	--	2.4
	Chronic	N/A [1]	N/A [1]	--	0.012
Nickel	Acute	0.950	exp(0.8460*ln[hardness] + 3.3612)	666.25	--
	Chronic	0.950	exp(0.8460*ln[hardness] + 1.1645)	47.14	--
Selenium	Acute	--	20.0	20.0	--
	Chronic	--	5.0	5.0	--
Silver	Acute	0.531	exp(1.72*ln[hardness] - 6.52)	0.5149	--
	Chronic	--	--	--	--
Zinc	Acute	0.891	exp(0.8473*ln[hardness] + 0.8604)	51.50	--
	Chronic	0.891	exp(0.8473*ln[hardness] + 0.7614)	29.67	--
[1] The acute and chronic criteria for mercury are not hardness-dependent. Hardness, from RTCs last permit cycle (mg/L, $CaCO_3$):				43.5 acute	25.50 chronic

Based on data submitted by the City, the reasonable potential analysis indicated that copper shows reasonable potential to contribute to excursions above criteria at the edge of the chronic mixing zone and the acute mixing zone. Therefore, the draft permit contains limits for this metal.

The 2003 permit included mercury limits of 0.052 ug/L (average monthly) and 0.069 ug/L (maximum daily). The facility remained in compliance with these levels during the most recent permit cycle. A reasonable potential evaluation was conducted using recent data provided by the City. The evaluation indicated that mercury in the effluent does not have a reasonable potential to exceed the applicable water quality criteria. A similar situation exists for lead and zinc. In such cases, new effluent limits typically reflect the effluent limits established in the previous permit to avoid backsliding. However, there were questions about the validity of some of the metals data upon which the prior metals limits were based. EPA determined that there is now a sufficiently large data set obtained using clean sampling methods upon which to base reasonable potential without having to use the questionable data. The results of the current reasonable potential calculations are consequently being used to set effluent limits. These changes are consistent with language in Clean Water Act section 303(d)(4)(B) regarding the revision of certain effluent limits.

2. Permit Limit Calculation

Although the metals criteria are based on dissolved metal, 40 CFR 122.45(c) requires that metal limits be based on total recoverable metals. Changes in water chemistry as the effluent and receiving water mix could cause some of the particulate metal in the effluent to dissolve. To account for the difference between total recoverable effluent concentrations and dissolved criteria, "translators" are used in calculating effluent limits. "Translators" are based on the fraction of the total recoverable metals that is predicted to be in the dissolved form in the receiving water. The dissolved wasteload allocation is divided by the translator, resulting in a total recoverable value. Translators can either be site specific numbers or default numbers. Because there are no site-specific translators for the Puyallup River, EPA guidance allows for the use of the criteria conversion factors listed in Table C-6 as the translators (EPA 1996). In cases where there were no tribal metals conversion factors (e.g. arsenic, and mercury**),** factors were obtained from Table 1 of EPA's metals guidance document (EPA 1996).

Table C-7 summarizes the limits for metals in the draft permit. Mass-based limits were calculated by multiplying the concentration (in mg/L) by the treatment plant design flow (13.98 mgd) and a conversion factor of 8.34. Example calculations for the ammonia and copper effluent limits are provided in Appendix D.

Table C-7: Metals Limits (total recoverable) for the City of Puyallup Permit

Parameter	**Monthly Average**	**Daily Maximum**
Copper, Total Recoverable		
ug/L	8.5	13.7
lbs/day	0.99	1.60

F. pH

Under 40 CFR 133.102 effluent pH must be within the range of 6.0 to 9.0 standard units for POTWs. In addition, the Tribe's water quality standards for protection of aquatic life require that ambient pH be in the range of 6.5 to 8.5 standard units.

A model of pH mixing was used to determine the effluent pH values that would result in meeting the criteria at the edge of the mixing zone (Table C-8). Mixing zone boundary pH is a function of effluent and ambient pH, flow, alkalinity (buffering capacity), and temperature. The worst-case scenario is a warm, highly buffered effluent being discharged into a warm, poorly buffered stream.

Table C-8: Determination of pH Limits

Calculation of pH of a mixture of two flows. Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93

INPUT	
1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	1.900
2. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	15.90
pH:	7.70
A kalinity (mg CaCO3/L):	20.10
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	23.18
pH:	6.42
A kalinity (mg CaCO3/L):	110.60
OUTPUT	
1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.41
Effluent pKa:	6.36
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.95
Effluent Ionization Fraction:	0.53
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	21.14
Effluent Total Inorganic Carbon (mg CaCO3/L):	208.17
4. CONDITIONS AT MIXING ZONE BOUNDARY	
Temperature (deg C):	19.73
A kalinity (mg CaCO3/L):	67.73
Total Inorganic Carbon (mg CaCO3/L):	119.57
pKa:	6.38
pH at Mixing Zone Boundary:	6.50

The effluent temperature used in the model is the 99th percentile of DMR temperature data from 2003 through 2011. The effluent alkalinity value represents the 95th percentile of WET testing data (obtained December 2003, November 2004, November 2005, and November 2006). The 95th percentile effluent alkalinity value was used in the previous permit mixed hardness calculation. The upstream temperature value represents the 90th percentile of data from Ecology river monitoring station 10A070 from 1990 through 2007, plus additional temperature data supplied separately by the Puyallup Tribe for years 2004 and 2007. The upstream alkalinity was the 10th percentile of available 10A070 river monitoring data (2006 through 2007). The upstream pH range represents the 10th and 90th percentile of 10A070 data from 1990 through 2007.

The model indicated that an effluent pH within the range of 6.4 to 9.0 is required to achieve a pH at the edge of the mixing zone that complies with the Tribe's water quality standards. Therefore, the draft permit contains a pH range of 6.4 to 9.0.

G. Temperature

EPA calculated the reasonable potential for the discharge to exceed the Puyallup Tribe’s freshwater temperature criteria at the edge of the chronic mixing zone during critical conditions.

According to the Puyallup water quality standards:

(iv) Temperature shall not exceed 18.0°C (freshwater) or 16.0°C (marine water) due to human activities. When natural conditions exceed 18.0°C (freshwater) and 16.0°C (marine water), no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C. Temperature reasonable potential was evaluated for this permit using a statistical representation of existing temperature data, including data provided by the Puyallup Tribe. If there is sufficient ambient temperature monitoring data that indicates the need for the Puyallup River to be listed as Category 5 “impaired” waters under Clean Water Act section 303(d), a TMDL process would be used to determine “natural” temperature conditions in the river. Currently, the most serious temperature listing for the Puyallup River is Category 2, which identifies waters where there is some evidence of a water quality problem, but not enough to require a TMDL at this time.

Incremental temperature increases resulting from point source activities shall not, at any time, exceed t=28/(T+7) (freshwater) or t=12/(T-2) (marine water). Incremental temperature increases resulting from nonpoint source activities shall not exceed 2.8 °C.

For purposes hereof, “t” represents the maximum permissible temperature increase measured at a mixing zone boundary; and "T" represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge.

Therefore: t=28/(T+7) (freshwater)

t=28/(15.9+7)= 1.22

And, 1.22<2.8

Therefore, the maximum permissible temperature increase at a mixing zone boundary is 1.22 degrees C.

What is the temperature at the edge of the chronic mixing zone?

Inputs:

1.) chronic dilution factor = 13.6

2.) Max Effluent Temperature = 23.6

3.) 7DADMax Ambient Temperature (T) (Upstream Background 90th percentile) = 15.9

Output:

= (23.6+(13.6-1)*15.9)/13.6 = 16.5 degrees C

What is the temperature increase at the chronic mixing zone boundary?

= 16.5 - 15.9 = 0.6 degrees C

Conclusion:
The max permissible temperature increase at a mixing zone boundary is 1.22 degrees C.
0.6 degrees C < 1.22 degrees C
Therefore, there is no reasonable potential for temperature.

IV. References

EPA, 1999. *1999 Update of Ambient Water Quality Criteria for Ammonia.* EPA-822-R-99-014, December 1999.

EPA, 1996. *The Metals Translator: Guidance for Calculating A Total Recoverable Permit Limit From A Dissolved Criterion.* EPA 823-B-96-007, June 1996.

APPENDIX D – EXAMPLE EFFLUENT LIMIT CALCULATIONS

This appendix steps through an example calculation of permit limits for ammonia during the time period of November through April. Calculations for additional parameters, such as copper, are also provided.

Step 1: Determine the appropriate criteria

A. Determine the uses

The Puyallup River is protected by the Puyallup Tribe for the following uses: domestic, industrial and agricultural water supply, stock watering, fish and shellfish (including salmonids, crustaceans and other shellfish, and other fish), wildlife habitat, ceremonial and religious water use, commerce, navigation, and primary and secondary recreation.

B. Determine the most stringent criterion to protect the uses

The most stringent criterion associated with these uses is for protection of salmonid spawning. The criteria for ammonia are based on temperature and pH (see Appendix C, section IV.D). Using reasonable assumptions for pH and temperature results in the following seasonal acute criterion (CMC) and chronic criterion (CCC):

Table D-1: Unionized Ammonia Criteria

Time Period	Receiving Water Conditions[1]		Acute Criteria (ug/L)	Chronic Criteria (ug/L)
	pH	Temperature (°C)		
November to April	7.67	9.0	85	19
May to October	7.70	15.9	140	31

Note:
[1] Based on the 90th percentile of the receiving water data collected from 1990 to 2007.

Step 2: Determine whether there is "reasonable potential" to exceed the criteria

2A. Determine the "reasonable potential" multiplier

The "reasonable potential" multiplier is based on the CV of the data and the number of data points. The data used are DMR results from August 2003 through December 2011, there are 50 data points for this period during the months of November through April. The calculated CV is 1.754. (See Appendix E for effluent monitoring results.)

Using the equations in Section 3.3.2. of the TSD, the reasonable potential multiplier (RPM) is calculated as follows:

pn = (1 - confidence level)1/n

where,

pn = the percentile represented by the highest concentration

n = the number of samples

pn = (1-0.99)1/30

pn = 0.86

This means that the largest value in the data set is greater than the 86th percentile.

Next, the ratio of the 99th percentile to the 86th percentile is calculated, based on the equation:

$Cp = \exp(z\sigma - 0.5\sigma^2)$

where,

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

CV = coefficient of variation (= 1.754)

$\sigma^2 = 1.405$

z = normal distribution value

= 2.326 for the 99th percentile

= 1.080 for the 86th percentile

C99 = exp(2.326 * 1.185 - 0.5 * 1.405)

= 7.80

C86 = exp(1.080 * 1.185 - 0.5 * 1.405)

= 1.78

RPM = C99/C86

= 7.80/1.78

RPM = 4.38

2B. <u>Calculate the concentration of the pollutant at the edge of the mixing zone</u>

There is reasonable potential to exceed criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the criterion. The maximum projected concentration is calculated from the following equation:

Cd = (Ce – Cu)/D + Cu

where,

Cd = receiving water concentration at the edge of the mixing zone

Ce = maximum projected effluent concentration

= maximum reported effluent concentration * reasonable potential multiplier ((6.83*1000*0.01) * 4.38 = 299.2 ug/L unionized ammonia)

Cu = upstream concentration of unionized ammonia (0.4 ug/L)

D = dilution factor (1.9 for acute, 13.6 for chronic)

Acute mixing zone concentration,

Cd = (299.2 - 0.4)/1.9 + 0.4

Cd = 157.6 ug/L (> 85 ug/L)

Chronic mixing zone concentration,

Cd = (299.2 - 0.4)/13.6 +0.4

Cd = 22.37 ug/L (> 19 ug/L)

The concentrations at the edges of the acute and chronic mixing zones are greater than the criteria, therefore a limit must be included in the permit.

Step 3: Calculate the wasteload allocations

Wasteload allocations (WLAs) are calculated using the same mass balance equation used to calculate the concentration of the pollutant at the edge of the mixing zone.

However, Cd becomes the acute or chronic criterion and Ce is replaced by the acute or chronic WLA. The equation is rearranged to solve for the WLA, becoming:

WLAa = D*(CMC - Cu) + Cu

For the acute criterion,

WLAa = 1.9 * (85 - 0.4) + 0.4

WLAa = 161.14 ug/L

For the chronic criterion,

$WLAc = 13.6 * (19- 0.4) + 0.4$
$WLAc = 253.36$ ug/L

The WLAs are converted to long-term average concentrations, using the following equations from EPA's *Technical Support Document for Water Quality-based Toxics*

Control (TSD):

$LTAa = WLAa * \exp[0.5\sigma^2 - z\sigma]$

$LTAc = WLAc * \exp[0.5\sigma4^2 - z\sigma4]$

where,

$\sigma4^2 = \ln(CV^2/4 + 1) = 0.570$

$z = 2.326$ for 99th percentile probability basis

LTAa = **161.14*** exp[0.5 * 1.405 - 2.326 * 1.185]

LTAa = 20.67 ug/L (November through April)

LTAc = **253.36** * exp[0.5 * 0.570 - 2.326 * 0.755]

LTAc = 58.19 ug/L (November through April)

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits. In this case, the acute LTA is more stringent.

Step 4: Derive the maximum daily (MDL) and average monthly (AML) permit limits

Example calculations for Step 4 are provided for the November through April time period. Using the TSD equations, the MDL and AML permit limits are calculated as follows:

$MDL = LTA * \exp[z\sigma-0.5\sigma^2]$

where:

$z = 2.326$ for 99th percentile probability basis

MDL= 20.67 * exp[2.326 * 1.185 - 0.5 * 1.405]
MDL= 161.18 ug/L

$AML= LTA * \exp[z\sigma n - 0.5\sigma n^2]$

where:

$\sigma n^2 = \ln(CV^2/n + 1) = \ln((1.754^2)/4 + 1) = 0.570$

z = 1.645 for 95th percentile probability basis

n = number of samples

AML= **20.67** * exp[1.645 * 0.755 - 0.5 * 0.570]

AML= 53.82 ug/L

These MDL and AML are expressed as unionized ammonia. These values must be converted back to total ammonia to reflect limits that are consistent with the ammonia monitoring required at the facility. Based on receiving water information including pH and temperature, the percentage of total ammonia in the unionized form is approximately 1%. The conversion to mg/L total ammonia is as follows:

AML = 53.82 ug/L / 0.01 = 16,117.54 ug/L / 1000 = 16.12 mg/L total ammonia

MDL = 161.18 ug/L / 0.01 = 5,382.07 ug/L / 1000 = 5.38 mg/L total ammonia

The mass-based limits corresponding to these concentrations are calculated based on the concentration limits, the wastewater treatment plant design flow of 13.98 mgd, and a conversion factor of 8.34.

From November to April:

Mass-based MDL = 16.12 mg/L x 19.5 mgd x 8.34 = 2621.6 lbs/day

Mass-based AML = 5.38 mg/L x 19.5 mgd x 8.34 = 874.9 lbs/day

The MDLs and AMLs calculated in this manner must be compared to existing limits to ensure the more stringent limits are selected for the new permit. The existing ammonia limits for November through April are an AML of 6.8 mg/L and 793 lbs/day, and an MDL of 17.6 mg/L and 2,862 lbs/day. The ammonia limits below will be used in the new permit for the months of November through April. Note that the maximum day mass-based limits for November to April is based on the winter maximum day design flow of 19.5 MGD. This design criterion was used in the previous permit cycle as requested by the Permittee.

AML = 5.4 mg/L; 793 lbs/day

MDL = 16.1 mg/L; 2,622 lbs/day

Ammonia limits were not calculated in a similar fashion for May to October as a reasonable potential was not found on the basis of recent effluent data. However, as discussed in Appendix C Section IV.D, mass-based effluent limits for ammonia were still assigned for the period of May to October based on preventative TMDL waste load allocations and the prohibition on backsliding.

Table D-2 summarizes the reasonable potential and effluent limit calculations for pollutants found in the treatment plant effluent. A reasonable potential to exceed water quality standards was found for ammonia and copper. The resulting limits for ammonia and copper were compared to effluent limits in the previous permit, with the more stringent limit being selected for the new permit. Arsenic may also have been found to pose a reasonable potential to exceed human health criteria for the consumption of water and aquatic organisms (fish). A special course of arsenic monitoring has therefore been included in the draft permit and is discussed in Section IX.B. of this fact sheet.

Table D-2. Reasonable Potential Calculations and Limits

Reasonable Potential Calculation

Water Body Type	Freshwater

Facility: Puyallup

Dilution Factors:	Acute	Chronic
Aquatic Life	1.9	13.6
Human Health Carcinogenic		13.6
Human Health Non-Carcinogenic		13.6

			Unionized NH3 Nov-April	Unionized NH3 May-Oct	Total As											
Pollutant, CAS No. & NPDES Application Ref. No.			**AMMONIA, Criteria as Total NH3**	**AMMONIA, Criteria as Total NH4**	**ARSENIC (dissolved) 7440382 2M**	**ARSENIC (inorganic)**	**CADMIUM - 7440439 4M Hardness dependent**	**CHROMIUM(TRI) -16065831 5M Hardness dependent**	**COPPER - 744058 6M Hardness dependent**	**ENDOSULFAN a 959988 11P, b 33213659 12P**	**LEAD - 7439921 7M Dependent on hardness**	**MERCURY 7439976 8M**	**NICKEL - 7440020 9M - Dependent on hardness**	**SELENIUM 7782492 10M**	**SILVER - 7740224 11M dependent on hardness.**	**ZINC- 7440666 13M hardness dependent**
Effluent Data	# of Samples (n)		50	52	26	26	26	23	60	6	102	100	26	26	26	73
	Coeff of Variation (Cv)		1.75	1.14	0.23	0.23	0.47	0.67	0.548	0.6	0.52	2.34	0.25	0.67	0.48	0.317
	Effluent Concentration, ug/L (Max. or 99th Percentile)		68	66	1.38		0.18	2.7	81	0.05	1	0.02	3	1.1	0.3	72.04
	Calculated 50th percentile Effluent Conc. (when n>10)					1.1						0.00265	2.4			
Receiving Water Data	90th Percentile Conc., ug/L		0.4	0.4	1.03		0.02	0.26	0.94	0	0.05	0.008	0.52	0	0.02	2.66
	Geo Mean, ug/L					0				0		0.002	0.415			
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	85	140	360	-	1.326639	878.215	6.974045	0.22	19.43943	2.4	666.248	20	0.51487	51.5035
		Chronic	19	31	190	-	0.33554	67.5912	3.170695	0.056	0.383819	0.012	47.1403	5	-	29.6696
	WQ Criteria for Protection of Human Health, ug/L		-	-	-	0.018	-	-	-	0.93	-	0.14	610	-	-	-
	Metal Criteria Translator, decimal	Acute	-	-	1	-	0.865	-	0.862	-	0.687		0.95	-	0.531	0.891
		Chronic	-	-	1	-	0.865	-	0.862	-	0.687	-	0.95	-	-	0.891
	Carcinogen?		N	N	Y	Y	N	N	N	N	N	N	N	N	N	N

Aquatic Life Reasonable Potential

s		1.184	0.913	0.227		0.447	0.609	0.512	0.555	0.489	1.367	0.246	0.609	0.455	0.309
Pn		0.912	0.915	0.838		0.838	0.819	0.926	0.464	0.956	0.955	0.838	0.838	0.838	0.939
Multiplier		3.16	2.38	1.36		1.82	2.37	1.57	3.82	1.36	2.37	1.39	2.26	1.84	1.27
Max concentration (ug/L) at edge of…	Acute	114	83	1.473		0.159	3.489	58.089	0.100	0.514	0.029	2.333	1.310	0.164	44.274
	Chronic	16	12	1.092		0.039	0.711	8.924	0.014	0.115	0.011	0.773	0.183	0.059	8.474
Reasonable Potential? Limit Required?		**YES**	**NO**	**NO**		**NO**	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Copper Effluent Limit Calculation

Criteria Calculations per Tribal Standards										
	INPUTS:::	acute criteria =	(0.862)*(EXP(0.9422*LN(acute hardness)-1.464))				=	6.97	ug/L dissolved Cu	
		acute hardness =	43.5	mg/L $CaCO_3$						
		acute dilution =	1.9							
		chronic cr teria =	(0.862)*(EXP(0.8545*LN(chronic hardness)-1.465))				=	3.17	ug/L dissolved Cu	
		chronic hardness =	25.5	mg/L $CaCO_3$						
		chronic dilution =	13.9							
		background Cu =	0.94	<-- ug/L dissolved Copper *(dissolved Cu data from upstream long-term monitoring station #10A070).*						
WLAa/WLAc		WLAa =	(acute cr terion *acute DF)-(background Cu *(acute DF-1))				=	12.40		
		WLAb =	(chronic cr ter on *chron c DF)-(background Cu *(chron c DF-1))				=	31.95		
TLAa/TLAc		LTAa =	(WLAa)*(EXP(0.5σ^2 - zσ))				=	**4.29**		
		σ^2 =	LN(CV^2 + 1)		=	0.263				
		z =	2.326							
		CV =	0.548							
				<-- Derived from last three years of DMRs.						
		LTAc =	(WLAb)*(EXP(0.5*σ^2 - 2.326*SQRT(σ^2)))				=	**17.72**		
		σ^2 =	LN(CV^2/4 + 1)		=	0.072				
Choose lowest LTA		LTAa < LTAc therefore **LTAa** is used for calculating MDL and AML								
MDL		MDL =	(LTAa)*(EXP(2.326*SQRT(σ^2) - 0.5*σ^2))				=	**12.40**	ug/L dissolved Cu	
		σ^2 =	LN(CV^2 + 1)		=	0.263				
		z =	2.326							
AML		AML =	(LTAa)*(EXP(1.645*SQRT($σ_n$^2) - 0.5*$σ_n$^2))				=	**8.75**	ug/L dissolved Cu	
		n =	1							
		$σ_n$^2 =	LN((CV^2)/n + 1)		=	0.263				
Convert dissolved limits to total recoverable using metals translators. Use conversion factors as translators per EPA guidance (EPA 823-B-96-007).										
		MDL tr =	MDL dis/0.862 =			**14.39**	ug/L total recoverable Cu			
		AML tr =	AML dissolved/0.862 =			**10.15**	ug/L total recoverable Cu			
Compare new and existing limits, choosing the most stringent for new permit.										
			Calculated Limit		vs.	Existing Limit		Limit for New Permit		
		MDL =	14.39	ppb		13.7 ppb (ug/L)	--->	**13.7**	ppb Cu	
		AML =	10.15	ppb		8.5 ppb (ug/L)	--->	**8.5**	ppb Cu	

APPENDIX E – MONITORING DATA[5]

Puyallup River Receiving Water pH				Puyallup River Receiving Water Temp. (ºC)			
DATE	TIME	PARAMETER	VALUE	DATE	TIME	TEST	VALUE
9/26/2007	9:20	PH	7.59	9/26/2007	9:20	TEMP	10.2
8/22/2007	8:55	PH	7.51	8/22/2007	8:55	TEMP	13.5
7/18/2007	9:28	PH	7.41	7/18/2007	9:28	TEMP	14.3
6/13/2007	8:10	PH	7.35	6/13/2007	8:10	TEMP	12.7
5/23/2007	9:20	PH	7.73	5/23/2007	9:20	TEMP	9.7
4/25/2007	8:30	PH	7.39	4/25/2007	8:30	TEMP	9.4
3/21/2007	9:00	PH	7.54	3/21/2007	9:00	TEMP	4.4
2/14/2007	8:55	PH	7.23	2/14/2007	8:55	TEMP	5.1
1/24/2007	10:30	PH	7.36	1/24/2007	10:30	TEMP	3.9
11/15/2006	10:20	PH	7.21	12/20/2006	10:30	TEMP	3.9
10/18/2006	12:00	PH	7.47	11/15/2006	10:20	TEMP	7.3
9/25/2006	12:00	PH	7.36	10/18/2006	12:00	TEMP	10.8
8/21/2006	10:05	PH	7.84	9/25/2006	12:00	TEMP	12.3
7/24/2006	9:55	PH	7.29	8/21/2006	10:05	TEMP	13.8
6/19/2006	9:15	PH	7.33	7/24/2006	9:55	TEMP	15.5
4/17/2006	11:10	PH	7.56	6/19/2006	9:15	TEMP	11.1
3/13/2006	10:45	PH	7.46	5/15/2006	10:30	TEMP	11.8
2/13/2006	12:14	PH	7.37	4/17/2006	11:10	TEMP	6.5
1/23/2006	14:12	PH	7.35	3/13/2006	10:45	TEMP	4.8

[5] U flagged data accounted for as 0.5 times the undetected concentration.

12/12/2005	11:23	PH	7.42	2/13/2006	12:14	TEMP	6
11/14/2005	13:00	PH	7.41	1/23/2006	14:12	TEMP	6.4
10/17/2005	9:55	PH	7.52	12/12/2005	11:23	TEMP	3.3
9/19/2005	10:00	PH	7.46	11/14/2005	13:00	TEMP	7.3
8/15/2005	11:50	PH	7.23	10/17/2005	9:55	TEMP	11.7
7/18/2005	10:40	PH	7.29	9/19/2005	10:00	TEMP	11.7
6/13/2005	16:50	PH	7.74	8/15/2005	11:50	TEMP	15
5/23/2005	16:15	PH	7.6	7/18/2005	10:40	TEMP	15.4
4/18/2005	15:40	PH	7.46	6/13/2005	16:50	TEMP	14.4
3/28/2005	16:30	PH	7.48	5/23/2005	16:15	TEMP	11.5
2/14/2005	16:25	PH	7.51	4/18/2005	15:40	TEMP	9
1/24/2005	16:40	PH	7.28	3/28/2005	16:30	TEMP	7.8
12/13/2004	15:35	PH	7.36	2/14/2005	16:25	TEMP	5.4
11/15/2004	16:30	PH	7.64	1/24/2005	16:40	TEMP	7.6
10/18/2004	17:00	PH	7.37	12/13/2004	15:35	TEMP	6.1
9/21/2004	13:45	PH	7.45	11/15/2004	16:30	TEMP	9.4
8/17/2004	11:15	PH	7.24	10/18/2004	17:00	TEMP	10.2
7/20/2004	13:54	PH	7.43	9/21/2004	13:45	TEMP	11.7
6/22/2004	15:05	PH	7.48	8/17/2004	11:15	TEMP	14.1
5/18/2004	13:55	PH	7.55	7/20/2004	13:54	TEMP	14.4
4/20/2004	13:40	PH	7.79	6/22/2004	15:05	TEMP	14.6
3/23/2004	12:15	PH	7.62	5/18/2004	13:55	TEMP	12.3
2/24/2004	14:32	PH	7.46	4/20/2004	13:40	TEMP	10
1/27/2004	12:56	PH	7.43	3/23/2004	12:15	TEMP	9.5
12/16/2003	14:15	PH	7.32	2/24/2004	14:32	TEMP	7.2

11/18/2003	14:49	PH	7.45	1/27/2004	12:56	TEMP	4.7
10/21/2003	15:06	PH	7.24	12/16/2003	14:15	TEMP	6
9/24/2003	13:40	PH	7.42	11/18/2003	14:49	TEMP	8.4
8/18/2003	14:25	PH	7.31	10/21/2003	15:06	TEMP	11.9
7/21/2003	16:30	PH	7.38	9/24/2003	13:40	TEMP	12.4
6/16/2003	15:00	PH	7.55	8/18/2003	14:25	TEMP	14.7
5/19/2003	12:55	PH	8.05	7/21/2003	16:30	TEMP	17.9
4/21/2003	13:30	PH	7.35	6/16/2003	15:00	TEMP	14.9
3/19/2003	12:55	PH	7.23	5/19/2003	12:55	TEMP	9.1
2/24/2003	14:05	PH	7.34	4/21/2003	13:30	TEMP	9.4
1/27/2003	13:23	PH	7.22	3/19/2003	12:55	TEMP	6
12/11/2002	14:50	PH	7.43	2/24/2003	14:05	TEMP	4
11/18/2002	13:25	PH	7.36	1/27/2003	13:23	TEMP	7
10/23/2002	14:10	PH	7.45	12/11/2002	14:50	TEMP	6
9/24/2002	14:00	PH	7.58	11/18/2002	13:25	TEMP	8.9
8/27/2002	17:00	PH	7.44	10/23/2002	14:10	TEMP	10.6
7/30/2002	14:00	PH	7.31	9/24/2002	14:00	TEMP	12.4
6/25/2002	14:10	PH	7.48	8/27/2002	17:00	TEMP	16.5
5/28/2002	15:02	PH	7.45	7/30/2002	14:00	TEMP	14.3
4/16/2002	14:05	PH	7.36	6/25/2002	14:10	TEMP	14.3
3/26/2002	12:23	PH	7.68	5/28/2002	15:02	TEMP	11.2
2/19/2002	14:52	PH	7.56	4/16/2002	14:05	TEMP	6.7
1/29/2002	13:14	PH	7.21	3/26/2002	12:23	TEMP	6.6
12/11/2001	12:37	PH	7.62	2/19/2002	14:52	TEMP	6
11/27/2001	13:00	PH	7.46	1/29/2002	13:14	TEMP	3.3

10/30/2001	12:10	PH	7.36	12/11/2001	12:37	TEMP	5.4
9/19/2001	15:26	PH	7.57	11/27/2001	13:00	TEMP	6.2
8/22/2001	16:20	PH	7.52	10/30/2001	12:10	TEMP	9
7/18/2001	13:10	PH	7.57	9/19/2001	15:26	TEMP	12.2
6/20/2001	13:10	PH	7.55	8/22/2001	16:20	TEMP	12.4
5/23/2001	14:15	PH	7.7	7/18/2001	13:10	TEMP	14
4/18/2001	13:05	PH	7.63	6/20/2001	13:10	TEMP	14.3
3/21/2001	12:45	PH	7.83	5/23/2001	14:15	TEMP	14.3
2/28/2001	13:45	PH	7.43	4/18/2001	13:05	TEMP	9.5
1/24/2001	15:00	PH	7.7	3/21/2001	12:45	TEMP	7.4
12/6/2000	14:00	PH	7.57	2/28/2001	13:45	TEMP	4.3
11/15/2000	12:50	PH	7.56	1/24/2001	15:00	TEMP	5.1
10/18/2000	12:40	PH	7.6	12/6/2000	14:00	TEMP	4.1
9/20/2000	13:10	PH	7.3	11/15/2000	12:50	TEMP	4.5
8/23/2000	13:25	PH	7.53	10/18/2000	12:40	TEMP	10.9
7/19/2000	13:35	PH	7.7	9/20/2000	13:10	TEMP	12.4
6/21/2000	13:50	PH	7.6	8/23/2000	13:25	TEMP	15.2
5/17/2000	14:50	PH	7.8	7/19/2000	13:35	TEMP	12.5
4/19/2000	14:10	PH	7.8	6/21/2000	13:50	TEMP	10.9
3/22/2000	14:20	PH	7.6	5/17/2000	14:50	TEMP	9.2
2/16/2000	14:30	PH	7.4	4/19/2000	14:10	TEMP	8.5
1/19/2000	14:40	PH	7.6	3/22/2000	14:20	TEMP	5.4
12/8/1999	14:05	PH	7.4	2/16/2000	14:30	TEMP	0
11/3/1999	15:10	PH	7.3	1/19/2000	14:40	TEMP	1.9
10/20/1999	16:15	PH	7.6	12/8/1999	14:05	TEMP	4.4

9/22/1999	13:40	PH	7.5	11/3/1999	15:10	TEMP	5.4
8/18/1999	13:20	PH	7.4	10/20/1999	16:15	TEMP	9.7
7/21/1999	14:45	PH	7.6	9/22/1999	13:40	TEMP	13.4
5/26/1999	13:55	PH	7.5	8/18/1999	13:20	TEMP	14.4
4/21/1999	15:20	PH	8.2	7/21/1999	14:45	TEMP	12.4
3/24/1999	14:00	PH	7.9	6/23/1999	14:35	TEMP	9.7
2/17/1999	14:40	PH	7.5	5/26/1999	13:55	TEMP	9.3
1/20/1999	16:05	PH	7.4	4/21/1999	15:20	TEMP	7.8
12/16/1998	13:30	PH	7.3	3/24/1999	14:00	TEMP	7.1
10/21/1998	16:50	PH	7.6	2/17/1999	14:40	TEMP	4.5
9/23/1998	8:20	PH	7.4	1/20/1999	16:05	TEMP	5
8/19/1998	7:20	PH	7.5	12/16/1998	13:30	TEMP	5.5
7/22/1998	7:15	PH	7.1	11/18/1998	15:10	TEMP	6.4
6/24/1998	7:30	PH	6.9	10/21/1998	16:50	TEMP	9.1
5/20/1998	7:30	PH	7.3	9/23/1998	8:20	TEMP	12.5
4/22/1998	7:25	PH	7.4	8/19/1998	7:20	TEMP	10.8
3/18/1998	8:00	PH	7.2	7/22/1998	7:15	TEMP	15.5
2/19/1998	8:10	PH	7.3	6/24/1998	7:30	TEMP	11.8
1/21/1998	8:28	PH	6.8	5/20/1998	7:30	TEMP	10
12/17/1997	9:30	PH	7.1	4/22/1998	7:25	TEMP	9.6
11/19/1997	8:30	PH	7	3/18/1998	8:00	TEMP	5.6
10/22/1997	7:45	PH	6.8	2/19/1998	8:10	TEMP	5.3
9/23/1997	11:05	PH	7.4	1/21/1998	8:28	TEMP	3.4
8/20/1997	10:45	PH	7.4	12/17/1997	9:30	TEMP	5.3
7/23/1997	10:55	PH	7.4	11/19/1997	8:30	TEMP	6.7

6/18/1997	11:40	PH	7.6	10/22/1997	7:45	TEMP	9.2
5/21/1997	11:05	PH	7.4	9/23/1997	11:05	TEMP	15.3
4/23/1997	11:10	PH	7.5	8/20/1997	10:45	TEMP	14.2
3/19/1997	11:15	PH	7.3	7/23/1997	10:55	TEMP	13.1
2/19/1997	11:40	PH	7.4	6/18/1997	11:40	TEMP	11
1/22/1997	11:25	PH	7.3	5/21/1997	11:05	TEMP	9.1
12/17/1996	12:05	PH	7.4	4/23/1997	11:10	TEMP	7.8
11/20/1996	11:15	PH	7.7	3/19/1997	11:15	TEMP	6.6
10/23/1996	11:45	PH	7.6	2/19/1997	11:40	TEMP	4.6
9/18/1996	13:15	PH	7.6	1/22/1997	11:25	TEMP	5.1
8/21/1996	13:20	PH	7.7	12/17/1996	12:05	TEMP	4.5
7/24/1996	13:10	PH	7.5	11/20/1996	11:15	TEMP	3.5
6/19/1996	13:00	PH	7.7	10/23/1996	11:45	TEMP	7.5
5/22/1996	13:45	PH	7.6	9/18/1996	13:15	TEMP	9.8
4/24/1996	12:55	PH	7.4	8/21/1996	13:20	TEMP	14.8
3/20/1996	13:30	PH	7.2	7/24/1996	13:10	TEMP	17.9
2/21/1996	13:35	PH	7.3	6/19/1996	13:00	TEMP	12.9
1/24/1996	14:15	PH	7.2	5/22/1996	13:45	TEMP	10.2
12/19/1995	13:20	PH	7.5	4/24/1996	12:55	TEMP	8.3
11/21/1995	14:30	PH	7.2	3/20/1996	13:30	TEMP	7.7
10/18/1995	13:30	PH	7.6	2/21/1996	13:35	TEMP	5.7
9/18/1995	7:25	PH	7.2	1/24/1996	14:15	TEMP	4.8
8/21/1995	7:40	PH	6.9	12/19/1995	13:20	TEMP	6
7/17/1995	8:00	PH	7.1	11/21/1995	14:30	TEMP	7.3
6/19/1995	7:35	PH	7.7	10/18/1995	13:30	TEMP	10.6

5/15/1995	7:05	PH	7.2	9/18/1995	7:25	TEMP	13.2
4/17/1995	7:50	PH	7	8/21/1995	7:40	TEMP	14.9
3/20/1995	7:40	PH	7.5	7/17/1995	8:00	TEMP	16.8
2/20/1995	7:50	PH	7.4	6/19/1995	7:35	TEMP	12.6
1/16/1995	7:50	PH	7.7	5/15/1995	7:05	TEMP	12.9
12/19/1994	7:50	PH	7.8	4/17/1995	7:50	TEMP	8.5
11/14/1994	8:30	PH	7.3	3/20/1995	7:40	TEMP	7.3
10/17/1994	7:40	PH	7.4	2/20/1995	7:50	TEMP	6.4
9/28/1994	10:50	PH	7.3	1/16/1995	7:50	TEMP	4.7
8/24/1994	10:30	PH	7.6	12/19/1994	7:50	TEMP	5.2
7/27/1994	11:10	PH	7.1	11/14/1994	8:30	TEMP	7.1
6/29/1994	10:30	PH	7.4	10/17/1994	7:40	TEMP	8.6
5/25/1994	11:40	PH	7.7	9/28/1994	10:50	TEMP	12.8
4/27/1994	11:20	PH	7.5	8/24/1994	10:30	TEMP	14.2
3/30/1994	9:50	PH	7.4	7/27/1994	11:10	TEMP	15.8
2/23/1994	10:35	PH	7.4	6/29/1994	10:30	TEMP	14.8
1/26/1994	12:00	PH	7.5	5/25/1994	11:40	TEMP	13.6
12/21/1993	12:15	PH	7.4	4/27/1994	11:20	TEMP	8.6
11/22/1993	14:40	PH	7.6	3/30/1994	9:50	TEMP	7.7
10/27/1993	11:40	PH	7.3	2/23/1994	10:35	TEMP	4.1
9/28/1993	13:05	PH	7.2	1/26/1994	12:00	TEMP	5.6
7/27/1993	11:50	PH	7.4	12/21/1993	12:15	TEMP	3.5
6/29/1993	12:35	PH	7.5	11/22/1993	14:40	TEMP	5.1
5/25/1993	11:30	PH	7.2	10/27/1993	11:40	TEMP	10.5
4/27/1993	12:15	PH	7.5	9/28/1993	13:05	TEMP	11.6

3/23/1993	11:45	PH	7.2	8/24/1993	12:40	TEMP	13
2/23/1993	11:00	PH	7.3	7/27/1993	11:50	TEMP	15.9
1/26/1993	12:05	PH	7.2	6/29/1993	12:35	TEMP	12.3
12/21/1992	12:30	PH	7.6	5/25/1993	11:30	TEMP	12.5
11/22/1992	13:15	PH	7.2	4/27/1993	12:15	TEMP	9
10/27/1992	12:20	PH	7.5	3/23/1993	11:45	TEMP	7.1
9/30/1992	9:40	PH	7.6	2/23/1993	11:00	TEMP	2.9
8/26/1992	9:00	PH	7.4	1/26/1993	12:05	TEMP	6.6
7/29/1992	9:30	PH	7.5	12/21/1992	12:30	TEMP	4.3
6/24/1992	8:50	PH	7.5	11/22/1992	13:15	TEMP	6.9
5/27/1992	9:25	PH	7.1	10/27/1992	12:20	TEMP	10.4
4/29/1992	9:25	PH	7.6	9/30/1992	9:40	TEMP	13
3/25/1992	9:15	PH	7	8/26/1992	9:00	TEMP	13.2
2/26/1992	9:45	PH	7.3	7/29/1992	9:30	TEMP	14.1
1/29/1992	9:20	PH	7.5	6/24/1992	8:50	TEMP	15.9
12/18/1991	9:10	PH	7.4	5/27/1992	9:25	TEMP	13.4
11/20/1991	9:30	PH	7.2	4/29/1992	9:25	TEMP	11.8
10/30/1991	9:50	PH	7.2	3/25/1992	9:15	TEMP	9.3
9/25/1991	10:40	PH	7.4	2/26/1992	9:45	TEMP	6.8
8/28/1991	10:55	PH	7.4	1/29/1992	9:20	TEMP	6.4
7/31/1991	10:10	PH	7.9	12/18/1991	9:10	TEMP	4.5
6/26/1991	10:25	PH	7	11/20/1991	9:30	TEMP	7
5/29/1991	12:15	PH	7.7	10/30/1991	9:50	TEMP	8
4/24/1991	11:05	PH	7.4	9/25/1991	10:40	TEMP	11.5
3/27/1991	10:55	PH	7	8/28/1991	10:55	TEMP	13.8

2/27/1991	10:35	PH	7.3	7/31/1991	10:10	TEMP	14.4
1/30/1991	13:30	PH	7.3	6/26/1991	10:25	TEMP	12
12/19/1990	13:25	PH	7.6	5/29/1991	12:15	TEMP	10.9
11/28/1990	13:50	PH	7.4	4/24/1991	11:05	TEMP	9.2
10/31/1990	13:25	PH	7.7	3/27/1991	10:55	TEMP	6.2
9/26/1990	11:20	PH	7.6	2/27/1991	10:35	TEMP	5.8
8/29/1990	11:45	PH	7.5	1/30/1991	13:30	TEMP	2.9
7/31/1990	11:50	PH	7.6	12/19/1990	13:25	TEMP	2
6/27/1990	10:35	PH	7.3	11/28/1990	13:50	TEMP	6.3
5/31/1990	10:45	PH	7.3	10/31/1990	13:25	TEMP	9.1
4/25/1990	11:35	PH	7.1	9/26/1990	11:20	TEMP	14.2
3/28/1990	13:40	PH	7.7	8/29/1990	11:45	TEMP	16.1
2/28/1990	10:25	PH	7.3	7/31/1990	11:50	TEMP	14.1
				6/27/1990	10:35	TEMP	13.5
				5/31/1990	10:45	TEMP	10.7
				4/25/1990	11:35	TEMP	8.7
				3/28/1990	13:40	TEMP	8.5
				2/28/1990	10:25	TEMP	3.9
				1/31/1990	11:10	TEMP	4.1

Puyallup River Receiving Water Hardness (mg/L as $CaCO_3$)				Puyallup River Receiving Water Metals (ug/L)			
8/21/2006	10:05	HARD	32.7	8/21/2006	10:05	Ag_DIS	0.02 U
6/19/2006	9:15	HARD	23.9	6/19/2006	9:15	Ag_DIS	0.02 U
2/13/2006	12:14	HARD	31.6	2/13/2006	12:14	Ag_DIS	0.02 U
12/12/2005	11:23	HARD	32.3	12/12/2005	11:23	Ag_DIS	0.02 U
10/17/2005	9:55	HARD	32.3	10/17/2005	9:55	Ag_DIS	0.02 U
8/20/1997	10:45	HARD	27				
6/18/1997	11:40	HARD	21	8/21/2006	10:05	As_DIS	0.42
4/23/1997	11:10	HARD	24	6/19/2006	9:15	As_DIS	0.57
2/19/1997	11:40	HARD	22	2/13/2006	12:14	As_DIS	0.5
12/17/1996	12:05	HARD	28	12/12/2005	11:23	As_DIS	0.55
10/23/1996	11:45	HARD	26	10/17/2005	9:55	As_DIS	0.6
8/21/1996	13:20	HARD	30				
6/19/1996	13:00	HARD	26	8/21/2006	10:05	As_TR	1.14
4/24/1996	12:55	HARD	26	6/19/2006	9:15	As_TR	0.68
2/21/1996	13:35	HARD	24	2/13/2006	12:14	As_TR	0.53
12/19/1995	13:20	HARD	24	12/12/2005	11:23	As_TR	0.63
10/18/1995	13:30	HARD	20	10/17/2005	9:55	As_TR	0.79
3/20/1995	7:40	HARD	28	6/25/2002	14:10	As_TR	0.58
1/16/1995	7:50	HARD	26	5/28/2002	15:02	As_TR	0.77
11/14/1994	8:30	HARD	28	4/16/2002	14:05	As_TR	0.96
9/28/1994	10:50	HARD	41E	3/26/2002	12:23	As_TR	0.47
7/27/1994	11:10	HARD	37E	2/19/2002	14:52	As_TR	0.62

5/25/1994	11:40	HARD	24E	1/29/2002	13:14	As_TR	0.47
10/30/1991	9:50	HARD	30	12/11/2001	12:37	As_TR	0.67
10/13/1982	12:15	HARD	32	11/27/2001	13:00	As_TR	0.56
12/18/1974	11:50	HARD	24	10/30/2001	12:10	As_TR	0.63
12/11/1974	10:20	HARD	37	9/19/2001	15:26	As_TR	0.85
11/20/1974	11:15	HARD	35	8/22/2001	16:20	As_TR	1.1
11/14/1974	11:00	HARD	28				

Puyallup River Receiving Water NH3-N (mg/L)					**Puyallup River Receiving Water Metals (ug/L)**			
9/26/2007	9:20	NH3_N	0.044		8/21/2006	10:05	Cu_DIS	0.65
8/22/2007	8:55	NH3_N	0.01	U	6/19/2006	9:15	Cu_DIS	0.74
7/18/2007	9:28	NH3_N	0.017		2/13/2006	12:14	Cu_DIS	0.87
6/13/2007	8:10	NH3_N	0.01		12/12/2005	11:23	Cu_DIS	0.79
5/23/2007	9:20	NH3_N	0.01	U	10/17/2005	9:55	Cu_DIS	0.95
4/25/2007	8:30	NH3_N	0.01	U	8/20/1997	10:45	CU_DIS	0.514
3/21/2007	9:00	NH3_N	0.01	U	6/18/1997	11:40	CU_DIS	0.716
2/14/2007	8:55	NH3_N	0.021		4/23/1997	11:10	CU_DIS	0.781
1/24/2007	10:30	NH3_N	0.038		2/19/1997	11:40	CU_DIS	0.715
12/20/2006	10:30	NH3_N	0.03		12/17/1996	12:05	CU_DIS	0.77
11/15/2006	10:20	NH3_N	0.01	U	10/23/1996	11:45	CU_DIS	0.794
10/18/2006	12:00	NH3_N	0.013		8/21/1996	13:20	CU_DIS	0.49
9/25/2006	12:00	NH3_N	0.012		6/19/1996	13:00	CU_DIS	0.571

8/21/2006	10:05	NH3_N	0.01	U
7/24/2006	9:55	NH3_N	0.01	
6/19/2006	9:15	NH3_N	0.01	U
5/15/2006	10:30	NH3_N	0.01	U
4/17/2006	11:10	NH3_N	0.011	
3/13/2006	10:45	NH3_N	0.01	U
2/13/2006	12:14	NH3_N	0.024	
1/23/2006	14:12	NH3_N	0.016	
12/12/2005	11:23	NH3_N	0.017	
11/14/2005	13:00	NH3_N	0.01	U
10/17/2005	9:55	NH3_N	0.031	
9/19/2005	10:00	NH3_N	0.015	
8/15/2005	11:50	NH3_N	0.01	U
7/18/2005	10:40	NH3_N	0.012	
6/13/2005	16:50	NH3_N	0.01	U
5/23/2005	16:15	NH3_N	0.01	U
4/18/2005	15:40	NH3_N	0.022	
3/28/2005	16:30	NH3_N	0.024	
2/14/2005	16:25	NH3_N	0.065	
1/24/2005	16:40	NH3_N	0.022	
12/13/2004	15:35	NH3_N	0.018	
11/15/2004	16:30	NH3_N	0.025	
10/18/2004	17:00	NH3_N	0.01	U
9/21/2004	13:45	NH3_N	0.012	
8/17/2004	11:15	NH3_N	0.01	U

4/24/1996	12:55	CU_DIS	1.37
2/21/1996	13:35	CU_DIS	0.878
12/19/1995	13:20	CU_DIS	0.708
10/16/1995	14:01	CU_DIS	0.903
3/20/1995	7:40	CU_DIS	1.55
1/16/1995	7:50	CU_DIS	0.855
11/14/1994	8:30	CU_DIS	0.865
9/28/1994	10:50	CU_DIS	0.535
7/27/1994	11:10	CU_DIS	0.531
5/25/1994	11:40	CU_DIS	0.446

8/21/2006	10:05	Hg	0.0136
6/19/2006	9:15	Hg	0.002 U
2/13/2006	12:14	Hg	0.0034
12/12/2005	11:23	Hg	0.002 U
10/17/2005	9:55	Hg	0.0035
8/20/1997	10:45	HG	0.003
6/18/1997	11:40	HG	0.002
4/23/1997	11:10	HG	0.002 U
2/19/1997	11:40	HG	0.003
12/17/1996	12:05	HG	0.003
10/23/1996	11:45	HG	0.001

7/20/2004	13:54	NH3_N	0.048					U	
6/22/2004	15:05	NH3_N	0.01	U	8/21/1996	13:20	HG	0.003	
5/18/2004	13:55	NH3_N	0.011		6/19/1996	13:00	HG	0.001	
4/20/2004	13:40	NH3_N	0.013		4/24/1996	12:55	HG	0.001 U	
3/23/2004	12:15	NH3_N	0.016		2/21/1996	13:35	HG	0.005 J	
2/24/2004	14:32	NH3_N	0.024		12/19/1995	13:20	HG	0.004 J	
1/27/2004	12:56	NH3_N	0.015		10/18/1995	13:30	HG	0.002	
12/16/2003	14:15	NH3_N	0.025		3/20/1995	7:40	HG	0.001 J	
11/18/2003	14:49	NH3_N	0.01	U	1/16/1995	7:50	HG	0.001 U	
10/21/2003	15:06	NH3_N	0.012		11/14/1994	8:30	HG	0.002 J	
9/24/2003	13:40	NH3_N	0.021		9/28/1994	10:50	HG	0.017	
8/18/2003	14:25	NH3_N	0.019		7/27/1994	11:10	HG	0.009 J	
7/21/2003	16:30	NH3_N	0.016		5/25/1994	11:40	HG	0.001 J	
6/16/2003	15:00	NH3_N	0.014						
5/19/2003	12:55	NH3_N	0.013						
4/21/2003	13:30	NH3_N	0.033						
3/19/2003	12:55	NH3_N	0.01	U	8/21/2006	10:05	Pb_DIS	0.029	
2/24/2003	14:05	NH3_N	0.011		6/19/2006	9:15	Pb_DIS	0.031	
1/27/2003	13:23	NH3_N	0.019		2/13/2006	12:14	Pb_DIS	0.027	
12/11/2002	14:50	NH3_N	0.06		12/12/2005	11:23	Pb_DIS	0.037	
11/18/2002	13:25	NH3_N	0.01	U	10/17/2005	9:55	Pb_DIS	0.04	
10/23/2002	14:10	NH3_N	0.014		8/20/1997	10:45	PB_DIS	0.02 U	
9/24/2002	14:00	NH3_N	0.02						
8/27/2002	17:00	NH3_N	0.013		6/18/1997	11:40	PB_DIS	0.02 U	
7/30/2002	14:00	NH3_N	0.024						

6/25/2002	14:10	NH3_N	0.02	
5/28/2002	15:02	NH3_N	0.02	
4/16/2002	14:05	NH3_N	0.018	
3/26/2002	12:23	NH3_N	0.027	
2/19/2002	14:52	NH3_N	0.034	
1/29/2002	13:14	NH3_N	0.04	
12/11/2001	12:37	NH3_N	0.041	
11/27/2001	13:00	NH3_N	0.028	
10/30/2001	12:10	NH3_N	0.015	
9/19/2001	15:26	NH3_N	0.085	
8/22/2001	16:20	NH3_N	0.018	
7/18/2001	13:10	NH3_N	0.043	
6/20/2001	13:10	NH3_N	0.011	
5/23/2001	14:15	NH3_N	0.026	
4/18/2001	13:05	NH3_N	0.01	U
3/21/2001	12:45	NH3_N	0.01	U
2/28/2001	13:45	NH3_N	0.023	
1/24/2001	15:00	NH3_N	0.021	
12/6/2000	14:00	NH3_N	0.01	U
11/15/2000	12:50	NH3_N	0.01	U
10/18/2000	12:40	NH3_N	0.032	
9/20/2000	13:10	NH3_N	0.01	U
8/23/2000	13:25	NH3_N	0.012	
7/19/2000	13:35	NH3_N	0.03	
6/21/2000	13:50	NH3_N	0.011	

4/23/1997	11:10	PB_DIS	0.15	
2/19/1997	11:40	PB_DIS	0.03	U
12/17/1996	12:05	PB_DIS	0.037	
10/23/1996	11:45	PB_DIS	0.031	
8/21/1996	13:20	PB_DIS	0.02	U
6/19/1996	13:00	PB_DIS	0.022	
4/24/1996	12:55	PB_DIS	0.042	
2/21/1996	13:35	PB_DIS	0.031	
12/19/1995	13:20	PB_DIS	0.03	U
10/18/1995	13:30	PB_DIS	0.03	U
3/20/1995	7:40	PB_DIS	0.052	J
1/16/1995	7:50	PB_DIS	0.022	J
11/14/1994	8:30	PB_DIS	0.208	
9/28/1994	10:50	PB_DIS	0.02	U
7/27/1994	11:10	PB_DIS	0.02	U
5/25/1994	11:40	PB_DIS	0.02	U
8/21/2006	10:05	Zn_DIS	1.2	
6/19/2006	9:15	Zn_DIS	3.2	

5/17/2000	14:50	NH3_N	0.01	U	2/13/2006	12:14	Zn_DIS	2.7	
4/19/2000	14:10	NH3_N	0.01	U	12/12/2005	11:23	Zn_DIS	4.1	
3/22/2000	14:20	NH3_N	0.023		10/17/2005	9:55	Zn_DIS	2.2	
2/16/2000	14:30	NH3_N	0.01	U	8/20/1997	10:45	ZN_DIS	0.75	
1/19/2000	14:40	NH3_N	0.01	U	6/18/1997	11:40	ZN_DIS	0.21	
12/8/1999	14:05	NH3_N	0.019		4/23/1997	11:10	ZN_DIS	0.82	
11/3/1999	15:10	NH3_N	0.01	U	2/19/1997	11:40	ZN_DIS	0.86	
10/20/1999	16:15	NH3_N	0.01	UJ	12/17/1996	12:05	ZN_DIS	1.1	
9/22/1999	13:40	NH3_N	0.046		10/23/1996	11:45	ZN_DIS	2.2	J
8/18/1999	13:20	NH3_N	0.051		8/21/1996	13:20	ZN_DIS	0.87	
7/21/1999	14:45	NH3_N	0.027		6/19/1996	13:00	ZN_DIS	0.51	
6/23/1999	14:35	NH3_N	0.019		4/24/1996	12:55	ZN_DIS	0.56	
5/26/1999	13:55	NH3_N	0.031		2/21/1996	13:35	ZN_DIS	1	U
4/21/1999	15:20	NH3_N	0.01	U	12/19/1995	13:20	ZN_DIS	5	U
3/24/1999	14:00	NH3_N	0.022		10/18/1995	13:30	ZN_DIS	1.7	
2/17/1999	14:40	NH3_N	0.01	U	3/20/1995	7:40	ZN_DIS	1.6	J
1/20/1999	16:05	NH3_N	0.01	U	1/16/1995	7:50	ZN_DIS	0.44	J
12/16/1998	13:30	NH3_N	0.025		11/14/1994	8:30	ZN_DIS	2.4	J
11/18/1998	15:10	NH3_N	0.039		9/28/1994	10:50	ZN_DIS	1	U
10/21/1998	16:50	NH3_N	0.034		7/27/1994	11:10	ZN_DIS	1	U
9/23/1998	8:20	NH3_N	0.01	U	5/25/1994	11:40	ZN_DIS	2.1	J
8/19/1998	7:20	NH3_N	0.01	U					
7/22/1998	7:15	NH3_N	0.033						
6/24/1998	7:30	NH3_N	0.01	U					
5/20/1998	7:30	NH3_N	0.02						

4/22/1998	7:25	NH3_N	0.027		
3/18/1998	8:00	NH3_N	0.01	U	
2/19/1998	8:10	NH3_N	0.011		
1/21/1998	8:28	NH3_N	0.019		
12/17/1997	9:30	NH3_N	0.038		
11/19/1997	8:30	NH3_N	0.015		
10/22/1997	7:45	NH3_N	0.01	U	
9/23/1997	11:05	NH3_N	0.019		
8/20/1997	10:45	NH3_N	0.016		
7/23/1997	10:55	NH3_N	0.01	U	
6/18/1997	11:40	NH3_N	0.01	UJ	
5/21/1997	11:05	NH3_N	0.019		
4/23/1997	11:10	NH3_N	0.032		
3/19/1997	11:15	NH3_N	0.038		
2/19/1997	11:40	NH3_N	0.013		
1/22/1997	11:25	NH3_N	0.029		
12/17/1996	12:05	NH3_N	0.039		
11/20/1996	11:15	NH3_N	0.023		
10/23/1996	11:45	NH3_N	0.01	U	
9/18/1996	13:15	NH3_N	0.01	U	
8/21/1996	13:20	NH3_N	0.012		
7/24/1996	13:10	NH3_N	0.01	U	
6/19/1996	13:00	NH3_N	0.01	U	
5/22/1996	13:45	NH3_N	0.013		
4/24/1996	12:55	NH3_N	0.036		

3/20/1996	13:30	NH3_N	0.01	U
2/21/1996	13:35	NH3_N	0.01	U
1/24/1996	14:15	NH3_N	0.03	
12/19/1995	13:20	NH3_N	0.023	
11/21/1995	14:30	NH3_N	0.021	
10/18/1995	13:30	NH3_N	0.01	U
9/18/1995	7:25	NH3_N	0.038	
8/21/1995	7:40	NH3_N	0.01	U
7/17/1995	8:00	NH3_N	0.015	
6/19/1995	7:35	NH3_N	0.023	
5/15/1995	7:05	NH3_N	0.027	
4/17/1995	7:50	NH3_N	0.015	
3/20/1995	7:40	NH3_N	0.01	U
2/20/1995	7:50	NH3_N	0.045	
1/16/1995	7:50	NH3_N	0.019	
12/19/1994	7:50	NH3_N	0.01	U
11/14/1994	8:30	NH3_N	0.026	
10/17/1994	7:40	NH3_N	0.01	U
9/28/1994	10:50	NH3_N	0.024	
8/24/1994	10:30	NH3_N	0.01	UJ
7/27/1994	11:10	NH3_N	0.01	U
6/29/1994	10:30	NH3_N	0.053	
5/25/1994	11:40	NH3_N	0.01	U
4/27/1994	11:20	NH3_N	0.016	
3/30/1994	9:50	NH3_N	0.01	

2/23/1994	10:35	NH3_N	0.039
1/26/1994	12:00	NH3_N	0.039
12/21/1993	12:15	NH3_N	0.033
11/22/1993	14:40	NH3_N	0.1
10/27/1993	11:40	NH3_N	0.017
9/28/1993	13:05	NH3_N	0.019
8/24/1993	12:40	NH3_N	0.017
7/27/1993	11:50	NH3_N	0.018
6/29/1993	12:35	NH3_N	0.037
5/25/1993	11:30	NH3_N	0.033
4/27/1993	12:15	NH3_N	0.03
3/23/1993	11:45	NH3_N	0.045
2/23/1993	11:00	NH3_N	0.027
1/26/1993	12:05	NH3_N	0.067
12/21/1992	12:30	NH3_N	0.059
11/22/1992	13:15	NH3_N	0.039
10/27/1992	12:20	NH3_N	0.019
9/30/1992	9:40	NH3_N	0.02
8/26/1992	9:00	NH3_N	0.04
7/29/1992	9:30	NH3_N	0.04
6/24/1992	8:50	NH3_N	0.03
5/27/1992	9:25	NH3_N	0.01
4/29/1992	9:25	NH3_N	0.03
3/25/1992	9:15	NH3_N	0.03
2/26/1992	9:45	NH3_N	0.02

1/29/1992	9:20	NH3_N	0.05		
12/18/1991	9:10	NH3_N	0.03		
11/20/1991	9:30	NH3_N	0.04		
10/30/1991	9:50	NH3_N	0.02		
9/25/1991	10:40	NH3_N	0.03		
8/28/1991	10:55	NH3_N	0.04		
7/31/1991	10:10	NH3_N	0.03		
6/26/1991	10:25	NH3_N	0.01	U	
5/29/1991	12:15	NH3_N	0.01		
4/24/1991	11:05	NH3_N	0.02		
3/27/1991	10:55	NH3_N	0.03		
2/27/1991	10:35	NH3_N	0.02		
1/30/1991	13:30	NH3_N	0.03		
12/19/1990	13:25	NH3_N	0.03		
11/28/1990	13:50	NH3_N	0.02		
10/31/1990	13:25	NH3_N	0.03		
9/26/1990	11:20	NH3_N	0.01		
8/29/1990	11:45	NH3_N	0.03		
7/31/1990	11:50	NH3_N	0.04		
6/27/1990	10:35	NH3_N	0.02		
5/31/1990	10:45	NH3_N	0.03		
4/25/1990	11:35	NH3_N	0.02		
3/28/1990	13:40	NH3_N	0.02		
2/28/1990	10:25	NH3_N	0.03		
1/31/1990	11:10	NH3_N	0.06		

EFFLUENT DATA

Note on units: Metals are in ug/L. Ammonia, BOD5, and TSS are in mg/L. Temperature is in degrees Celsius. pH is in standard units. Fecal coliform is in cfu/100mL.

TEST	DATE	MCMN	MCAV	MCMX
AMMONIA, TOTAL	08/31/2003		1.2	3.9
AMMONIA, TOTAL	09/30/2003		0.8	2.3
AMMONIA, TOTAL	10/31/2003		0.6	2.2
AMMONIA, TOTAL	11/30/2003		0.6	2.6
AMMONIA, TOTAL	12/31/2003		0.5	1.1
AMMONIA, TOTAL	01/31/2004		0.9	2.7
AMMONIA, TOTAL	02/29/2004		2.3	9.3
AMMONIA, TOTAL	03/31/2004		0.5	1.0
AMMONIA, TOTAL	04/30/2004		0.4	0.6
AMMONIA, TOTAL	05/31/2004		0.5	0.7
AMMONIA, TOTAL	06/30/2004		0.3	0.4
AMMONIA, TOTAL	07/31/2004		0.4	1.3
AMMONIA, TOTAL	08/31/2004		1.0	2.5
AMMONIA, TOTAL	09/30/2004		0.5	0.8
AMMONIA, TOTAL	10/31/2004		0.2	0.4
AMMONIA, TOTAL	11/30/2004		0.2	0.5
AMMONIA, TOTAL	12/31/2004		0.2	0.4
AMMONIA, TOTAL	01/31/2005		0.2	0.8
AMMONIA, TOTAL	02/28/2005		0.2	0.5
AMMONIA, TOTAL	03/31/2005		0.3	0.6

AMMONIA, TOTAL	04/30/2005		0.2	0.6
AMMONIA, TOTAL	05/31/2005		0.2	0.4
AMMONIA, TOTAL	06/30/2005		0.3	0.7
AMMONIA, TOTAL	07/31/2005		0.6	1.6
AMMONIA, TOTAL	08/31/2005		0.2	0.5
AMMONIA, TOTAL	09/30/2005		0.5	2.1
AMMONIA, TOTAL	10/31/2005		0.2	0.5
AMMONIA, TOTAL	11/30/2005		0.2	0.3
AMMONIA, TOTAL	12/31/2005		0.1	0.2
AMMONIA, TOTAL	01/31/2006		0.4	1.8
AMMONIA, TOTAL	02/28/2006		0.1	0.3
AMMONIA, TOTAL	03/31/2006		0.1	0.3
AMMONIA, TOTAL	04/30/2006		0.2	0.3
AMMONIA, TOTAL	05/31/2006		0.2	0.5
AMMONIA, TOTAL	06/30/2006		5.0	6.0
AMMONIA, TOTAL	07/31/2006		0.9	2.0
AMMONIA, TOTAL	08/31/2006		0.4	0.9
AMMONIA, TOTAL	09/30/2006		0.7	2.3
AMMONIA, TOTAL	10/31/2006		0.1	0.2
AMMONIA, TOTAL	11/30/2006		0.7	1.2
AMMONIA, TOTAL	12/31/2006		0.3	0.8
AMMONIA, TOTAL	01/31/2007		1.1	3.9
AMMONIA, TOTAL	02/28/2007		0.1	0.3
AMMONIA, TOTAL	03/31/2007		0.4	1.1

AMMONIA, TOTAL	04/30/2007		0.2	0.9
AMMONIA, TOTAL	05/31/2007		0.1	0.1
AMMONIA, TOTAL	06/30/2007		0.1	0.1
AMMONIA, TOTAL	07/31/2007		0.5	1.4
AMMONIA, TOTAL	08/31/2007		0.4	1.1
AMMONIA, TOTAL	09/30/2007		0.5	0.9
AMMONIA, TOTAL	10/31/2007		0.4	1.6
AMMONIA, TOTAL	11/30/2007		0.1	0.2
AMMONIA, TOTAL	12/31/2007		0.3	0.6
AMMONIA, TOTAL	01/31/2008		0.1	0.2
AMMONIA, TOTAL	02/29/2008		0.1	0.0
AMMONIA, TOTAL	03/31/2008		0.1	0.1
AMMONIA, TOTAL	04/30/2008		0.1	0.1
AMMONIA, TOTAL	05/31/2008		0.1	0.1
AMMONIA, TOTAL	06/30/2008		0.1	0.2
AMMONIA, TOTAL	07/31/2008		0.6	1.5
AMMONIA, TOTAL	08/31/2008		0.5	1.3
AMMONIA, TOTAL	09/30/2008		0.3	0.8
AMMONIA, TOTAL	10/31/2008		0.1	0.2
AMMONIA, TOTAL	11/30/2008		0.1	0.2
AMMONIA, TOTAL	12/31/2008		0.2	0.4
AMMONIA, TOTAL	1/31/2009		1.8	4.3
AMMONIA, TOTAL	2/28/2009		0.6	1.7
AMMONIA, TOTAL	3/31/2009		0.1	0.2

AMMONIA, TOTAL	4/30/2009		0.1	0.1
AMMONIA, TOTAL	5/31/2009		0.1	0.1
AMMONIA, TOTAL	6/30/2009		0.1	0.1
AMMONIA, TOTAL	7/31/2009		0.1	0.3
AMMONIA, TOTAL	8/31/2009		0.5	1.8
AMMONIA, TOTAL	9/30/2009		0.9	2.9
AMMONIA, TOTAL	10/13/2009		0.9	2.9
AMMONIA, TOTAL	10/31/2009		0.4	1.0
AMMONIA, TOTAL	11/30/2009		0.1	0.3
AMMONIA, TOTAL	12/31/2009		0.1	0.1
AMMONIA, TOTAL	1/31/2010		0.1	0.3
AMMONIA, TOTAL	2/28/2010		0.1	0.1
AMMONIA, TOTAL	3/31/2010		0.1	0.1
AMMONIA, TOTAL	4/30/2010		0.1	0.1
AMMONIA, TOTAL	5/31/2010		0.1	0.2
AMMONIA, TOTAL	6/30/2010		0.1	0.1
AMMONIA, TOTAL	7/31/2010		0.2	0.7
AMMONIA, TOTAL	8/31/2010		0.3	1.8
AMMONIA, TOTAL	9/30/2010		0.1	0.2
AMMONIA, TOTAL	10/31/2010		0.1	0.4
AMMONIA, TOTAL	11/30/2010		0.1	0.3
AMMONIA, TOTAL	12/31/2010		0.2	0.4
AMMONIA, TOTAL	1/31/2011		0.1	0.2
AMMONIA, TOTAL	2/28/2011		0.1	0.1

AMMONIA, TOTAL	3/31/2011		0.1	0.1
AMMONIA, TOTAL	4/30/2011		0.1	0.2
AMMONIA, TOTAL	5/31/2011		0.6	2.2
AMMONIA, TOTAL	6/30/2011		2.7	7.3
AMMONIA, TOTAL	7/31/2011		0.1	0.3
AMMONIA, TOTAL	8/31/2011		0.1	0.2
AMMONIA, TOTAL	9/30/2011		0.2	0.4
AMMONIA, TOTAL	10/31/2011		0.3	0.6
AMMONIA, TOTAL	11/30/2011		0.1	0.3
AMMONIA, TOTAL	12/31/2011		0.3	0.7
BOD5	08/31/2003		6.4	4.3
BOD5	09/30/2003		5.7	4.0
BOD5	10/31/2003		7.4	4.0
BOD5	11/30/2003		5.0	4.2
BOD5	12/31/2003		6.2	4.5
BOD5	01/31/2004		7.4	5.9
BOD5	02/29/2004		8.7	6.5
BOD5	03/31/2004		7.6	6.4
BOD5	04/30/2004		7.5	4.8
BOD5	05/31/2004		5.7	4.4
BOD5	06/30/2004		3.8	2.5
BOD5	08/31/2004		9.0	6.0
BOD5	09/30/2004		6.5	4.7
BOD5	10/31/2004		4.3	2.5

BOD5	11/30/2004		2.8	2.4
BOD5	12/31/2004		2.9	2.6
BOD5	01/31/2005		5.4	3.3
BOD5	02/28/2005		2.7	2.5
BOD5	03/31/2005		4.4	3.8
BOD5	04/30/2005		2.5	2.3
BOD5	05/31/2005		2.8	2.2
BOD5	06/30/2005		3.9	2.5
BOD5	07/31/2005		4.9	3.6
BOD5	08/31/2005		3.0	2.2
BOD5	09/30/2005		4.7	3.7
BOD5	10/31/2005		5.8	4.2
BOD5	11/30/2005		6.3	5.5
BOD5	12/31/2005		2.8	2.5
BOD5	01/31/2006		6.7	5.0
BOD5	02/28/2006		5.7	3.5
BOD5	03/31/2006		3.5	2.9
BOD5	04/30/2006		4.0	2.7
BOD5	05/31/2006		3.0	3.0
BOD5	06/30/2006		4.0	5.0
BOD5	07/31/2006		7.0	5.6
BOD5	08/31/2006		3.5	3.0
BOD5	09/30/2006		5.3	3.6
BOD5	10/31/2006		4.7	3.5

BOD5	11/30/2006		3.2	4.9
BOD5	12/31/2006		4.5	6.4
BOD5	01/31/2007		6.3	16.0
BOD5	02/28/2007		4.7	7.1
BOD5	03/31/2007		7.5	5.5
BOD5	04/30/2007		3.2	3.5
BOD5	05/31/2007		2.7	1.9
BOD5	06/30/2007		2.0	2.5
BOD5	07/31/2007		3.3	2.9
BOD5	08/31/2007		2.9	3.5
BOD5	09/30/2007		3.4	4.3
BOD5	10/31/2007		3.8	5.3
BOD5	11/30/2007		3.8	4.4
BOD5	12/31/2007		4.8	7.0
BOD5	01/31/2008		4.2	4.7
BOD5	02/29/2008		4.5	5.5
BOD5	03/31/2008		3.4	3.8
BOD5	10/31/2008		2.5	3.0
BOD5	11/30/2008		2.9	3.3
BOD5	12/31/2008		3.7	5.0
BOD5	1/31/2009		5.3	6.5
BOD5	3/31/2009		3.3	3.7
BOD5	1/31/2010		4.6	5.8
BOD5	2/28/2010		2.7	3.1

BOD5	3/31/2010		2.5	3.4
BOD5	4/30/2010		3.5	4.0
BOD5	5/31/2010		3.4	4.2
BOD5	6/30/2010		2.5	2.7
BOD5	7/31/2010		2.7	3.7
BOD5	8/31/2010		2.6	3.5
BOD5	9/30/2010		2.9	3.4
BOD5	10/31/2010		3.1	3.8
BOD5	11/30/2010		3.7	4.0
BOD5	12/31/2010		3.9	4.9
BOD5	1/31/2011		4.0	5.1
BOD5	2/28/2011		3.4	3.7
BOD5	3/31/2011		3.5	4.2
BOD5	4/30/2011		4.0	4.8
BOD5	5/31/2011		3.5	5.9
BOD5	6/30/2011		3.5	4.6
BOD5	7/31/2011		2.7	3.1
BOD5	8/31/2011		2.2	2.6
BOD5	9/30/2011		2.4	2.9
BOD5	10/31/2011		4.5	6.4
BOD5	11/30/2011		3.7	4.5
BOD5	12/31/2011		3.0	3.2
BOD5, % REMOVAL	08/31/2003	99.0		
BOD5, % REMOVAL	09/30/2003	99.0		

BOD5, % REMOVAL	10/31/2003	98.0		
BOD5, % REMOVAL	11/30/2003	99.0		
BOD5, % REMOVAL	12/31/2003	96.0		
BOD5, % REMOVAL	01/31/2004	97.0		
BOD5, % REMOVAL	02/29/2004	98.0		
BOD5, % REMOVAL	03/31/2004	98.0		
BOD5, % REMOVAL	04/30/2004	98.0		
BOD5, % REMOVAL	05/31/2004	99.0		
BOD5, % REMOVAL	06/30/2004	99.0		
BOD5, % REMOVAL	07/31/2004	99.0		
BOD5, % REMOVAL	08/31/2004	98.0		
BOD5, % REMOVAL	09/30/2004	99.0		
BOD5, % REMOVAL	10/31/2004	99.0		
BOD5, % REMOVAL	11/30/2004	99.0		
BOD5, % REMOVAL	12/31/2004	99.0		
BOD5, % REMOVAL	01/31/2005	99.0		
BOD5, % REMOVAL	02/28/2005	99.0		
BOD5, % REMOVAL	04/30/2005	99.0		
BOD5, % REMOVAL	05/31/2005	99.0		
BOD5, % REMOVAL	06/30/2005	99.0		
BOD5, % REMOVAL	07/31/2005	99.0		
BOD5, % REMOVAL	08/31/2005	99.0		
BOD5, % REMOVAL	09/30/2005	99.0		
BOD5, % REMOVAL	10/31/2005	99.0		

BOD5, % REMOVAL	11/30/2005	98.0		
BOD5, % REMOVAL	12/31/2005	99.0		
BOD5, % REMOVAL	01/31/2006	94.0		
BOD5, % REMOVAL	02/28/2006	98.0		
BOD5, % REMOVAL	03/31/2006	97.0		
BOD5, % REMOVAL	04/30/2006	99.0		
BOD5, % REMOVAL	05/31/2006	98.0		
BOD5, % REMOVAL	06/30/2006	98.0		
BOD5, % REMOVAL	07/31/2006	98.0		
BOD5, % REMOVAL	08/31/2006	99.0		
BOD5, % REMOVAL	09/30/2006	98.1		
BOD5, % REMOVAL	10/31/2006	98.6		
BOD5, % REMOVAL	11/30/2006	96.0		
BOD5, % REMOVAL	12/31/2006	94.4		
BOD5, % REMOVAL	01/31/2007	95.0		
BOD5, % REMOVAL	02/28/2007	97.4		
BOD5, % REMOVAL	03/31/2007	96.6		
BOD5, % REMOVAL	04/30/2007	98.5		
BOD5, % REMOVAL	05/31/2007	99.3		
BOD5, % REMOVAL	06/30/2007	99.3		
BOD5, % REMOVAL	07/31/2007	99.0		
BOD5, % REMOVAL	08/31/2007	99.0		
BOD5, % REMOVAL	09/30/2007	99.0		
BOD5, % REMOVAL	10/31/2007	98.5		

BOD5, % REMOVAL	11/30/2007	98.0		
BOD5, % REMOVAL	12/31/2007	92.7		
BOD5, % REMOVAL	01/31/2008	97.1		
BOD5, % REMOVAL	02/29/2008	97.6		
BOD5, % REMOVAL	03/31/2008	98.3		
BOD5, % REMOVAL	04/30/2008	98.4		
BOD5, % REMOVAL	05/31/2008	99.0		
BOD5, % REMOVAL	06/30/2008	99.0		
BOD5, % REMOVAL	07/31/2008	98.9		
BOD5, % REMOVAL	08/31/2008	99.2		
BOD5, % REMOVAL	09/30/2008	99.3		
BOD5, % REMOVAL	10/31/2008	99.2		
BOD5, % REMOVAL	11/30/2008	98.6		
BOD5, % REMOVAL	12/31/2008	98.6		
BOD5, % REMOVAL	1/31/2009	96.9		
BOD5, % REMOVAL	2/28/2009	98.2		
BOD5, % REMOVAL	3/31/2009	98.2		
BOD5, % REMOVAL	3/31/2009	98.2		
BOD5, % REMOVAL	4/30/2009	98.2		
BOD5, % REMOVAL	5/31/2009	98.9		
BOD5, % REMOVAL	6/30/2009	99.3		
BOD5, % REMOVAL	7/31/2009	99.2		
BOD5, % REMOVAL	8/31/2009	98.8		
BOD5, % REMOVAL	9/30/2009	98.8		

BOD5, % REMOVAL	10/13/2009	98.8		
BOD5, % REMOVAL	10/31/2009	99.1		
BOD5, % REMOVAL	11/30/2009	98.6		
BOD5, % REMOVAL	12/31/2009	98.5		
BOD5, % REMOVAL	1/31/2010	96.8		
BOD5, % REMOVAL	1/31/2010	96.8		
BOD5, % REMOVAL	2/28/2010	98.6		
BOD5, % REMOVAL	2/28/2010	98.6		
BOD5, % REMOVAL	3/31/2010	98.6		
BOD5, % REMOVAL	4/30/2010	98.3		
BOD5, % REMOVAL	5/31/2010	98.7		
BOD5, % REMOVAL	5/31/2010	98.3		
BOD5, % REMOVAL	6/30/2010	99.0		
BOD5, % REMOVAL	6/30/2010	98.9		
BOD5, % REMOVAL	7/31/2010	99.1		
BOD5, % REMOVAL	8/31/2010	99.1		
BOD5, % REMOVAL	9/30/2010	99.1		
BOD5, % REMOVAL	10/31/2010	99.9		
BOD5, % REMOVAL	11/30/2010	98.1		
BOD5, % REMOVAL	12/31/2010	97.4		
BOD5, % REMOVAL	1/31/2011	97.8		
BOD5, % REMOVAL	2/28/2011	98.2		
BOD5, % REMOVAL	3/31/2011	97.6		
BOD5, % REMOVAL	4/30/2011	97.3		

BOD5, % REMOVAL	5/31/2011	97.9		
BOD5, % REMOVAL	6/30/2011	98.5		
BOD5, % REMOVAL	7/31/2011	99.0		
BOD5, % REMOVAL	8/31/2011	99.2		
BOD5, % REMOVAL	9/30/2011	99.2		
BOD5, % REMOVAL	10/31/2011	98.3		
BOD5, % REMOVAL	11/30/2011	98.4		
BOD5, % REMOVAL	12/31/2011	98.9		
COPPER (total recoverable)	08/31/2003		7.2	7.2
COPPER (total recoverable)	09/30/2003		11.	11.
COPPER (total recoverable)	10/31/2003		10.6	10.6
COPPER (total recoverable)	11/30/2003		9.8	9.8
COPPER (total recoverable)	12/31/2003		10.7	10.5
COPPER (total recoverable)	01/31/2004		12.	12.
COPPER (total recoverable)	02/29/2004		9.7	9.7
COPPER (total recoverable)	03/31/2004		8.1	8.1
COPPER (total recoverable)	04/30/2004		10.9	10.7
COPPER (total recoverable)	05/31/2004		10.8	10.8
COPPER (total recoverable)	06/30/2004		13.4	13.4
COPPER (total recoverable)	07/31/2004		10.5	6.1
COPPER (total recoverable)	08/31/2004		11.8	11.8
COPPER (total recoverable)	09/30/2004		.	.
COPPER (total recoverable)	10/31/2004		12.2	12.2
COPPER (total recoverable)	11/30/2004		15.3	14.9

COPPER (total recoverable)	12/31/2004		13.4	13.4
COPPER (total recoverable)	01/31/2005		13.8	13.8
COPPER (total recoverable)	02/28/2005		12.3	12.3
COPPER (total recoverable)	03/31/2005		15.2	15.1
COPPER (total recoverable)	04/30/2005		12.	12.
COPPER (total recoverable)	05/31/2005		9.6	9.6
COPPER (total recoverable)	06/30/2005		12.5	12.5
COPPER (total recoverable)	07/31/2005		22.3	22.3
COPPER (total recoverable)	08/31/2005		16.3	16.3
COPPER (total recoverable)	09/30/2005		17.4	17.4
COPPER (total recoverable)	10/31/2005		18.5	18.5
COPPER (total recoverable)	11/30/2005		.	.
COPPER (total recoverable)	12/31/2005		15.6	15.6
COPPER (total recoverable)	01/31/2006		10.1	10.1
COPPER (total recoverable)	02/28/2006		14.7	13.1
COPPER (total recoverable)	03/31/2006		14.4	13.2
COPPER (total recoverable)	04/30/2006		14.8	14.2
COPPER (total recoverable)	05/31/2006		17.1	16.4
COPPER (total recoverable)	06/30/2006		18.4	18.4
COPPER (total recoverable)	07/31/2006		20.9	20.9
COPPER (total recoverable)	08/31/2006		14.6	14.6
COPPER (total recoverable)	09/30/2006		13.8	13.8
COPPER (total recoverable)	10/31/2006		14.9	14.9
COPPER (total recoverable)	11/30/2006		17.9	17.9

COPPER (total recoverable)	12/31/2006		12.4	12.4
COPPER (total recoverable)	01/31/2007		9.	9.
COPPER (total recoverable)	02/28/2007		15.5	15.5
COPPER (total recoverable)	03/31/2007		12.4	11.7
COPPER (total recoverable)	04/30/2007		12.7	12.7
COPPER (total recoverable)	05/31/2007		4.5	4.5
COPPER (total recoverable)	06/30/2007		3.7	3.7
COPPER (total recoverable)	07/31/2007		3.6	3.
COPPER (total recoverable)	08/31/2007		3.1	3.1
COPPER (total recoverable)	09/30/2007		5.5	5.5
COPPER (total recoverable)	10/31/2007		7.7	6.5
COPPER (total recoverable)	11/30/2007		4.2	4.2
COPPER (total recoverable)	12/31/2007		6.	6.
COPPER (total recoverable)	01/31/2008		3.9	3.9
COPPER (total recoverable)	02/29/2008		4.3	4.3
COPPER (total recoverable)	03/31/2008		7.1	5.2
COPPER (total recoverable)	08/31/2003		7.2	7.2
COPPER (total recoverable)	09/30/2003		11.	11.
COPPER (total recoverable)	10/31/2003		10.6	10.6
COPPER (total recoverable)	11/30/2003		9.8	9.8
COPPER (total recoverable)	12/31/2003		10.7	10.5
COPPER (total recoverable)	01/31/2004		12.	12.
COPPER (total recoverable)	02/29/2004		9.7	9.7
COPPER (total recoverable)	03/31/2004		8.1	8.1

COPPER (total recoverable)	04/30/2004		10.9	10.7
COPPER (total recoverable)	05/31/2004		10.8	10.8
COPPER (total recoverable)	06/30/2004		13.4	13.4
COPPER (total recoverable)	07/31/2004		10.5	6.1
COPPER (total recoverable)	08/31/2004		11.8	11.8
COPPER (total recoverable)	09/30/2004		.	.
COPPER (total recoverable)	10/31/2004		12.2	12.2
COPPER (total recoverable)	11/30/2004		15.3	14.9
COPPER (total recoverable)	12/31/2004		13.4	13.4
COPPER (total recoverable)	01/31/2005		13.8	13.8
COPPER (total recoverable)	02/28/2005		12.3	12.3
COPPER (total recoverable)	03/31/2005		15.2	15.1
COPPER (total recoverable)	04/30/2005		12.	12.
COPPER (total recoverable)	05/31/2005		9.6	9.6
COPPER (total recoverable)	06/30/2005		12.5	12.5
COPPER (total recoverable)	07/31/2005		22.3	22.3
COPPER (total recoverable)	08/31/2005		16.3	16.3
COPPER (total recoverable)	09/30/2005		17.4	17.4
COPPER (total recoverable)	10/31/2005		18.5	18.5
COPPER (total recoverable)	11/30/2005		.	.
COPPER (total recoverable)	12/31/2005		15.6	15.6
COPPER (total recoverable)	01/31/2006		10.1	10.1
COPPER (total recoverable)	02/28/2006		14.7	13.1
COPPER (total recoverable)	03/31/2006		14.4	13.2

COPPER (total recoverable)	04/30/2006		14.8	14.2
COPPER (total recoverable)	05/31/2006		17.1	16.4
COPPER (total recoverable)	06/30/2006		18.4	18.4
COPPER (total recoverable)	07/31/2006		20.9	20.9
COPPER (total recoverable)	08/31/2006		14.6	14.6
COPPER (total recoverable)	09/30/2006		13.8	13.8
COPPER (total recoverable)	10/31/2006		14.9	14.9
COPPER (total recoverable)	11/30/2006		17.9	17.9
COPPER (total recoverable)	12/31/2006		12.4	12.4
COPPER (total recoverable)	01/31/2007		9.	9.
COPPER (total recoverable)	02/28/2007		15.5	15.5
COPPER (total recoverable)	03/31/2007		12.4	11.7
COPPER (total recoverable)	04/30/2007		12.7	12.7
COPPER (total recoverable)	05/31/2007		4.5	4.5
COPPER (total recoverable)	06/30/2007		3.7	3.7
COPPER (total recoverable)	07/31/2007		3.6	3.
COPPER (total recoverable)	08/31/2007		3.1	3.1
COPPER (total recoverable)	09/30/2007		5.5	5.5
COPPER (total recoverable)	10/31/2007		7.7	6.5
COPPER (total recoverable)	11/30/2007		4.2	4.2
COPPER (total recoverable)	12/31/2007		6.	6.
COPPER (total recoverable)	01/31/2008		3.9	3.9
COPPER (total recoverable)	02/29/2008		4.3	4.3
COPPER (total recoverable)	03/31/2008		7.1	5.2

COPPER (total recoverable)	04/30/2008		2.8	2.8
COPPER (total recoverable)	05/31/2008		2.6	2.6
COPPER (total recoverable)	06/30/2008		2.9	2.9
COPPER (total recoverable)	07/31/2008		3.4	3.4
COPPER (total recoverable)	08/31/2008		2.8	2.8
COPPER (total recoverable)	09/30/2008		2.9	2.9
COPPER (total recoverable)	10/31/2008		2.8	2.8
COPPER (total recoverable)	11/30/2008		4.1	4.1
COPPER (total recoverable)	12/31/2008		4.2	4.2
COPPER (total recoverable)	01/31/2009		4.3	4.3
COPPER (total recoverable)	02/28/2009		3.2	3.2
COPPER (total recoverable)	03/31/2009		2.8	2,8
COPPER (total recoverable)	04/31/2009		3.7	3.7
COPPER (total recoverable)	05/31/2009		4.4	4.4
COPPER (total recoverable)	06/30/2009		3.9	3.9
COPPER (total recoverable)	07/31/2009		2.6	2.6
COPPER (total recoverable)	08/31/2009		3.8	3.8
COPPER (total recoverable)	09/30/2009		4.2	4.2
COPPER (total recoverable)	10/31/2009		7.7	7.7
COPPER (total recoverable)	11/30/2009		3.4	3.4
COPPER (total recoverable)	01/31/2010		5	5
COPPER (total recoverable)	01/31/2010		7.7	7.7
COPPER (total recoverable)	02/28/2010		5	5
COPPER (total recoverable)	03/31/2010		4.9	4.9

COPPER (total recoverable)	04/30/2010		7.5	7.5
COPPER (total recoverable)	05/31/2010		4.4	4.4
COPPER (total recoverable)	06/30/2010		2.7	2.7
COPPER (total recoverable)	07/31/2010		3.1	3.1
COPPER (total recoverable)	08/31/2010		3.8	3.8
COPPER (total recoverable)	09/30/2010		4.2	4.2
COPPER (total recoverable)	10/31/2010		5.2	5.2
COPPER (total recoverable)	11/30/2010		6.4	6.4
COPPER (total recoverable)	12/31/2010		4.9	4.9
COPPER (total recoverable)	01/31/2011		4.9	4.9
COPPER (total recoverable)	02/28/2011		4.4	4.4
COPPER (total recoverable)	03/31/2011		4.8	4.8
COPPER (total recoverable)	04/30/2011		8.1	8.1
COPPER (total recoverable)	05/31/2011		6.4	6.4
COPPER (total recoverable)	06/30/2011		6.3	6.3
COPPER (total recoverable)	07/31/2011		4	4
COPPER (total recoverable)	08/31/2011		4	4
COPPER (total recoverable)	09/30/2011		3.5	3.5
COPPER (total recoverable)	10/31/2011		6.7	6.7
COPPER (total recoverable)	11/30/2011		6.1	6.1
COPPER (total recoverable)	12/31/2011		5.4	5.4
COPPER (total recoverable)	01/31/2012		5.9	5.9
COPPER (total recoverable)	02/29/2012		6.1	6.1
COPPER (total recoverable)	03/31/2012		5.9	5.9

COPPER (total recoverable)	04/30/2012		4.8	4.8
COPPER (total recoverable)	05/31/2012		5	5
COPPER (total recoverable)	06/30/2012		3.4	3.4
COPPER (total recoverable)	07/31/2012		5.9	5.9
COPPER (total recoverable)	08/31/2012		5.2	5.2
COPPER (total recoverable)	09/30/2012		5.2	5.2
COPPER (total recoverable)	10/31/2012		4.8	4.8
COPPER (total recoverable)	11/30/2012		4.3	4.3
COPPER (total recoverable)	12/31/2012		5.6	5.6
COPPER (total recoverable)	01/31/2013		6	6
COPPER (total recoverable)	02/28/2013		5.9	5.9
COPPER (total recoverable)	03/31/2013		6.9	6.9

FECAL COLIFORM	08/31/2003		53.0	
FECAL COLIFORM	09/30/2003		54.0	
FECAL COLIFORM	10/31/2003		25.0	
FECAL COLIFORM	11/30/2003		14.0	
FECAL COLIFORM	12/31/2003		32.0	
FECAL COLIFORM	01/31/2004		8.0	
FECAL COLIFORM	02/29/2004		9.0	
FECAL COLIFORM	03/31/2004		13.0	
FECAL COLIFORM	04/30/2004		10.0	
FECAL COLIFORM	05/31/2004		25.0	
FECAL COLIFORM	06/30/2004		9.0	
FECAL COLIFORM	07/31/2004		20.0	
FECAL COLIFORM	08/31/2004		47.0	
FECAL COLIFORM	09/30/2004		8.0	
FECAL COLIFORM	10/31/2004		5.0	
FECAL COLIFORM	11/30/2004		8.0	
FECAL COLIFORM	12/31/2004		3.0	
FECAL COLIFORM	01/31/2005		11.0	
FECAL COLIFORM	02/28/2005		2.0	
FECAL COLIFORM	03/31/2005		6.0	
FECAL COLIFORM	04/30/2005		6.0	
FECAL COLIFORM	05/31/2005		6.0	
FECAL COLIFORM	06/30/2005		4.0	

FECAL COLIFORM	07/31/2005		9.0	
FECAL COLIFORM	08/31/2005		9.0	
FECAL COLIFORM	09/30/2005		31.0	
FECAL COLIFORM	10/31/2005		55.0	
FECAL COLIFORM	11/30/2005		18.0	
FECAL COLIFORM	12/31/2005		6.0	
FECAL COLIFORM	01/31/2006		8.0	
FECAL COLIFORM	02/28/2006		9.0	
FECAL COLIFORM	03/31/2006		9.0	
FECAL COLIFORM	04/30/2006		2.0	
FECAL COLIFORM	05/31/2006		5.0	
FECAL COLIFORM	06/30/2006		19.0	
FECAL COLIFORM	07/31/2006		21.0	
FECAL COLIFORM	08/31/2006		9.0	
FECAL COLIFORM	09/30/2006		12.0	
FECAL COLIFORM	10/31/2006		4.0	
FECAL COLIFORM	11/30/2006		4.3	
FECAL COLIFORM	12/31/2006		10.3	
FECAL COLIFORM	01/31/2007		4.7	
FECAL COLIFORM	02/28/2007		6.3	
FECAL COLIFORM	03/31/2007		0.0	
FECAL COLIFORM	04/30/2007		7.9	
FECAL COLIFORM	05/31/2007		6.5	
FECAL COLIFORM	06/30/2007		10.6	

FECAL COLIFORM	07/31/2007		18.9	
FECAL COLIFORM	08/31/2007		9.9	
FECAL COLIFORM	09/30/2007		7.4	
FECAL COLIFORM	10/31/2007		3.2	
FECAL COLIFORM	11/30/2007		0.0	
FECAL COLIFORM	12/31/2007		0.0	
FECAL COLIFORM	01/31/2008		0.0	
FECAL COLIFORM	02/29/2008		4.4	
FECAL COLIFORM	03/31/2008		2.5	
FECAL COLIFORM	04/30/2008		2.9	
FECAL COLIFORM	05/31/2008		3.2	
FECAL COLIFORM	06/30/2008		3.2	
FECAL COLIFORM	07/31/2008		2.9	
FECAL COLIFORM	08/31/2008		3.6	
FECAL COLIFORM	09/30/2008		4.6	
FECAL COLIFORM	10/31/2008		7.6	
FECAL COLIFORM	11/30/2008		3.6	
FECAL COLIFORM	12/31/2008		2.7	
FECAL COLIFORM	1/31/2009		12.8	
FECAL COLIFORM	2/28/2009		6.0	
FECAL COLIFORM	3/31/2009		2.6	
FECAL COLIFORM	4/30/2009		3.9	
FECAL COLIFORM	5/31/2009		4.0	
FECAL COLIFORM	6/30/2009		12.0	

FECAL COLIFORM	7/31/2009		14.8	
FECAL COLIFORM	8/31/2009		18.2	
FECAL COLIFORM	9/30/2009		4.0	
FECAL COLIFORM	10/13/2009		4.0	
FECAL COLIFORM	10/31/2009		3.1	
FECAL COLIFORM	11/30/2009		5.0	
FECAL COLIFORM	12/31/2009		6.4	
FECAL COLIFORM	1/31/2010		11.1	
FECAL COLIFORM	2/28/2010		3.2	
FECAL COLIFORM	3/31/2010		5.7	
FECAL COLIFORM	4/30/2010		7.4	
FECAL COLIFORM	5/31/2010		38.7	
FECAL COLIFORM	6/30/2010		14.5	
FECAL COLIFORM	7/31/2010		5.7	
FECAL COLIFORM	8/31/2010		9.5	
FECAL COLIFORM	9/30/2010		10.0	
FECAL COLIFORM	10/31/2010		8.6	
FECAL COLIFORM	11/30/2010		56.8	
FECAL COLIFORM	12/31/2010		40.4	
FECAL COLIFORM	1/31/2011		12.1	
FECAL COLIFORM	2/28/2011		33.1	
FECAL COLIFORM	3/31/2011		8.9	
FECAL COLIFORM	4/30/2011		15.3	
FECAL COLIFORM	5/31/2011		11.2	

FECAL COLIFORM	6/30/2011		20.2	
FECAL COLIFORM	7/31/2011		8.8	
FECAL COLIFORM	8/31/2011		13.3	
FECAL COLIFORM	9/30/2011		18.4	
FECAL COLIFORM	10/31/2011		18.7	
FECAL COLIFORM	11/30/2011		28.8	
FECAL COLIFORM	12/31/2011		4.1	
LEAD (total recoverable)	08/31/2003		0.6	0.6
LEAD (total recoverable)	09/30/2003		0.6	0.6
LEAD (total recoverable)	10/31/2003		0.8	0.8
LEAD (total recoverable)	11/30/2003		0.5	0.5
LEAD (total recoverable)	12/31/2003		0.4	0.4
LEAD (total recoverable)	01/31/2004		0.3	0.3
LEAD (total recoverable)	02/29/2004		0.3	0.3
LEAD (total recoverable)	03/31/2004		0.3	0.3
LEAD (total recoverable)	04/30/2004		0.3	0.3
LEAD (total recoverable)	05/31/2004		0.5	0.5
LEAD (total recoverable)	06/30/2004		0.2	0.2
LEAD (total recoverable)	07/31/2004		0.3	0.3
LEAD (total recoverable)	08/31/2004		0.3	0.3
LEAD (total recoverable)	09/30/2004		0.0	0.0
LEAD (total recoverable)	10/31/2004		0.3	0.3
LEAD (total recoverable)	11/30/2004		0.4	0.4
LEAD (total recoverable)	12/31/2004		0.2	0.2

LEAD (total recoverable)	01/31/2005		0.2	0.2
LEAD (total recoverable)	02/28/2005		0.2	0.2
LEAD (total recoverable)	03/31/2005		0.3	0.3
LEAD (total recoverable)	04/30/2005		0.3	0.3
LEAD (total recoverable)	05/31/2005		0.2	0.2
LEAD (total recoverable)	06/30/2005		0.3	0.3
LEAD (total recoverable)	07/31/2005		0.6	0.6
LEAD (total recoverable)	08/31/2005		0.5	0.5
LEAD (total recoverable)	09/30/2005		0.4	0.4
LEAD (total recoverable)	10/31/2005		0.5	0.5
LEAD (total recoverable)	11/30/2005		0.0	0.0
LEAD (total recoverable)	12/31/2005		0.3	0.3
LEAD (total recoverable)	01/31/2006		0.2	0.2
LEAD (total recoverable)	02/28/2006		0.2	0.2
LEAD (total recoverable)	03/31/2006		0.4	0.4
LEAD (total recoverable)	04/30/2006		0.3	0.4
LEAD (total recoverable)	05/31/2006		0.3	0.4
LEAD (total recoverable)	06/30/2006		0.4	0.4
LEAD (total recoverable)	07/31/2006		0.4	0.4
LEAD (total recoverable)	08/31/2006		0.4	0.4
LEAD (total recoverable)	09/30/2006		0.3	0.3
LEAD (total recoverable)	10/31/2006		0.4	0.4
LEAD (total recoverable)	11/30/2006		1.0	1.0
LEAD (total recoverable)	12/31/2006		0.5	0.5

LEAD (total recoverable)	01/31/2007		0.4	0.4
LEAD (total recoverable)	02/28/2007		0.4	0.4
LEAD (total recoverable)	03/31/2007		0.4	0.6
LEAD (total recoverable)	04/30/2007		0.3	0.3
LEAD (total recoverable)	05/31/2007		0.7	0.7
LEAD (total recoverable)	06/30/2007		0.3	0.3
LEAD (total recoverable)	07/31/2007		0.3	0.4
LEAD (total recoverable)	08/31/2007		0.8	0.8
LEAD (total recoverable)	09/30/2007		0.3	0.3
LEAD (total recoverable)	10/31/2007		0.5	0.6
LEAD (total recoverable)	11/30/2007		0.4	0.4
LEAD (total recoverable)	12/31/2007		0.7	0.7
LEAD (total recoverable)	01/31/2008		0.4	0.4
LEAD (total recoverable)	02/29/2008		0.3	0.3
LEAD (total recoverable)	03/31/2008		0.4	0.6
LEAD (total recoverable)	04/30/2008		0.5	0.5
LEAD (total recoverable)	05/31/2008		0.3	0.3
LEAD (total recoverable)	06/30/2008		0.2	0.2
LEAD (total recoverable)	07/31/2008		0.4	0.4
LEAD (total recoverable)	08/31/2008		0.3	0.3
LEAD (total recoverable)	09/30/2008		0.2	0.2
LEAD (total recoverable)	10/31/2008		0.6	0.6
LEAD (total recoverable)	11/30/2008		0.4	0.4
LEAD (total recoverable)	12/31/2008		0.4	0.4

LEAD (total recoverable)	1/31/2009		0.4	0.4
LEAD (total recoverable)	2/28/2009		0.6	0.6
LEAD (total recoverable)	3/31/2009		0.6	1.1
LEAD (total recoverable)	4/30/2009		0.7	0.7
LEAD (total recoverable)	5/31/2009		0.3	0.3
LEAD (total recoverable)	6/30/2009		0.8	0.8
LEAD (total recoverable)	7/31/2009		0.6	0.6
LEAD (total recoverable)	8/31/2009		0.3	0.3
LEAD (total recoverable)	9/30/2009		0.3	0.3
LEAD (total recoverable)	10/13/2009		0.3	0.3
LEAD (total recoverable)	10/31/2009		0.4	0.4
LEAD (total recoverable)	11/30/2009		0.2	0.2
LEAD (total recoverable)	12/31/2009		0.2	0.2
LEAD (total recoverable)	1/31/2010		0.3	0.3
LEAD (total recoverable)	2/28/2010		0.2	0.2
LEAD (total recoverable)	3/31/2010		0.1	0.2
LEAD (total recoverable)	4/30/2010		0.2	0.2
LEAD (total recoverable)	5/31/2010		0.3	0.3
LEAD (total recoverable)	6/30/2010		0.1	0.1
LEAD (total recoverable)	7/31/2010		0.2	0.2
LEAD (total recoverable)	8/31/2010		0.2	0.2
LEAD (total recoverable)	9/30/2010		0.3	0.3
LEAD (total recoverable)	10/31/2010		0.3	0.3
LEAD (total recoverable)	11/30/2010		0.2	0.2

LEAD (total recoverable)	12/31/2010		0.3	0.3
LEAD (total recoverable)	1/31/2011		0.3	0.3
LEAD (total recoverable)	2/28/2011		0.3	0.3
LEAD (total recoverable)	3/31/2011		0.2	0.2
LEAD (total recoverable)	4/30/2011		0.3	0.3
LEAD (total recoverable)	5/31/2011		0.2	0.2
LEAD (total recoverable)	6/30/2011		0.2	0.2
LEAD (total recoverable)	7/31/2011		0.4	0.1
LEAD (total recoverable)	8/31/2011		0.2	0.2
LEAD (total recoverable)	9/30/2011		0.2	0.2
LEAD (total recoverable)	10/31/2011		0.2	0.2
LEAD (total recoverable)	11/30/2011		0.2	0.2
LEAD (total recoverable)	12/31/2011		0.2	0.2
MERCURY (total recoverable)	08/31/2003		0.0052	0.0052
MERCURY (total recoverable)	09/30/2003		0.0022	0.0022
MERCURY (total recoverable)	10/31/2003		0.0123	0.0123
MERCURY (total recoverable)	11/30/2003		0.0040	0.0040
MERCURY (total recoverable)	12/31/2003		0.0053	0.0077
MERCURY (total recoverable)	01/31/2004		0.0058	0.0058
MERCURY (total recoverable)	02/29/2004		0.0032	0.0032
MERCURY (total recoverable)	03/31/2004		0.0037	0.0037
MERCURY (total recoverable)	04/30/2004		0.0026	0.0026
MERCURY (total recoverable)	05/31/2004		0.0058	0.0058
MERCURY (total recoverable)	06/30/2004		0.0032	0.0032

MERCURY (total recoverable)	07/31/2004		0.0022	0.0022
MERCURY (total recoverable)	08/31/2004		0.0021	0.0021
MERCURY (total recoverable)	09/30/2004		0.0028	0.0028
MERCURY (total recoverable)	10/31/2004		0.0018	0.0018
MERCURY (total recoverable)	11/30/2004		0.0037	0.0045
MERCURY (total recoverable)	12/31/2004		0.0024	0.0024
MERCURY (total recoverable)	01/31/2005		0.0017	0.0017
MERCURY (total recoverable)	02/28/2005		0.0017	0.0017
MERCURY (total recoverable)	03/31/2005		0.0024	0.0026
MERCURY (total recoverable)	04/30/2005		0.0033	0.0033
MERCURY (total recoverable)	05/31/2005		0.0013	0.0013
MERCURY (total recoverable)	06/30/2005		0.0020	0.0020
MERCURY (total recoverable)	07/31/2005		0.0059	0.0059
MERCURY (total recoverable)	08/31/2005		0.0025	0.0025
MERCURY (total recoverable)	09/30/2005		0.0029	0.0029
MERCURY (total recoverable)	10/31/2005		0.0039	0.0039
MERCURY (total recoverable)	11/30/2005		0.0000	0.0000
MERCURY (total recoverable)	12/31/2005		0.0034	0.0034
MERCURY (total recoverable)	01/31/2006		0.0002	0.0024
MERCURY (total recoverable)	02/28/2006		0.0018	0.0018
MERCURY (total recoverable)	03/31/2006		0.0033	0.0033
MERCURY (total recoverable)	04/30/2006		0.0017	0.0019
MERCURY (total recoverable)	05/31/2006		0.0015	0.0015
MERCURY (total recoverable)	06/30/2006		0.0030	0.0030

MERCURY (total recoverable)	07/31/2006		0.0040	0.0040
MERCURY (total recoverable)	08/31/2006		0.0018	0.0018
MERCURY (total recoverable)	09/30/2006		0.0011	0.0011
MERCURY (total recoverable)	10/31/2006		0.0011	0.0011
MERCURY (total recoverable)	11/30/2006		0.0022	0.0022
MERCURY (total recoverable)	01/31/2007		0.0023	0.0023
MERCURY (total recoverable)	02/28/2007		0.0041	0.0041
MERCURY (total recoverable)	03/31/2007		0.0021	0.0023
MERCURY (total recoverable)	04/30/2007		0.0027	0.0027
MERCURY (total recoverable)	05/31/2007		0.0014	0.0014
MERCURY (total recoverable)	06/30/2007		0.0012	0.0012
MERCURY (total recoverable)	07/31/2007		0.0011	0.0012
MERCURY (total recoverable)	09/30/2007		0.0012	0.0012
MERCURY (total recoverable)	10/31/2007		0.0023	0.0029
MERCURY (total recoverable)	11/30/2007		0.0017	0.0017
MERCURY (total recoverable)	12/31/2007		0.0032	0.0032
MERCURY (total recoverable)	01/31/2008		0.0020	0.0020
MERCURY (total recoverable)	02/29/2008		0.0020	0.0020
MERCURY (total recoverable)	03/31/2008		0.0000	0.0000
MERCURY (total recoverable)	04/30/2008		0.0000	0.0000
MERCURY (total recoverable)	05/31/2008		0.0176	0.0176
MERCURY (total recoverable)	06/30/2008		0.0014	0.0014
MERCURY (total recoverable)	08/31/2008		0.0000	0.0000
MERCURY (total recoverable)	09/30/2008		0.0015	0.0015

MERCURY (total recoverable)	11/30/2008		0.0013	0.0013
MERCURY (total recoverable)	1/31/2009		0.0021	0.0021
MERCURY (total recoverable)	2/28/2009		0.0000	0.0001
MERCURY (total recoverable)	3/31/2009		<.0011	0.0023
MERCURY (total recoverable)	4/30/2009		0.0014	0.0014
MERCURY (total recoverable)	5/31/2009		0.0013	0.0013
MERCURY (total recoverable)	6/30/2009		0.0010	0.0010
MERCURY (total recoverable)	7/31/2009		0.0000	0.0001
MERCURY (total recoverable)	8/31/2009		0.0018	0.0018
MERCURY (total recoverable)	9/30/2009		0.0013	0.0014
MERCURY (total recoverable)	10/13/2009		0.0013	0.0014
MERCURY (total recoverable)	10/31/2009		0.0024	0.0024
MERCURY (total recoverable)	11/30/2009		0.0011	0.0011
MERCURY (total recoverable)	12/31/2009		0.0000	0.0001
MERCURY (total recoverable)	1/31/2010		0.0030	0.0030
MERCURY (total recoverable)	2/28/2010		0.0016	0.0016
MERCURY (total recoverable)	3/31/2010		0.0014	0.0020
MERCURY (total recoverable)	5/31/2010		0.0023	0.0023
MERCURY (total recoverable)	6/30/2010		0.0000	0.0000
MERCURY (total recoverable)	7/31/2010		0.0000	0.0000
MERCURY (total recoverable)	8/31/2010		0.0014	0.0014
MERCURY (total recoverable)	9/30/2010		0.0017	0.0017
MERCURY (total recoverable)	10/31/2010		0.0024	0.0024
MERCURY (total recoverable)	11/30/2010		0.0017	0.0017

MERCURY (total recoverable)	12/31/2010		0.0019	0.0019
MERCURY (total recoverable)	1/31/2011		0.0520	0.0720
MERCURY (total recoverable)	2/28/2011		0.0013	0.0013
MERCURY (total recoverable)	3/31/2011		0.0024	0.0029
MERCURY (total recoverable)	4/30/2011		0.0029	0.0029
MERCURY (total recoverable)	5/31/2011		0.0030	0.0030
MERCURY (total recoverable)	6/30/2011		0.0024	0.0024
MERCURY (total recoverable)	7/31/2011		0.0014	0.0014
MERCURY (total recoverable)	8/31/2011		0.0015	0.0015
MERCURY (total recoverable)	9/30/2011		0.0015	0.0015
MERCURY (total recoverable)	10/31/2011		0.0023	0.0023
MERCURY (total recoverable)	11/30/2011		0.0017	0.0017
MERCURY (total recoverable)	12/31/2011		0.0022	0.0022
PH	08/31/2003	6.5		7.3
PH	09/30/2003	6.3		6.6
PH	10/31/2003	5.9		6.6
PH	11/30/2003	6.2		6.5
PH	12/31/2003	6.2		6.3
PH	01/31/2004	6.1		6.4
PH	02/29/2004	6.3		6.7
PH	03/31/2004	6.4		6.7
PH	04/30/2004	6.4		6.6
PH	05/31/2004	6.2		6.5
PH	06/30/2004	6.3		6.5

PH	08/31/2004	6.4		6.7
PH	09/30/2004	6.2		6.8
PH	10/31/2004	6.3		6.6
PH	11/30/2004	6.4		6.6
PH	12/31/2004	6.4		6.8
PH	01/31/2005	6.1		6.8
PH	02/28/2005	6.5		6.7
PH	03/31/2005	6.4		6.9
PH	04/30/2005	6.7		7.0
PH	05/31/2005	6.7		7.0
PH	06/30/2005	6.8		7.1
PH	07/31/2005	6.8		7.0
PH	08/31/2005	6.7		7.0
PH	09/30/2005	6.8		7.0
PH	10/31/2005	6.9		7.0
PH	11/30/2005	6.6		6.9
PH	12/31/2005	6.6		6.8
PH	01/31/2006	6.5		6.8
PH	02/28/2006	6.5		6.9
PH	03/31/2006	6.7		6.9
PH	04/30/2006	6.6		6.9
PH	05/31/2006	6.7		7.0
PH	06/30/2006	6.7		7.2
PH	07/31/2006	6.5		7.2

PH	08/31/2006	6.8		7.4
PH	09/30/2006	6.6		7.2
PH	10/31/2006	6.6		7.2
PH	11/30/2006	6.5		7.1
PH	12/31/2006	6.3		6.8
PH	01/31/2007	6.4		6.7
PH	02/28/2007	6.2		6.7
PH	03/31/2007	6.2		6.8
PH	04/30/2007	6.4		7.1
PH	05/31/2007	6.2		7.4
PH	06/30/2007	6.9		7.3
PH	07/31/2007	6.8		7.4
PH	08/31/2007	6.8		7.3
PH	09/30/2007	6.7		7.1
PH	10/31/2007	6.7		7.1
PH	11/30/2007	6.8		7.1
PH	12/31/2007	6.5		7.0
PH	01/31/2008	6.5		7.1
PH	02/29/2008	6.5		7.1
PH	03/31/2008	6.5		7.2
PH	10/31/2008	6.8		7.2
PH	11/30/2008	6.7		7.1
PH	12/31/2008	6.6		7.3
PH	1/31/2009	6.6		7.0

PH	3/31/2009	6.7		7.1
PH	4/30/2009	6.7		7.2
PH	5/31/2009	6.8		7.2
PH	6/30/2009	6.8		7.2
PH	7/31/2009	6.8		7.2
PH	8/31/2009	6.7		7.1
PH	9/30/2009	6.6		7.2
PH	10/13/2009	6.6		7.2
PH	10/31/2009	6.5		7.1
PH	11/30/2009	6.5		7.3
PH	12/31/2009	6.6		7.1
PH	1/31/2010	6.7		7.0
PH	2/28/2010	6.7		7.0
PH	3/31/2010	6.7		7.1
PH	4/30/2010	6.7		7.2
PH	5/31/2010	6.7		7.6
PH	6/30/2010	6.7		7.1
PH	7/31/2010	6.8		7.2
PH	8/31/2010	6.9		7.4
PH	9/30/2010	6.4		7.3
PH	10/31/2010	6.7		7.4
PH	11/30/2010	6.7		7.2
PH	12/31/2010	6.5		7.1
PH	1/31/2011	6.6		7.2

PH	2/28/2011	6.4		7.2
PH	3/31/2011	6.6		7.0
PH	4/30/2011	6.5		7.3
PH	5/31/2011	6.5		7.1
PH	6/30/2011	6.7		7.4
PH	7/31/2011	6.7		7.3
PH	8/31/2011	6.7		7.6
PH	9/30/2011	6.8		7.6
PH	10/31/2011	6.6		7.2
PH	11/30/2011	6.6		7.1
PH	12/31/2011	6.6		7.2
TEMPERATURE (C)	08/31/2003		22.3	23.1
TEMPERATURE (C)	09/30/2003		21.5	23.0
TEMPERATURE (C)	10/31/2003		19.8	21.3
TEMPERATURE (C)	11/30/2003		16.0	17.2
TEMPERATURE (C)	12/31/2003		14.5	15.8
TEMPERATURE (C)	01/31/2004		13.4	14.4
TEMPERATURE (C)	02/29/2004		13.8	14.7
TEMPERATURE (C)	03/31/2004		15.0	16.3
TEMPERATURE (C)	04/30/2004		16.9	18.0
TEMPERATURE (C)	05/31/2004		18.7	19.8
TEMPERATURE (C)	06/30/2004		20.2	21.5
TEMPERATURE (C)	08/31/2004		22.4	23.6
TEMPERATURE (C)	09/30/2004		20.8	22.4

TEMPERATURE (C)	10/31/2004		19.1	20.9
TEMPERATURE (C)	11/30/2004		17.1	18.4
TEMPERATURE (C)	12/31/2004		15.6	16.5
TEMPERATURE (C)	01/31/2005		14.4	15.4
TEMPERATURE (C)	02/28/2005		14.5	15.3
TEMPERATURE (C)	03/31/2005		15.9	17.1
TEMPERATURE (C)	04/30/2005		16.1	17.8
TEMPERATURE (C)	05/31/2005		18.4	20.7
TEMPERATURE (C)	06/30/2005		20.0	21.3
TEMPERATURE (C)	07/31/2005		21.6	23.0
TEMPERATURE (C)	08/31/2005		22.4	22.8
TEMPERATURE (C)	09/30/2005		21.0	22.7
TEMPERATURE (C)	10/31/2005		19.9	20.6
TEMPERATURE (C)	11/30/2005		16.7	18.2
TEMPERATURE (C)	12/31/2005		14.5	15.4
TEMPERATURE (C)	01/31/2006		13.5	14.4
TEMPERATURE (C)	02/28/2006		13.4	14.5
TEMPERATURE (C)	03/31/2006		14.6	16.0
TEMPERATURE (C)	04/30/2006		16.2	18.3
TEMPERATURE (C)	05/31/2006		18.2	20.2
TEMPERATURE (C)	06/30/2006			21.3
TEMPERATURE (C)	07/31/2006		21.5	23.1
TEMPERATURE (C)	08/31/2006		21.9	22.8
TEMPERATURE (C)	09/30/2006		21.1	22.5

TEMPERATURE (C)	10/31/2006		19.6	21.4
TEMPERATURE (C)	11/30/2006			18.2
TEMPERATURE (C)	12/31/2006			15.6
TEMPERATURE (C)	01/31/2007			14.5
TEMPERATURE (C)	02/28/2007			14.6
TEMPERATURE (C)	03/31/2007		14.3	15.4
TEMPERATURE (C)	04/30/2007			16.9
TEMPERATURE (C)	05/31/2007		17.7	19.3
TEMPERATURE (C)	06/30/2007			21.3
TEMPERATURE (C)	07/31/2007		21.4	22.9
TEMPERATURE (C)	08/31/2007			22.1
TEMPERATURE (C)	09/30/2007			22.1
TEMPERATURE (C)	10/31/2007			19.3
TEMPERATURE (C)	11/30/2007			17.8
TEMPERATURE (C)	12/31/2007			15.1
TEMPERATURE (C)	01/31/2008			14.3
TEMPERATURE (C)	02/29/2008			14.8
TEMPERATURE (C)	03/31/2008			15.5
TEMPERATURE (C)	10/31/2008			20.7
TEMPERATURE (C)	11/30/2008			18.4
TEMPERATURE (C)	12/31/2008			17.2
TEMPERATURE (C)	1/31/2009			14.1
TEMPERATURE (C)	3/31/2009			14.8
TEMPERATURE (C)	7/31/2009			23.1

TEMPERATURE (C)	1/31/2010			14.3
TEMPERATURE (C)	2/28/2010			14.6
TEMPERATURE (C)	3/31/2010			16.1
TEMPERATURE (C)	4/30/2010			16.8
TEMPERATURE (C)	5/31/2010			18.5
TEMPERATURE (C)	6/30/2010			19.2
TEMPERATURE (C)	7/31/2010			21.1
TEMPERATURE (C)	8/31/2010			22.2
TEMPERATURE (C)	9/30/2010			21.6
TEMPERATURE (C)	10/31/2010			20.7
TEMPERATURE (C)	11/30/2010			18.2
TEMPERATURE (C)	12/31/2010			15.7
TEMPERATURE (C)	1/31/2011			14.4
TEMPERATURE (C)	2/28/2011			15.0
TEMPERATURE (C)	3/31/2011			14.3
TEMPERATURE (C)	4/30/2011			15.6
TEMPERATURE (C)	5/31/2011			17.1
TEMPERATURE (C)	6/30/2011			19.7
TEMPERATURE (C)	7/31/2011			21.4
TEMPERATURE (C)	8/31/2011			22.6
TEMPERATURE (C)	9/30/2011			22.3
TEMPERATURE (C)	10/31/2011			20.5
TEMPERATURE (C)	11/30/2011			17.2
TEMPERATURE (C)	12/31/2011			15.0

TSS	08/31/2003		6.8	9.7
TSS	09/30/2003		4.9	5.3
TSS	10/31/2003		7.3	10.8
TSS	11/30/2003		9.3	10.1
TSS	12/31/2003		9.9	10.9
TSS	01/31/2004		10.1	11.7
TSS	02/29/2004		10.5	12.8
TSS	03/31/2004		12.4	14.6
TSS	04/30/2004		8.8	11.4
TSS	05/31/2004		7.4	16.3
TSS	06/30/2004		4.9	6.6
TSS	08/31/2004		8.2	11.8
TSS	09/30/2004		7.4	9.6
TSS	10/31/2004		3.9	5.6
TSS	11/30/2004		3.7	4.5
TSS	12/31/2004		3.9	4.5
TSS	01/31/2005		4.2	5.8
TSS	02/28/2005		4.0	4.2
TSS	03/31/2005		5.4	6.1
TSS	04/30/2005		3.7	5.0
TSS	05/31/2005		3.5	3.8
TSS	06/30/2005		5.3	9.1
TSS	07/31/2005		7.2	10.0
TSS	08/31/2005		3.2	4.8

TSS	09/30/2005		4.8	6.2
TSS	10/31/2005		6.4	7.5
TSS	11/30/2005		8.4	9.7
TSS	12/31/2005		4.0	5.7
TSS	01/31/2006		9.3	14.9
TSS	02/28/2006		6.3	12.1
TSS	03/31/2006		4.0	6.5
TSS	04/30/2006		3.6	4.4
TSS	05/31/2006		3.0	4.0
TSS	06/30/2006		5.0	6.0
TSS	07/31/2006		4.9	7.6
TSS	08/31/2006		3.2	4.0
TSS	09/30/2006		3.9	4.4
TSS	10/31/2006		5.0	6.0
TSS	11/30/2006		4.8	5.8
TSS	12/31/2006		6.0	8.5
TSS	01/31/2007		5.2	9.5
TSS	02/28/2007		5.8	8.0
TSS	03/31/2007		7.1	8.9
TSS	04/30/2007		6.4	7.8
TSS	05/31/2007		3.8	5.7
TSS	06/30/2007		4.1	4.6
TSS	07/31/2007		3.7	4.3
TSS	08/31/2007		2.9	3.4

TSS	09/30/2007		4.6	6.3
TSS	10/31/2007		6.0	7.3
TSS	11/30/2007		6.1	6.5
TSS	12/31/2007		7.1	8.8
TSS	01/31/2008		7.1	8.5
TSS	02/29/2008		7.1	10.5
TSS	03/31/2008		5.0	5.4
TSS	10/31/2008		2.1	2.6
TSS	11/30/2008		3.0	3.7
TSS	12/31/2008		4.4	6.0
TSS	1/31/2009		4.8	6.3
TSS	3/31/2009		3.8	5.3
TSS	4/30/2009		4.6	6.3
TSS	5/31/2009		2.8	3.9
TSS	6/30/2009		2.2	2.5
TSS	7/31/2009		2.6	3.2
TSS	8/31/2009		3.4	4.0
TSS	9/30/2009		3.1	4.5
TSS	10/13/2009		3.1	4.5
TSS	10/31/2009		4.7	7.2
TSS	11/30/2009		4.5	5.7
TSS	12/31/2009		6.1	7.0
TSS	1/31/2010		6.9	9.5
TSS	2/28/2010		3.4	3.9

TSS	3/31/2010		3.0	4.0
TSS	4/30/2010		4.5	6.8
TSS	5/31/2010		4.6	6.6
TSS	6/30/2010		2.5	3.0
TSS	7/31/2010		4.3	6.8
TSS	8/31/2010		3.4	4.6
TSS	9/30/2010		4.6	5.0
TSS	10/31/2010		5.7	7.0
TSS	11/30/2010		5.9	6.3
TSS	12/31/2010		6.4	7.6
TSS	1/31/2011		5.5	6.7
TSS	2/28/2011		4.6	4.9
TSS	3/31/2011		5.8	7.4
TSS	4/30/2011		7.5	9.2
TSS	5/31/2011		6.6	9.4
TSS	6/30/2011		5.2	7.8
TSS	7/31/2011		3.8	4.6
TSS	8/31/2011		3.5	5.2
TSS	9/30/2011		3.7	4.5
TSS	10/31/2011		9.7	14.5
TSS	11/30/2011		7.1	9.1
TSS	12/31/2011		5.3	6.9
TSS, % REMOVAL	08/31/2003	98.0		
TSS, % REMOVAL	09/30/2003	99.0		

TSS, % REMOVAL	10/31/2003	98.0		
TSS, % REMOVAL	11/30/2003	97.0		
TSS, % REMOVAL	12/31/2003	96.0		
TSS, % REMOVAL	01/31/2004	96.0		
TSS, % REMOVAL	02/29/2004	96.0		
TSS, % REMOVAL	03/31/2004	96.0		
TSS, % REMOVAL	04/30/2004	98.0		
TSS, % REMOVAL	05/31/2004	98.0		
TSS, % REMOVAL	06/30/2004	99.0		
TSS, % REMOVAL	07/31/2004	98.0		
TSS, % REMOVAL	08/31/2004	98.0		
TSS, % REMOVAL	09/30/2004	98.0		
TSS, % REMOVAL	10/31/2004	99.0		
TSS, % REMOVAL	11/30/2004	99.0		
TSS, % REMOVAL	12/31/2004	99.0		
TSS, % REMOVAL	01/31/2005	99.0		
TSS, % REMOVAL	02/28/2005	99.0		
TSS, % REMOVAL	05/31/2005	99.0		
TSS, % REMOVAL	06/30/2005	98.0		
TSS, % REMOVAL	07/31/2005	98.0		
TSS, % REMOVAL	08/31/2005	99.0		
TSS, % REMOVAL	09/30/2005	99.0		
TSS, % REMOVAL	10/31/2005	98.0		
TSS, % REMOVAL	11/30/2005	97.0		

TSS, % REMOVAL	12/31/2005	98.0		
TSS, % REMOVAL	01/31/2006	94.0		
TSS, % REMOVAL	02/28/2006	97.0		
TSS, % REMOVAL	03/31/2006	97.0		
TSS, % REMOVAL	04/30/2006	99.0		
TSS, % REMOVAL	05/31/2006	98.0		
TSS, % REMOVAL	06/30/2006	94.0		
TSS, % REMOVAL	07/31/2006	98.0		
TSS, % REMOVAL	08/31/2006	98.8		
TSS, % REMOVAL	09/30/2006	98.0		
TSS, % REMOVAL	10/31/2006	98.1		
TSS, % REMOVAL	11/30/2006	94.6		
TSS, % REMOVAL	12/31/2006	91.3		
TSS, % REMOVAL	01/31/2007	97.0		
TSS, % REMOVAL	02/28/2007	97.4		
TSS, % REMOVAL	03/31/2007	96.4		
TSS, % REMOVAL	04/30/2007	97.6		
TSS, % REMOVAL	05/31/2007	98.6		
TSS, % REMOVAL	06/30/2007	98.7		
TSS, % REMOVAL	07/31/2007	98.8		
TSS, % REMOVAL	08/31/2007	99.2		
TSS, % REMOVAL	09/30/2007	98.8		
TSS, % REMOVAL	10/31/2007	97.8		
TSS, % REMOVAL	11/30/2007	97.1		

TSS, % REMOVAL	12/31/2007	93.2		
TSS, % REMOVAL	01/31/2008	94.5		
TSS, % REMOVAL	02/29/2008	96.8		
TSS, % REMOVAL	03/31/2008	97.9		
TSS, % REMOVAL	04/30/2008	98.6		
TSS, % REMOVAL	05/31/2008	99.0		
TSS, % REMOVAL	06/30/2008	99.1		
TSS, % REMOVAL	07/31/2008	99.0		
TSS, % REMOVAL	08/31/2008	99.2		
TSS, % REMOVAL	09/30/2008	99.4		
TSS, % REMOVAL	10/31/2008	99.2		
TSS, % REMOVAL	11/30/2008	98.7		
TSS, % REMOVAL	12/31/2008	98.7		
TSS, % REMOVAL	1/31/2009	98.4		
TSS, % REMOVAL	2/28/2009	98.8		
TSS, % REMOVAL	3/31/2009	98.2		
TSS, % REMOVAL	4/30/2009	97.7		
TSS, % REMOVAL	5/31/2009	98.7		
TSS, % REMOVAL	6/30/2009	99.2		
TSS, % REMOVAL	7/31/2009	99.1		
TSS, % REMOVAL	8/31/2009	98.8		
TSS, % REMOVAL	9/30/2009	98.9		
TSS, % REMOVAL	10/13/2009	98.9		
TSS, % REMOVAL	10/31/2009	98.4		

TSS, % REMOVAL	11/30/2009	97.7		
TSS, % REMOVAL	12/31/2009	97.2		
TSS, % REMOVAL	1/31/2010	95.9		
TSS, % REMOVAL	2/28/2010	98.4		
TSS, % REMOVAL	3/31/2010	98.6		
TSS, % REMOVAL	4/30/2010	98.1		
TSS, % REMOVAL	5/31/2010	98.3		
TSS, % REMOVAL	6/30/2010	99.0		
TSS, % REMOVAL	7/31/2010	98.6		
TSS, % REMOVAL	8/31/2010	98.9		
TSS, % REMOVAL	9/30/2010	98.5		
TSS, % REMOVAL	10/31/2010	98.1		
TSS, % REMOVAL	11/30/2010	97.5		
TSS, % REMOVAL	12/31/2010	96.7		
TSS, % REMOVAL	1/31/2011	97.3		
TSS, % REMOVAL	2/28/2011	98.1		
TSS, % REMOVAL	3/31/2011	96.3		
TSS, % REMOVAL	4/30/2011	95.8		
TSS, % REMOVAL	5/31/2011	96.9		
TSS, % REMOVAL	6/30/2011	97.7		
TSS, % REMOVAL	7/31/2011	98.6		
TSS, % REMOVAL	8/31/2011	98.8		
TSS, % REMOVAL	9/30/2011	98.8		
TSS, % REMOVAL	10/31/2011	96.4		

TSS, % REMOVAL	11/30/2011	97.0		
TSS, % REMOVAL	12/31/2011	97.9		
ZINC (total recoverable)	01/31/2006		23.0	23.0
ZINC (total recoverable)	02/28/2006		41.0	44.0
ZINC (total recoverable)	03/31/2006		35.1	38.8
ZINC (total recoverable)	04/30/2006		42.0	44.3
ZINC (total recoverable)	05/31/2006		51.0	52.0
ZINC (total recoverable)	06/30/2006		47.0	47.0
ZINC (total recoverable)	07/31/2006		64.6	64.6
ZINC (total recoverable)	08/31/2006		53.9	53.9
ZINC (total recoverable)	09/30/2006		51.5	51.5
ZINC (total recoverable)	10/31/2006		55.9	55.9
ZINC (total recoverable)	11/30/2006		72.4	72.4
ZINC (total recoverable)	12/31/2006		43.3	43.3
ZINC (total recoverable)	01/31/2007		38.7	38.7
ZINC (total recoverable)	02/28/2007		44.3	44.3
ZINC (total recoverable)	03/31/2007		40.6	45.0
ZINC (total recoverable)	04/30/2007		34.8	34.8
ZINC (total recoverable)	05/31/2007		67.2	67.2
ZINC (total recoverable)	06/30/2007		39.0	39.0
ZINC (total recoverable)	07/31/2007		57.3	60.7
ZINC (total recoverable)	08/31/2007		69.8	71.9
ZINC (total recoverable)	09/30/2007		49.2	49.2
ZINC (total recoverable)	10/31/2007		54.4	59.4

ZINC (total recoverable)	11/30/2007		52.1	52.1
ZINC (total recoverable)	12/31/2007		23.7	23.7
ZINC (total recoverable)	01/31/2008		30.5	30.5
ZINC (total recoverable)	02/29/2008		29.7	29.7
ZINC (total recoverable)	03/31/2008		39.6	44.8
ZINC (total recoverable)	04/30/2008		38.4	38.4
ZINC (total recoverable)	05/31/2008		45.0	45.0
ZINC (total recoverable)	06/30/2008		30.7	30.7
ZINC (total recoverable)	07/31/2008		41.6	41.6
ZINC (total recoverable)	08/31/2008		46.8	46.8
ZINC (total recoverable)	09/30/2008		46.5	46.5
ZINC (total recoverable)	10/31/2008		65.0	65.0
ZINC (total recoverable)	11/30/2008		60.6	60.6
ZINC (total recoverable)	12/31/2008		53.0	53.0
ZINC (total recoverable)	1/31/2009		22.8	22.8
ZINC (total recoverable)	2/28/2009		45.8	45.8
ZINC (total recoverable)	3/31/2009		49.0	49.5
ZINC (total recoverable)	4/30/2009		37.1	37.1
ZINC (total recoverable)	5/31/2009		37.7	37.7
ZINC (total recoverable)	6/30/2009		44.9	44.9
ZINC (total recoverable)	7/31/2009		53.6	53.6
ZINC (total recoverable)	8/31/2009		43.1	43.1
ZINC (total recoverable)	9/30/2009		43.4	46.5
ZINC (total recoverable)	10/13/2009		43.4	46.5

ZINC (total recoverable)	10/31/2009		55.0	55.0
ZINC (total recoverable)	11/30/2009		27.5	27.5
ZINC (total recoverable)	12/31/2009		20.8	20.8
ZINC (total recoverable)	1/31/2010		19.7	19.7
ZINC (total recoverable)	2/28/2010		28.8	28.8
ZINC (total recoverable)	3/31/2010		29.4	30.1
ZINC (total recoverable)	4/30/2010		24.2	24.2
ZINC (total recoverable)	5/31/2010		29.0	29.0
ZINC (total recoverable)	6/30/2010		23.6	23.6
ZINC (total recoverable)	7/31/2010		35.0	35.0
ZINC (total recoverable)	8/31/2010		39.5	39.5
ZINC (total recoverable)	9/30/2010		45.0	45.0
ZINC (total recoverable)	10/31/2010		39.3	39.3
ZINC (total recoverable)	11/30/2010		28.9	28.9
ZINC (total recoverable)	12/31/2010		39.9	39.9
ZINC (total recoverable)	1/31/2011		35.7	35.7
ZINC (total recoverable)	2/28/2011		27.4	27.4
ZINC (total recoverable)	3/31/2011		23.6	24.4
ZINC (total recoverable)	4/30/2011		22.9	22.9
ZINC (total recoverable)	5/31/2011		27.9	27.9
ZINC (total recoverable)	6/30/2011		24.4	24.4
ZINC (total recoverable)	7/31/2011		25.1	25.1
ZINC (total recoverable)	8/31/2011		28.7	28.7
ZINC (total recoverable)	9/30/2011		44.5	44.5

ZINC (total recoverable)	10/31/2011		45.9	45.9
ZINC (total recoverable)	11/30/2011		37.3	37.3
ZINC (total recoverable)	12/31/2011		24.0	24.0

APPENDIX F – PRE-CERTIFICATION OF DRAFT PERMIT

DRAFT CERTIFICATION UNDER 401 OF THE CLEAN WATER ACT FOR PUYALLUP WASTEWATER TREATMENT PLANT (PUYALLUP, WASHINGTON)

As required under section 401 of the Clean Water Act, the Puyallup Tribe of Indians has been requested by EPA to certify that the wastewater discharged from the City of Puyallup Wastewater Treatment Plant will comply with the Water Quality Standards for Surface Waters of the Puyallup Tribe. Region X EPA is proposing to issue a National Pollutant Discharge Elimination System permit (WA-003716-8) to the City of Puyallup Wastewater Treatment Plant, authorizing the discharge of wastewater from the wastewater treatment facility located in the City of Puyallup to the Puyallup River at latitude 47º12'26"N, longitude 122º 19' 11" W.

Upon review of the draft NPDES permit (WA-003716-8), the Puyallup Tribe of Indians is granting certification under Section 401 of the Clean Water Act that there is reasonable assurance that the proposed activity and resulting discharge is in compliance with requirements of the Clean Water Act and Water Quality Standards for Surface Waters of the Puyallup Tribe provided that the following conditions are satisfied:

1. A mixing zone pursuant to section 9 of the Tribe's Water Quality Standards is authorized for copper, pH, and ammonia provided that the City of Puyallup monitor annually during critical conditions at the edge of the mixing zone. The intent of monitoring is to ensure that water quality criteria are met at the edge of the mixing zone over the life of the NPDES permit. Samples should be collected prior to the annual maintenance of the outfall and diffuser valves so that samples are representative of typical conditions. The Tribe will work with the City of Puyallup in developing a monitoring program that includes upstream sampling as well as sampling within the mixing zone boundary. A Quality Assurance Project Plan shall be submitted to the Tribe's Environmental Protection Department for review and approval prior to sampling. See Section I.D. of the draft permit.

2. As required in Section I.D. of the draft permit, the permittee must conduct surface water monitoring for total ammonia, temperature, pH, hardness, arsenic (total, dissolved, inorganic), copper (dissolved), and mercury (total). The permittee must develop a plan or modify the existing plan to incorporate new parameters, including continuous temperature monitoring for both effluent temperature monitoring and surface water temperature monitoring. Sampling frequencies, methods, and method detection limit thresholds for all parameters to be sampled are detailed in Table 2 of the draft permit. Continuous temperature monitoring of the effluent shall begin within six months of the effective date of the permit. The temperature sensor should be set to record at one-hour intervals. The 1-day maximum temperature and the 7-day average of the daily maximum temperatures (7-DADMax) should be recorded on the DMRs. The electronic data file must be submitted to the Puyallup Tribe annually by January 31st for the previous monitoring. A placement log that includes the following information relative to

the sensor deployment must be included in the submittal: date, time, temperature device manufacturer ID, location, depth, whether it measured air or water temperature, and any other details that may explain data anomalies. The Report must be submitted to EPA and the Puyallup Tribe with the application for permit renewal. See Section I.D (No. 1 through 10) and Table 2, including table notes, of the draft permit.

3. As required in Section II.B of the draft permit, the permittee must conduct arsenic monitoring for five years to assist in determining if there is reasonable potential for inorganic arsenic to exceed human health criteria. The permittee must monitor treatment plant influent and effluent quarterly for inorganic arsenic and total recoverable arsenic for five years. The permittee must also monitor the upstream receiving water for inorganic, dissolved, and total recoverable arsenic. The monitoring results must be submitted to EPA and the Tribe with the application for permit renewal and reported on the DMRs. See Section I.D. and II.B.

4. The permittee shall conduct an annual outfall inspection and repair any and all tide-flex valves damaged by the river bed load during low flow conditions. This annual inspection and maintenance program is intended to optimize mixing and dilution.

5. Monitoring data must be submitted electronically to EPA and the Tribe no later than the 15th of the month following the completed reporting period. Electronic submittals can be e-mailed directly to Char Naylor at char.naylor@puyalluptribe.com.

6. The permittee shall provide an annual report to the USFWS, NMFS and the Puyallup Tribe by February 15 each year of the permit term. The annual report shall compile and summarize data and information from Discharge Monitoring Reports submitted by the City of Puyallup, and shall include the following:
   a. A summary of maximum reported effluent discharge concentration
   b. A summary of any reported effluent limit violations.
   c. A summary of any reported emergency and/or non-compliance events, including any instances when the WWTP discharged under bypass or upset conditions.
   d. A summary of surface/receiving water monitoring data.
   e. Results of annual Whole Effluent Toxicity testing.
   f. A summary if there have been any significant revisions to the facility operation and maintenance (O&M) plan.

   See Section III.B.3 in the draft permit.