FACT SHEET FOR
NPDES PERMIT NO. WA-002406-6

CITY OF BRIDGEPORT
PUBLICLY OWNED TREATMENT WORKS

JANUARY 23, 2009

PURPOSE OF THIS FACT SHEET

This fact sheet explains and documents the decisions Ecology made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for the City of Bridgeport Publicly-Owned Treatment Works (POTW).

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit *and accompanying fact sheet* for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for the Bridgeport POTW NPDES Permit No. WA-002406-6, are available for public review and comment from March 5, 2009 until April 5, 2009. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement**.

The City of Bridgeport reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this Fact Sheet as **Appendix D - Response to Comments**, and publish it when issuing the final NPDES permit. Ecology will not revise the rest of the fact sheet, but the full document will become part of the legal history contained in the facility's permit file.

Jean Hays prepared the permit and this fact sheet.

SUMMARY

During the previous permit, limits were placed on Biochemical Oxygen Demand, Total Suspended Solids, pH, and Fecal Coliform Bacteria. The proposed permit does not contain substantial changes to the permit limits. The proposed permit requires the City of Bridgeport to take steps towards increasing the capacity of the Bridgeport POTW.

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the State of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations apply to municipal NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Technical criteria for discharges from municipal wastewater treatment facilities (chapter 173-221 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC) and for ground waters (chapter 173-200 WAC)
- Sediment management standards (chapter 173-204 WAC)
  Submission of Plans and Reports for Construction of Wastewater Facilities (Chapter 173-240 WAC)

These rules require any treatment facility operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for requirements imposed by the permit.

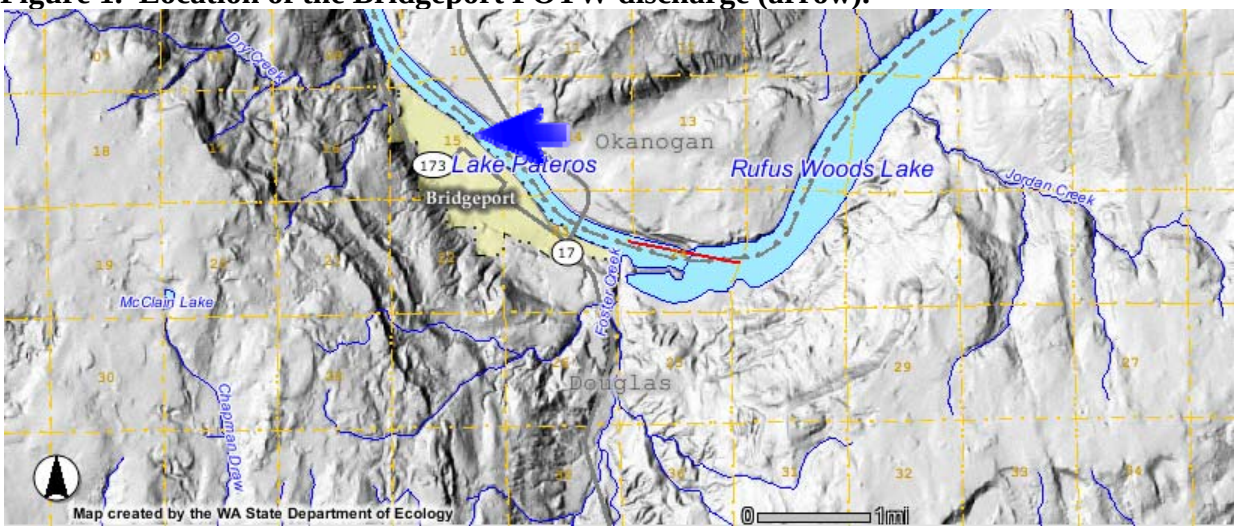
Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See **Appendix A—*Public Involvement*** for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit. Ecology will summarize the responses to comments and any changes to the permit in **Appendix D.**

BACKGROUND INFORMATION

TABLE 1 - GENERAL FACILITY INFORMATION

Applicant:	City of Bridgeport
Facility Name and Address:	Bridgeport Publicly Owned Treatment Plant
Type of Treatment:	Oxidation Ditch Activated Sludge
Discharge Location:	Columbia River, River Mile 543.7 Latitude: 48º 01' 10" N Longitude: 119º 41' 12" W
Waterbody ID Number:	1240483462464

Figure 1. Location of the Bridgeport POTW discharge (arrow).



FACILITY DESCRIPTION

The Bridgeport Publicly-Owned Treatment Works (POTW) discharges to the Columbia River at River Mile (RM) 543.7. The Wells Dam, located at RM 515.5, controls the elevation of the Lake Pateros reservoir in the vicinity of Bridgeport. The Chief Joseph Dam is located immediately upstream of Bridgeport on the Columbia River at RM 545.1. The Rufus Woods Lake was created by the construction of the Chief Joseph Dam and is upstream of Lake Pateros and Bridgeport.

History

The Bridgeport POTW was constructed at its current location in 1968. The POTW was constructed at that time with dam-related funding because the Wells Dam, constructed in 1967, raised the Columbia River elevation in the vicinity of Bridgeport.

In 1995 and 1997, the Bridgeport POTW was upgraded in two phases with a new clarifier, new headworks including flow measurement, ultraviolet (UV) disinfection, backup generator, new oxidation ditch aerators, and a bag sludge dewatering system.

Collection System Status

Most of the city's collection system was constructed between 1950 and 1951 (Forsgren 2001). Consultants prepared a General Sewer Plan in 2000 and there have been no substantial changes to the collection system since then. An Infiltration and Inflow (I&I) study conducted in 1998 did not find excessive I&I. The city has been testing the system because of inflow and flooding incidents during the past year (Schweizer 2008).

The area served by the existing collection system is about 360 acres. The system consists of about 10,400 feet of 15-inch pipe, 1,200 feet of 10-inch pipe, and 23,300 feet of 8-inch pipe (Forsgren 2001). There is also a septic tank effluent pump system from Marina Park to the Bridgeport POTW.

The existing city limits include an additional 300 acres outside of the collection system area. There is also another 800 acres within the Bridgeport Urban Growth Area (Forsgren 2001).

The Bridgeport population is higher in the summer and lower in the winter than average due to seasonal agricultural workers. During 2000, the city was predicting a decrease in population, but the decrease was not substantial. The current population is estimated to be about 2075.

Treatment Processes

The plant headworks consists of a new fine screen, manual bar screen, grit channel, comminutor, Parshall flume with ultrasonic flow meter, and sampler. An oxidation ditch with return activated sludge provides treatment. Two secondary clarifiers process the effluent prior to UV disinfection and discharge. Wasted sludge is processed by a sludge bagging unit. The bags of sludge are allowed to age prior to biosolids collection and land application.

The Bridgeport POTW is a class 2 plant. There are few commercial users and no industrial users. The city has two operators; one group 1 and one group 3.

The Bridgeport POTW is staffed Monday through Friday from 8 a.m. to 4:30 p.m. and checks are performed on the weekends. The POTW has alarms and an auto-dialer.

The city is currently in the process of applying for grants and loans for a facility plan for the POTW that would allow future city growth.

Discharge Outfall

The treated and disinfected effluent flows into the Columbia River through a deep 10-inch pipe with no diffuser.

Solid Wastes

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings) in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are drained and disposed of as solid waste at the Okanogan County landfill.

Solids removed from the secondary clarifiers are treated by a bag process and aged. The resulting biosolids are tested and collected by Biosolids Inc. for land treatment in accordance with the State of Washington General Permit for Biosolids Management.

PERMIT STATUS

Ecology issued the previous permit for this facility on November 14, 2003. The previous permit placed effluent limits on Biochemical Oxygen Demand, Total Suspended Solids, pH and Fecal Coliform Bacteria.

The City of Bridgeport submitted an application for permit renewal on December 13, 2007. Ecology accepted it as complete on December 18, 2007.

SUMMARY OF COMPLIANCE WITH PREVIOUS PERMIT

Ecology staff last conducted a non-sampling compliance inspection on September 26, 2008.

The Bridgeport POTW has been substantially in compliance with the effluent limits and permit conditions throughout the duration of the permit issued on November 14, 2003**.**

Ecology has had some concerns about the Bridgeport POTW during the period of the previous permit that will be resolved by a planned upgrade. The concerns include:

- Operation of the plant with high sludge volume index and mixed liquor suspended solids, which has occasionally resulted in floating sludge leaving the plant.

- Failing to submit an engineering report to Ecology for improvements.

The city has applied for funding for a facility plan and the POTW will be upgraded when funding is available.

Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and on inspections conducted by Ecology.

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports.

Table 2 shows the summarized Bridgeport POTW data from January 2004 to July 2008 samples and measurements. Because of the high amount of old sludge that has been in the POTW during the previous permit period, floating sludge has occasionally left the plant. Although the floating sludge is mostly inert, it can carry some BOD and Fecal Coliform Bacteria as well as TSS out to the river. Ecology cannot quantify the amount with current tests, therefore the actual range for these parameters is unknown.

Table 2. Wastewater Characterization (January 2004 to July 2008).

Parameter	Average	Maximum
Effluent		
5-day Biochemical Oxygen Demand (BOD_5) mg/L	2.5	6
BOD_5 lbs/day	3.9	11
BOD_5 % Removal	98.8	98 (Minimum)
Total Suspended Solids (TSS), mg/L	2.4	7
TSS lbs/day	3.9	12
TSS % Removal	98.8	96 (Minimum)
Fecal Coliform Bacteria	2.6	16
pH Range, Standard Units	6.2 to 7.9	
Ammonia, mg/L	0.75	3.0
Dissolved Oxygen, mg/L	5.3	0.3 (Minimum)
Maximum Daily Temperature ºC	15.9	24.4
Hardness, mg/L as CaCO3	183	205
Alkalinity, mg/L as CaCO3	116	220
Influent		
Flow, MGD	0.19	0.28
BOD, mg/L	198	415
BOD lbs/day	311	613
TSS, mg/L	200	551
TSS, lbs/day	315	910

DESCRIPTION OF THE RECEIVING WATER

The Bridgeport POTW discharges to The Columbia River at RM 543.7. Measurements have determined that the Columbia River is impaired for temperature at both Chief Joseph Dam and Wells Dam. There are no other nearby point source outfalls or significant nearby non-point sources of pollutants. Discharges from the cities of Brewster and Pateros are located about 12 and 19 river miles downstream, respectively. The Methow and Okanogan rivers enter the Columbia River in the Lake Pateros section.

The EPA is conducting a Columbia/Snake River Temperature TMDL study. Columbia River temperature has been increased by the large dams by 13 percent (EPA 2002). The areas impounded by the dams are not cooled as are the free-flowing areas. In the future, the Bridgeport POTW may receive a temperature wasteload allocation as a result of the TMDL study. However, the EPA is the lead agency for the temperature TMDL and is not currently moving the study forward.

The ambient background data used for this permit is shown in Table 3. Except for temperature, the ambient data are from Ecology monthly sampling in the Columbia River at Highway 2, (RM 469.4, north of Wenatchee) for the period October 2005 to September 2006. The temperature data used were collected by the Corps of Engineers at the Chief Joseph Dam tailwater.

Table 3. Ambient Background Data

Parameter	**Value used**
Temperature (highest daily maximum)	19.8 ºC
pH, standard units, upper 90th percentile	8.24
Dissolved Oxygen, chronic lower 10th percentile	9.1 mg/L
Total Ammonia	Not detected at 0.01 mg/L
Fecal Coliform Bacteria, Colony Forming Units (CFU), Geometric mean	2/100 mL
Turbidity, upper 90th percentile	3.0 NTU
Hardness, average	65 mg/L as CaCO3

PROPOSED PERMIT LIMITS

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).

- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36).

- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Nor does Ecology usually develop limits for pollutants that were not reported in the permit application but that may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. If significant changes occur in any constituent of the effluent discharge, the City of Bridgeport is required to notify Ecology (40 CFR 122.42(a)). The Bridgeport POTW may be in violation of the permit until Ecology modifies the permit to reflect additional discharge of pollutants.

DESIGN CRITERIA

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology-approved design criteria for this facility's treatment plant were obtained from the General Sewer Plan (Forsgren 2001a) and Operation and Maintenance Manual (Forsgren 2001b). The design criteria are shown in Table 4.

Table 4: Design Criteria for the Bridgeport POTW.

Parameter	Design Quantity
Maximum Monthly Average Flow	0.30 MGD
Average Daily Flow	0.175 MGD
BOD_5 loading for maximum month	350 lbs/day
TSS loading for maximum month	400 lbs/day

TECHNOLOGY-BASED EFFLUENT LIMITS

Federal and state regulations define technology-based effluent limits for municipal wastewater treatment plants. These effluent limits are given in 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available, and reasonable methods of prevention, control, and treatment (AKART) for municipal wastewater.

Chapter 173-221 WAC lists the following technology-based limits for pH, fecal coliform, BOD_5, and TSS:

Table 5: Technology-based Limits.

Parameter	Limit
pH	The pH must measure within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD_5 (concentration)	Average Monthly Limit is the most stringent of the following: 30 mg/L May not exceed 15% of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: 30 mg/L May not exceed 15% of the average influent concentration Average Weekly Limit = 45 mg/L

The technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent mass loadings (lbs/day) = maximum monthly influent BOD_5 design loading (350 lbs/day) x 0.15 = 52.5 lbs/day. Monthly effluent mass loadings (lbs/day) = maximum monthly influent TSS design loading (400 lbs/day) x 0.15 = 60.0 lbs/day.

The weekly average effluent mass loading for BOD and TSS= 1.5 x monthly loading = 78.8 and 90.0 lbs/day, respectively.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITS

The Washington State Surface Water Quality Standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

Numerical Criteria for the Protection of Aquatic Life and Recreation

Numerical water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA 1992). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other disease, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.

- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200; 2006) and of all marine waters (WAC 173-201A-210; 2006) in the State of Washington.

Antidegradation

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

This facility must meet Tier I requirements. Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC. For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.

Ecology's analysis described in this section of the fact sheet demonstrates that the existing and designated uses of the receiving water will be protected under the conditions of the proposed permit.

As part of the facility plan for the planned upgrade, an analysis will be required by Permit Condition S9 to determine if there will be any measureable change in water quality of the receiving water as a result of increased plant capacity (WAC 173-201A-320 (3)).

Mixing Zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and use no more than 25% of the available width of the water body for dilution.

Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derive any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's *Permit Writer's Manual*). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 10 means the effluent is 10% and the receiving water is 90% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and

effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life **acute** criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Each aquatic life **chronic** criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water.
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. Ecology must specify both the allowed size and location in a permit.

The proposed permit specifies the size and location of the allowed mixing zone.

2. The facility must fully apply "all known, available, and reasonable methods of prevention, control and treatment" (AKART) to its discharge.

Ecology has determined that the treatment provided at the Bridgeport POTW meets the requirements of AKART (see "Technology based Limits").

3. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the waterbody's critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water.

Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution and distance it takes for a plume to reach the surface (when there is little or no stratification). Ecology's *Permit Writer's Manual* describes additional guidance on criteria/design conditions for determining dilution factors.

The manual can be obtained from Ecology's website at:
http://www.ecy.wa.gov/biblio/92109.html.

Ecology modeled the following design conditions. These conditions were determined using USGS data for the Columbia River at Bridgeport and analyzed with the DFLOW model.

- The seven-day-average low river flow with a recurrence interval of ten years (7Q10) used for evaluating risks to aquatic life.
- The thirty-day low river flow with a recurrence interval of five years (30Q5) used for evaluating non-carcinogen human health risks.
- The Harmonic Mean flow used for evaluating human health carcinogen risks.

Table 6 shows the estimated river elevation, percentiles, flow, and velocity for the design flows used in modeling and the mean flow. Wells Dam operates at elevations from 771 feet to 781 feet, but most of the time operates between 779 and 781 feet, with 780 feet the average elevation (Pflueger 2008). On average, September is the month with the lowest flow (Sage 2008). The estimated 7Q10 and 30Q5 elevations may be high for Wells Dam, but water levels at Bridgeport are also influenced by Chief Joseph Dam operations.

Table 6. Mean and Cormix model values.

Design Flow	Flow, cfs	Percentile	Velocity, ft/sec	Elevation, feet
Mean/Average	109,400[a]	50	Not modeled	780[c]
Harmonic Mean	92,700[b]	42.6[b]	6.8	779.5
30Q5	59,000[b]	7.6[b]	4.3	777.6[d]
7Q10	44,800[b]	2.0[b]	3.3	772[e]

Footnotes:

a. USGS 2004.

b. DFLOW output (Appendix C).
c. Pflueger personal communication 2008.
d. Average elevation at Wells Dam September 19 to 29, 2008 (NOAA 2008).
e. Average elevation at Wells Dam November 5 to 14, 2008 (NOAA 2008).

Other model parameters include:

- Manning roughness coefficient 0.035.
- Maximum average monthly effluent flow of 0.30 MGD for chronic and human health.
- Maximum daily flow of 0.30 MGD for acute mixing zone.
- 1 Day maximum effluent temperature of 19.8 degrees C.

4. Supporting information must clearly indicate the mixing zone would not:

- **Have a reasonable potential to cause the loss of sensitive or important habitat.**
- **Substantially interfere with the existing or characteristic uses.**
- **Result in damage to the ecosystem.**
- **Adversely affect public health.**

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to generally protect the species tested and to fully protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of being discharged.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics and the discharge location. Based on this review, Ecology concluded that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health if the permit limits are met.

5. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis using procedures established by the EPA and by Ecology, for each pollutant and concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met.

6. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. The plume rises through the water column as it mixes, therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95^{th} percentile pollutant concentration, the 90^{th} percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum size of mixing zone.

The authorized mixing zone does not exceed the maximum size restriction.

8. Acute Mixing Zone.

- **The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.**

  Ecology determined the acute criteria will be met at 10% of the distance of the chronic mixing zone at the ten year low flow.

- **The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.**

  As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

- **Comply with size restrictions.**

  The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

9. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

DESIGNATED USES AND SURFACE WATER QUALITY CRITERIA

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). Criteria applicable to this facility's discharge are summarized in Table 8.

Aquatic Life Uses are designated based on the presence of, or the intent to provide protection for, the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species.

The Wells Dam is the last dam on the Columbia River that has fish passage. Migrating fish are no longer able to use Columbia River habitats above Chief Joseph Dam. A wide diversity of resident and introduced fish species use the Columbia River habitat near Bridgeport (Table 7). Many different salmonid stocks migrate upriver past the Wells Dam to the Okanogan and Methow rivers and creeks that discharge to the Lake Pateros section of the Columbia River.

Table 7. Fish species using the Columbia River near Bridgeport (BPA/Colville Tribes 2007).

Salmonids, Resident	Resident Fish	Introduced Fish
Upper Okanogan Sockeye salmon	White Sturgeon	Brown trout
Upper Columbia River summer steelhead	Chiselmouth	Common carp
Upper Columbia River spring Chinook	Dace species	Pumpkinseed
Upper Columbia River summer/fall Chinook	Redside shiner	Bass species
Bull trout	Sucker species	Black crappie
Rainbow trout	Burbot	Yellow perch
Mountain whitefish	Sculpin species	Walleye
Redband trout	Peamouth	
Coho salmon	Northern pikeminnow	

In 1999, the federal government listed Upper Columbia River spring Chinook Salmon population as endangered. The Upper Columbia steelhead population was also listed as endangered at that time and a 2007 court decision upheld that determination (NMFS 2008). The Upper Columbia River summer/fall Chinook population is considered depressed by the State of Washington. The Sockeye salmon only spawn and rear in the Canadian Okanogan Region and are considered depressed by the State of Washington (BPA/Colville Tribes 2007).

Historically, deepwater main stem Columbia River Chinook salmon spawning occurred from the lower river upriver to Kettle Falls, Washington (Chapman 1943; van der Naald et al., 2001). Little work has been done above Bonneville dam to identify deepwater spawning areas, therefore the extent of deepwater spawning near Bridgeport is unknown (Mueller 2002; van der Naald et al., 2001; Keller 2005).

Table 8. Aquatic Life Uses & Associated Criteria

Salmonid Spawning, Migration, and Rearing	
Temperature Criteria – Highest 1-Day Maximum	20°C , 17.5 °C 7-Day Average Recommended When natural conditions exceed a 1-DMax of 20ºC, no temperature increase will be allowed which will raise the receiving water temperature greater than 0.3ºC due to any single source or 1.1ºC due to all activities combined.
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	Dissolved oxygen shall exceed 90 percent of saturation (or 8.0 mg/L use-based)
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU
pH Criteria	pH shall be within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units

The recreational uses are extraordinary primary contact recreation, primary contact recreation, and secondary contact recreation. The recreational uses for this receiving water are identified in Table 9.

Table 9.Recreational Uses and Associated Criteria

Recreational Use	**Criteria**
Primary Contact Recreation	Fecal coliform bacteria counts must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL

The water supply uses are domestic, agricultural, industrial, and stock watering. The miscellaneous freshwater uses are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

EVALUATION OF SURFACE WATER QUALITY-BASED EFFLUENT LIMITS FOR NUMERIC CRITERIA

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants—their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by chapter 173-201A WAC.

Chronic Mixing Zone

WAC 173-201A-400(7)(a) specifies that mixing zones must not extend in a downstream direction from the discharge ports for a distance greater than 300 feet plus the depth of water over the discharge ports or extend upstream for a distance of over 100 feet, not utilize greater than 25% of the flow, and not occupy greater than 25% of the width of the water body.

The horizontal distance of the chronic mixing zone is 317 feet. The mixing zone extends from the river bottom to the water surface.

Acute Mixing Zone

WAC 173-201A-400(8)(a) specifies that in rivers and streams a zone where acute toxics criteria may be exceeded must not extend beyond 10% of the distance towards the upstream and downstream boundaries of the chronic zone, not use greater than 2.5% of the flow and not occupy greater than 25% of the width of the water body.

The horizontal distance of the acute mixing zone is 31.7 feet. The mixing zone extends from the river bottom to the water surface. The dilution factor is based on this distance.

Ecology determined the dilution factors that occur within these zones at the critical condition using Cormix I. The dilution factors are listed in Table 10:

Table 10. Dilution Factors (Appendix C).

Criteria	Acute	Chronic
Aquatic Life	15.5	82.1
Human Health, Carcinogen		92.1
Human Health, Non-carcinogen		84.0

Ecology determined the impacts of dissolved oxygen deficiency, temperature, pH, fecal coliform bacteria, ammonia, as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

BOD_5 and Dissolved Oxygen

Ecology predicted no violation of the surface water quality standards for biochemical oxygen demand (BOD) under critical conditions. Therefore, the proposed permit contains the technology-based effluent limit for BOD_5.

Ecology modeled the impact of BOD on the receiving water using Cormix, Streeter Phelps and Dissolved Oxygen EPA models, at critical condition and with the technology-based effluent limit for BOD_5 described under "Technology-Based Effluent Limits" above. The calculations to determine dissolved oxygen impacts are shown in Appendix C. At maximum allowed BOD concentrations and minimum dissolved oxygen, the EPA models predict an initial dissolved oxygen impact at the outfall of less than 0.2 mg/L. Dissolved oxygen impacts are not predicted at the edge of the mixing zone.

Temperature

The state temperature standards (WAC 173-201A-200-210 and 600-612) include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15)
- Supplemental spawning and rearing season criteria (September 15 to June 15)
- Incremental warming restrictions
- Protections against acute effects

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

Annual summer maximum and supplementary spawning/rearing criteria

Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), 210(1)(c), and Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

Incremental warming criteria

The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), 210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment. These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition.

When Ecology has not yet completed a TMDL, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25% or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

Temperature Acute Effects

Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C; unless a dilution analysis indicates ambient temperatures will not exceed 33°C two-seconds after discharge.

General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.

Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

The US Army Corps of Engineers (USACE 2007) monitors the Chief Joseph Dam tailwater temperature continuously at hourly intervals. Ecology downloaded that data for 2005 to 2008 and determined that the Maximum Daily temperature for that period is 19.8 °C. The river temperature warms during the summer because of the impoundments. The Columbia River temperature near Bridgeport is elevated above the recommended 17.5 °C temperature for salmonid rearing and migration from approximately mid-August to mid-October. The temperature did not exceed the current 1-day maximum temperature criteria of 20 °C during the 2005-2008 period.

Potential temperature effects from the Bridgeport POTW on the receiving water habitats and biota will be evaluated after continuous monitoring of the effluent has been conducted.

Data Collection Required

Ecology does not have the continuous monitoring data for the Bridgeport effluent needed to determine compliance with water quality criteria for temperature. The proposed permit requires Bridgeport to monitor effluent temperature and report the maximum daily results to Ecology.

pH

Ecology modeled the impact of the effluent pH on the receiving water using the calculations from EPA, 1988, and the chronic dilution factor of 82.1. The receiving water input variables used are listed in Table 3. The effluent input variables used are included in Table 2.

Ecology predicts no violation of the pH criteria under critical conditions. Therefore, the proposed permit includes technology-based effluent limits for pH.

Fecal Coliform Bacteria

Ecology modeled the numbers of fecal coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 84.

Under critical conditions, modeling predicts no violation of the water quality criterion for fecal coliform bacteria. Therefore, the proposed permit includes the technology-based effluent limit for fecal coliform bacteria.

Toxic Pollutants

Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

Ammonia is present in the discharge. Ecology conducted a reasonable potential analysis (Appendix C) on ammonia to determine whether it would require effluent limits in this permit.

Valid ambient background data were available for ammonia. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards. Ecology determined that ammonia in the effluent posed no reasonable potential to exceed the water quality criteria at the critical condition using procedures given in EPA, 1991 (Appendix C) and as described above.

WHOLE EFFLUENT TOXICITY

The water quality standards for surface waters forbid discharge of effluent that causes toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Using the screening criteria in chapter 173-205-040 WAC, Ecology determined that toxic effects caused by unidentified pollutants in the effluent are unlikely. Therefore, this permit does not require WET testing. Ecology may require WET testing in the future if it receives information indicating that toxicity may be present in this effluent.

HUMAN HEALTH

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the applicant's discharge is unlikely to contain chemicals regulated to protect human health. Ecology will reevaluate this discharge for impacts to human health at the next permit reissuance.

SEDIMENT QUALITY

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website: http://www.ecy.wa.gov/programs/tcp/smu/sediment.html.

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the sediment management standards.

GROUND WATER QUALITY LIMITS

The ground water quality standards (chapter 173-200 WAC) protect beneficial uses of ground water. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

The Bridgeport POTW does not discharge wastewater to the ground. No permit limits are required to protect ground water.

COMPLIANCE SCHEDULE FOR FACILITY UPGRADE

Special Permit Condition S9 contains a compliance schedule for preparing a facility plan. The facility plan is required in order to maintain adequate capacity at the Bridgeport POTW. A construction schedule will be developed for a companion order to this permit when an approved plan and funding is available.

COMPARISON OF EFFLUENT LIMITS WITH THE PREVIOUS PERMIT ISSUED ON NOVEMBER 14, 2003

There have been no significant changes to the Bridgeport POTW permit limits. The average weekly BOD lbs/day limit was adjusted slightly for a calculation error.

Table 11. Comparison of Effluent Limits

	Basis of Limit	Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
Parameter		**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
Biochemical Oxygen Demand (5-day)	Technology	30 mg/L; 52.5 lbs/day	45 mg/L; 79.0 lbs/day	30 mg/L; 52.5 lbs/day	45 mg/L; 78.8 lbs/day
Total Suspended Solids	Technology	30 mg/L; 60.0 lbs/day	45 mg/L; 90.0 lbs/day	30 mg/L; 60.0 lbs/day	45 mg/L; 90.0 lbs/day
Fecal Coliform Bacteria	Technology	200	400	200	400
pH, Standard Units	Technology	6.0 to 9.0		6.0 to 9.0	

MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

The monitoring schedule is detailed in the proposed permit under Condition S2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. Except for BOD and TSS, which have been reduced from 2 per week to 1 per week because of the low flow (<0.3 MGD) and little commercial input, the required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication Number 92-09) for an oxidation ditch with activated sludge.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Biosolids monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

LAB ACCREDITATION

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories* to prepare all monitoring data (with the exception of certain parameters). Ecology accredited the laboratory at

this facility for: Biochemical Oxygen Demand (BOD/CBOD), Dissolved Oxygen, pH, Total Suspended Solids, and Fecal Coliform Bacteria (counts).

OTHER PERMIT CONDITIONS

REPORTING AND RECORD KEEPING

Ecology based permit condition S3 on our authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the City of Bridgeport to take the actions detailed in proposed permit requirement S4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S4 restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Condition S5 as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that Bridgeport takes adequate safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment.

INFILTRATION AND INFLOW

Significant portions of the collection system are over 50 years old years old. Ecology expects leaks are present in the collection system due to its age, materials used and, construction methods for its installation. Therefore, the proposed permit requires the city of Bridgeport to characterize the collection system for the presence of leaks by providing the following information:

- Volume of the annual average and peak daily flow under worst conditions (inflow or infiltration) attributed to leaks.
- Location of each sizable individual leaks.
- Size of each leak and/or volume of excess flow contributed by a run of sewer.
- Whether exfiltration occurs in the system's force mains and/or inverted siphons.

Three good references to aid in these tasks include:

- *American Society of Civil Engineers and Water Environment Federation Manual of Practice FD-6, Existing Sewer Evaluation and Rehabilitation*.

- *U.S. Environmental Protection Agency, Handbook for Sewer System Infrastructure Analysis and Rehabilitation*, EPA/625/6-91/030, 1991.

- *Washington State Department of Transportation, Standard Specifications for Road, Bridge, and Municipal Construction*, 2002.

Following characterization of the leaks, Ecology may require corrective actions by issuing an administrative order after review of the assessment.

PRETREATMENT

Duty to Enforce Discharge Prohibitions

This provision prohibits the publicly owned treatment works (POTW) from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer.

- The first section of the pretreatment requirements prohibits the POTW from accepting pollutants which causes "Pass-through" or "Interference". This general prohibition is from 40 CFR §403.5(a). Appendix B of this fact sheet defines these terms.

- The second section reinforces a number of specific State and Federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). These reinforce that the POTW may not accept certain wastes, which:

    - Are prohibited due to dangerous waste rules.
    - Are explosive or flammable.
    - Have too high or low of a pH (too corrosive, acidic or basic).
    - May cause a blockage such as grease, sand, rocks, or viscous materials.
    - Are hot enough to cause a problem.
    - Are of sufficient strength or volume to interfere with treatment.
    - Contain too much petroleum-based oils, mineral oil, or cutting fluid.
    - Create noxious or toxic gases at any point.

    40 CFR Part 403 contains the regulatory basis for these prohibitions , with the exception of the pH provisions which are based on WAC 173-216-060.

- The third section of pretreatment conditions reflects state prohibitions on the POTW accepting certain types of discharges unless the discharge has received prior written

authorization from Ecology. These discharges include:

- Cooling water in significant volumes.
- Stormwater and other direct inflow sources.
- Wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Federal and State Pretreatment Program Requirements

Ecology administers the Pretreatment Program under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986) and 40 CFR, part 403. Under this delegation of authority, Ecology issues wastewater discharge permits for significant industrial users (SIUs) discharging to POTWs which have not been delegated authority to issue wastewater discharge permits. Ecology must approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) (40 CFR 403.8 (f)(1)(i) and(iii)).

Industrial dischargers must obtain a permit from Ecology before discharging waste to the Bridgeport POTW (WAC 173-216-110(5)). Industries discharging wastewater that is similar in character to domestic wastewater do not require a permit.

Routine Identification and Reporting of Industrial Users

The permit requires non-delegated POTWs to take "continuous, routine measures to identify all existing, new, and proposed significant industrial users (SIUs) and potential significant industrial users (PSIUs)" discharging to their sewer system. Examples of such routine measures include regular review of water and sewer billing records, business license and building permit applications, advertisements, and personal reconnaissance. System maintenance personnel should be trained on what to look for so they can identify and report new industrial dischargers in the course of performing their jobs. The POTW may not allow SIUs to discharge prior to receiving a permit, and must notify all industrial dischargers (significant or not) in writing of their responsibility to apply for a State Waste Discharge Permit. The POTW must send a copy of this notification to Ecology.

GENERAL CONDITIONS

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual municipal NPDES permits issued by Ecology.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for ground waters, based on new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

PROPOSED PERMIT ISSUANCE

This proposed permit meets all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

REFERENCES FOR TEXT AND APPENDICES

Chapman, W.M. 1943. The spawning of Chinook salmon in the main Columbia River. *Copeia*, Vol. 1943, No. 3 (Oct. 15, 1943) pp 168-170.

Environmental Protection Agency (EPA)

2002. Columbia/Snake Rivers Temperature TMDL: Preliminary Draft September 2002. Available at: http://yosemite.epa.gov/r10/water.nsf/2fb9887c3bbafaaf88256b5800609bf0/9d61ce85bbbd93ba88256c3300601055!OpenDocument

1992. *National Toxics Rule.* Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.

1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling.* USEPA Office of Water, Washington, D.C.

1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.

1983. *Water Quality Standards Handbook.* USEPA Office of Water, Washington, D.C.

Forsgren 2001a. City of Bridgeport General Sewer Plan. Prepared by: Forsgren Associates Inc., Wenatchee, WA. Prepared for the City of Bridgeport, Bridgeport, WA. October 2001.

Forsgren 2001b. City of Bridgeport General Operation and Maintenance Manual. Prepared by: Forsgren Associates Inc., Wenatchee, WA. Prepared for the City of Bridgeport, Bridgeport, WA. November 2001.

Keller, K. 2005. Evaluate spawning of fall Chinook and Chum salmon below the four lowermost Columbia River Mainstem Dams; 2004 Columbia River Chum salmon return. 2004-2005 Annual Report, Project No. 1999900301. 75 electronic pages, (BPA Report DOE/BP-00007583-2).

Mueller, R. 2002. Deepwater spawning of fall Chinook salmon (Oncorhynchus tshawytscha) spawning near Ives and Pierce Island of the Columbia River. Project No. 1999-00304, 27 electronic pages, (BPA Report DOE/BP-00000652-10)

NOAA 2008. National Weather Service, Advanced Hydrological Prediction Service. http://ahps2.wrh.noaa.gov/ahps2/hydrograph.php?wfo=otx&gage=welw1. Accessed September through November, 2008.

NMFS 2008. National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Consultation and Magnuson-Stevens Act (MSA) Essential fish Habitat Consultation.

Salmon Recovery Division, Northwest Region NMFS consultation Number F/NWR/2006/07534.

Pflueger, K. 2008. Personal communication (phone conversation with Jean Hays, Ecology, Yakima, WA) Ken Pflueger, Douglas County PUD No. 1, Wells Dam, October 1, 2008.

SAGE 2008. River Discharge Database. Center for Sustainability and the Global Environment, Gaylord Nelson Institute for environmental Studies, University of Wisconsin-Madison. Accessed September 17, 2008.

Tsivoglou, E.C., and J.R. Wallace.

1972. *Characterization of Stream Reaeration Capacity*. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

USGS 2004. 12438000 Columbia River at Bridgeport, WA. Discharge, Cubic Feet Per Second, Water Year October 2003 to September 2004. Available at: http://wa.water.usgs.gov/data/realtime/adr/2004/12438000.2004.sw.pdf.

USGS 2008. Bridgeport Long-Term Flow Data for USGS station 12438000 Columbia River at Bridgeport, WA. Downloaded October 8, 2008.

Washington State Department of Ecology.

2008. Water Quality Monitoring Station 44A190-Columbia River at HWY 2 Bridge data (10/05 to 9/06). Available at : http://www.ecy.wa.gov/apps/watersheds/riv/station.asp?theyear=&tab=final_data. Accessed October 9, 2008.

2006. *Permit Writer's Manual*. Publication Number 92-109 (http://www.ecy.wa.gov/biblio/92109.html)

Laws and Regulations (http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information (http://www.ecy.wa.gov/programs/wq/wastewater/index.html)

Van der Naald, W., Spellman, B., and Clark, R. Evaluation of Fall Chinook and Chum Salmon Spawning below Bonneville, The Dalles, John Day, and McNary Dams, 1999-2000 Annual Report, Project No. 199900301 (et al.) 45 electronic pages, (BPA Report DOE/BP-15007-2)

Water Pollution Control Federation.

1976. *Chlorination of Wastewater*.

Wright, R.M., and A.J. McDonnell.

1979. *In-stream Deoxygenation Rate Prediction.* Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to reissue a permit to the City of Bridgeport POTW. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice of Draft on March 5, 2009 in Wenatchee World to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice –

- Tells where copies of the draft permit and fact sheet are available for public evaluation (a local public library, the closest regional or field office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Asks people to tell us how well the proposed permit would protect the receiving water.
- Invites people to suggest fairer conditions, limits, and requirements for the permit.
- Invites comments on Ecology's determination of compliance with antidegradation rules.
- Urges people to submit their comments, in writing, before the end of the comment period.
- Tells how to request a public hearing about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

NOTICE: ANNOUNCEMENT OF AVAILABILITY OF DRAFT PERMIT
PERMIT NO.: WA-002406-6
APPLICANT: CITY OF BRIDGEPORT
PO BOX 640
BRIDGEPORT, WA 98813

has applied for renewal of National Pollutant Discharge Elimination System (NPDES) Permit No. WA-002406-6 in accordance with the provisions of Chapter 90.48 Revised Code of Washington (RCW), Chapter 173-220 Washington Administrative Code (WAC), and the Federal Clean Water Act.

Following evaluation of the application and other available information, a draft permit has been developed which would allow the discharge of treated municipal wastewater to a maximum of 300,000 gallons per day to the Columbia River at River Mile 543.7 from its facility located at First Street and Fairview Avenue in Bridgeport, Washington. All discharges to be in compliance with the Department of Ecology's Water Quality Standards for a permit to be issued.

A tentative determination has been made to reissue this permit based on the effluent limitations and special permit conditions that will prevent and control pollution. A final determination will not be made until all timely comments received in response to this notice have been evaluated.

PUBLIC COMMENT AND INFORMATION

The draft permit and fact sheet may be viewed at the Department of Ecology (Department) website: http://www.ecy.wa.gov/programs/wq/permits/central_permits.html. The application, fact sheet, proposed permit, and other related documents are also available at the Department's Central Regional Office for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m., weekdays. To obtain a copy or to arrange to view copies at the Central Regional Office, please call Cindy Huwe at 509/457-7105, e-mail chuw461@ecy.wa.gov, or write to the address below.

Interested persons are invited to submit written comments regarding the proposed permit. All comments must be submitted by April 5, 2009 (within 30 days of the final date of publication of this notice) to be considered for the final determination. Comments should be sent to: Department of Ecology, Central Regional Office, 15 West Yakima Avenue, Suite 200, Yakima, WA 98902, Attention: Cindy Huwe. E-mail comments should be sent to Cindy Huwe at chuw461@ecy.wa.gov.

Any interested party may request a public hearing on the proposed permit within 30 days of the publication date of this notice. The request for a hearing shall state the interest of the party and the reasons why a hearing is necessary. The request should be sent to the above address. The Department will hold a hearing if it determines that there is significant public interest. If a hearing is to be held, public notice will be published at least 30 days in advance of the hearing date. Any party responding to this notice with comments will be mailed a copy of a hearing public notice. Please bring this public notice to the attention of persons who you know would be interested in this matter. The Department is an equal opportunity agency. If you have a special accommodation needs, please contact Cindy Huwe at 509/457-7105 or TTY (for the speech and hearing impaired) at 1-800-833-6388.

Publication date of this Notice is March 5, 2009.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting* which is available on our website at http://www.ecy.wa.gov/biblio/0307023.html.

You may obtain further information from Ecology by telephone, 509/457-7105, or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Central Regional Office
15 West Yakima Avenue, Suite 200
Yakima, WA 98902

The primary author of this permit and fact sheet is Jean Hays.

APPENDIX B—GLOSSARY

1-DMax or **1-day maximum temperature -** The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or **7-day average of the daily maximum temperatures -** The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute Toxicity—The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART – The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Ambient Water Quality—The existing environmental condition of the water in a receiving water body.

Ammonia—Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual Average Design Flow (AADF)—The average of the daily flow volumes anticipated to occur over a calendar year.

Average Monthly Discharge Limit—The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)—Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5—Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment.

Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass—The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine—Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity—The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)—The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling—A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling—A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite Sample—A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity—Clearing, grading, excavation, and any other activity which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous Monitoring—Uninterrupted, unless otherwise noted in the permit.

Critical Condition—The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor (DF)—A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent

fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report—A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria—Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample—A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial Wastewater—Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility—A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limit—The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum Day Design Flow (MDDF)—The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum Month Design Flow (MMDF)— The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum Week Design Flow (MWDF)— The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method Detection Level (MDL)—The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Minor Facility—A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone—An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)—The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH—The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Peak Hour Design Flow (PHDF)—The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak Instantaneous Design Flow (PIDF)—The maximum anticipated instantaneous flow.

Quantitation Level (QL)— The smallest detectable concentration of analyte greater than the Method Detection Limit (MDL) where the accuracy (precision &bias) achieves the objectives of the intended purpose.

Reasonable Potential — A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible Corporate Officer—A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Technology-based Effluent Limit—A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)—Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to receiving waters may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Solid waste -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

State Waters—Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater—That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset—An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit—A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into receiving waters.

APPENDIX C—DATA & TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at http://www.ecy.wa.gov/programs/eap/pwspread/pwspread.html.

	ALKALINIT MAX MG/L Value	BOD AVG LBS/DAY Value	BOD AVG MG/L Value	BOD AVW LBS/DAY Value	BOD AVW MG/L Value	BOD AVG PERCENT Value	COLIFORM GEM #/100 ML Value	COLIFORM GM7 #/100 ML Value	HARDNESS MAX MG/L Value	AMMONIA MAX MG/L Value
BRIDGEPORT POTW										
WA0024066D										
DMR (MONTHLY)										
EFFLUENT										
1										
1-Jan-04		3	2	4	2	99	3	8		
1-Feb-04	150	3	2	4	2	99	3	16	190	0.3
1-Mar-04		4	3	5	4	98	3	9		
1-Apr-04		5	3	6	4	99	6	14		
1-May-04		4	3	8	5	99	3	7		
1-Jun-04	156	4	2.6	5	3	99	1	6.1	177	0.2
1-Jul-04		3	2	3	2	99	3	9		
1-Aug-04		3	2	3	2	99	3	12		
1-Sep-04		3	2	4	2	99	3	12		
1-Oct-04		6	3	10	5.4	99	13	4		
1-Nov-04		4	2.5	6	4	99	1.5	5		
1-Dec-04	110	3	2	4	3	99	3	11	165	0.3
1-Jan-05		4	2	6	3	99	2	12		
1-Feb-05		4	2.5	5	3	99	4	12		
1-Mar-05	127	4	3	6	4	99	2.7	8	174	0.1
1-Apr-05		3	4	8	5	98	1	2		
1-May-05		4	2.75	5	3	99	3	8		
1-Jun-05	160	6	4	8	5	98	3	6	179	0.6
1-Jul-05		4	2	5	3	98	1	4		
1-Aug-05		4	2	5	2	99	2	10		
1-Sep-05	0.1	4	2	4	2	99	2	5	180	0.1
1-Oct-05		5	2.5	5	3	99	4	11		
1-Nov-05		4	2	5	3	99	2	5		
1-Dec-05	121	4	4	5	3	99	1	3	166	0.2
1-Jan-06		4	3	6	4	99	1	1		
1-Feb-06		6	3	11	6	98	1	3		
1-Mar-06	125	5	3	8	5	98	2	5	185	3
1-Apr-06		3	2	3	2	99	2	4		
1-May-06		3	2	3	2	99	1	2		
1-Jun-06	2.1	3	2	5	3	99	1	5	190	2.1
1-Jul-06		3	2	3	2	99	2	5		
1-Aug-06		3	2	3	2	99	2	4		
1-Sep-06	142	3	2	3	2	99	2	7	185	0.9
1-Oct-06		3	2	3	2	99	1	3		
1-Nov-06		4	3	7	4	99	3	11		
1-Dec-06	122	3	2	3	2	99	1	1	173	0.2
1-Jan-07		3	2	3	2	99	1	4		
1-Feb-07	115	4	3	7	5	99	2	6	198	1.3
1-Mar-07		6	4	8	6	98	2	7		
1-Apr-07		3	2	4	2	99	3	7		
1-May-07	1	3	2	3	2	99	2	4	182	1
1-Jun-07		3	2	3	2	99	1	3		
1-Jul-07		3	2	3	1	99	1	4		
1-Aug-07	140	4	3	6	4	99	2	9	180	0.2
1-Sep-07		3	2	3	2	99	3	7		
1-Oct-07		3	2	4	3	99	2	10		
1-Nov-07	135	2	2	3	2	99	2	5	196	0.3
1-Dec-07		3	2	5	3	99	5	11		
1-Jan-08		4	3	6	4	99	4	10		1.6
1-Feb-08		4	2	4	2	99	2	7		
1-Mar-08	220	4	2	5	3	99	2	4	205	0.3
1-Apr-08		6	3	9	5	99	4	13		
1-May-08		5	3	7	4	99	3	9		
1-Jun-08	140	4	3	5	3	99	4	11	180	0.8
1-Jul-08		8	5	10	6	98	4	13		
Average	115.66	3.87	2.52	5.18	3.17	98.85	2.57	7.17	182.65	0.75
Maximum	220.00	6.00	4.00	11.00	6.00	99.00	13.00	16.00	205.00	3.00
Mini	0.10	2.00	2.00	3.00	1.00	98.00	1.00	1.00	165.00	0.10

	OXYGEN, MAX MG/L Value	OXYGEN, MIN MG/L Value	PH MAX S.U. Value	PH MIN S.U. Value	SOLIDS, SUS AVG PERCENT Value	SOLIDS, T AVG LBS/DAY Value	SOLIDS, T AVG MG/L Value	SOLIDS, T AVW LBS/DAY Value	SOLIDS, T AVW MG/L Value	TEMPERA MAX °C Value
BRIDGEPORT POTW										
WA0024066D										
DMR (MONTHLY)										
EFFLUENT										
1										
1-Jan-04	5.7	4.3	7.71	6.94	99	4	2	6	3	10.5
1-Feb-04	6	5.4	7.2	6.72	99	4	2	8	5	10
1-Mar-04	6	4.4	7.45	7.1	99	5	3	8	6	13.3
1-Apr-04	5.2	4.6	7.82	6.61	98	7	5	9	6	14.4
1-May-04	6	4.7	7.51	7.16	99	5	3	7	4	18.3
1-Jun-04	5.2	4.3	7.44	7.15	99	5	3	10	6	21.7
1-Jul-04	6.1	1.2	7.92	6.84	99	5	3	8	5	22.2
1-Aug-04	0.9	0.3	7.21	6.82	99	4	2	7	4	23.30
1-Sep-04	5.2	4.1	7.4	6.87	99	4	3	11	7	20.60
1-Oct-04	5.4	4	7.26	6.92	99	4	2	10	6	18.30
1-Nov-04	7	5.1	7.44	6.85	99	4	2	6	4	12.80
1-Dec-04	7.5	5.4	7.4	6.64	99	3	2	6	4	10.00
1-Jan-05	6	5.5	7.21	6.62	99	2	1	3	2	10.00
1-Feb-05	6.7	5.5	7.13	6.71	99	2	2	3	2	10.00
1-Mar-05	5.9	4.9	7.19	6.82	99	3	2	6	4	12.20
1-Apr-05	5.6	4.9	7.33	6.92	99	2	2	6	4	16.10
1-May-05	5.3	4.7	7.22	6.94	99	3	2	6	4	18.80
1-Jun-05	5.3	4.2	6.97	6.76	99	4	2	6	4	20.00
1-Jul-05	5.2	4.1	7.16	6.86	99	3	2	5	3	21.10
1-Aug-05	5.6	4.1	7.02	6.79	99	5	3	12	6	22.20
1-Sep-05	4.7	4.2	7	6.54	99	4	2	6	3	19.40
1-Oct-05	4.5	4.1	6.99	6.83	98	6	3	7	4	17.80
1-Nov-05	5.3	4.6	6.98	6.65	98	10	3	9	5	13.90
1-Dec-05	7.4	5.1	7	6.65	99	2	1	4	2	10.60
1-Jan-06	6.7	4.6	7.32	6.82	98	4	2	8	5	10.60
1-Feb-06	5.5	4.9	7.7	6.81	99	4	2	7	4	8.90
1-Mar-06	5.9	4.9	7.34	6.82	98	5	3	8	5	12.20
1-Apr-06	5.6	5.1	6.96	6.27	99	4	3	5	3	14.40
1-May-06	5.5	4.9	6.53	6.33	99	3	2	4	3	20.00
1-Jun-06	5.7	4	7.23	6.16	99	3	2	6	4	21.70
1-Jul-06	5.3	4.1	7.51	6.83	99	3	2	5	3	24.40
1-Aug-06	5.5	4.8	6.91	6.68	98	5	3	8	5	22.20
1-Sep-06	5.2	4.4	7.21	6.43	96	4	3	6	4	18.80
1-Oct-06	5.1	4.7	6.86	6.54	99	4	3	6	4	17.80
1-Nov-06	6.8	4.9	7.12	6.86	99	4	3	7	5	14.40
1-Dec-06	7.3	5.4	7.31	6.73	99	2	1	3	2	10.00
1-Jan-07	6.8	5.4	7.29	6.91	99	2	1	3	2	8.90
1-Feb-07	6.4	5.8	7.31	6.9	98	4	3	6	4	8.90
1-Mar-07	7	6.6	7.23	6.59	98	5	4	8	6	11.70
1-Apr-07	6.2	4.9	7.08	6.74	99	3	2	4	3	14.40
1-May-07	5.4	4.8	7.14	6.62	99	3	2	5	3	18.80
1-Jun-07	5.2	4.4	7.68	6.82	99	3	2	4	3	20.60
1-Jul-07	5.3	4.3	7.38	6.99	99	4	3	6	4	22.20
1-Aug-07	5.4	3.9	7.26	6.94	99	4	3	8	5	22.20
1-Sep-07	4.8	4.3	7.39	6.79	99	2	2	5	3	20.60
1-Oct-07	5.1	4.4	7.22	6.72	99	3	2	4	3	16.70
1-Nov-07	5.3	4.8	7.19	6.99	99	2	2	3	2	12.50
1-Dec-07	5.4	5	7.28	6.82	99	3	2	5	3	10.00
1-Jan-08	6.6	5.1	7.09	6.65	98	5	3	10	6	7.80
1-Feb-08	6.6	4.2	7.08	6.73	99	3	2	4	2	9.40
1-Mar-08	5.5	4.9	7.24	6.78	99	4	3	9	5	10.60
1-Apr-08	5.4	4.7	7.27	6.64	99	5	3	7	4	13.30
1-May-08	5	4.2	7.32	6.94	99	4	2	7	4	20.00
1-Jun-08	4.9	4.5	7.51	7.01	98	5	3	7	4	20.60
1-Jul-08	5.6	4.3	7.52	6.95	98	6	4	9	5	21.10
Average	5.67	4.56	7.26	6.77	98.75	3.91	2.44	6.47	4.02	15.88
Maximum	7.50	6.60	7.92	7.16	99.00	10.00	5.00	12.00	7.00	24.40

	BOD, 5-DA AVG LBS/DAY Value	BOD, 5-DA AVG MG/L Value	BOD, 5-DA MAX LBS/DAY Value	BOD, 5-DA MAX MG/L Value	FLOW AVG MGD Value	FLOW MAX MGD Value	OXYGEN, AVG MG/L Value	OXYGEN, MIN MG/L Value	PH MAX S.U. Value	PH MIN S.U. Value
BRIDGEPORT POTW										
WA0024066D										
DMR (MONTHLY)										
INFLUENT										
IN1										
1-Jan-04	285.00	161.00	310.00	178.00	0.22	0.27	4.00	3.10	7.98	7.19
1-Feb-04	264.00	178.00	312.00	209.00	0.19	0.24	4.30	3.40	7.87	7.04
1-Mar-04	265.00	190.00	313.00	225.00	0.18	0.23	4.00	3.10	8.32	7.41
1-Apr-04	310.00	220.00	358.00	257.00	0.18	0.21		2.30	7.92	7.24
1-May-04	287.00	186.00	363.00	233.00	0.19	0.20	3.10	2.80	7.81	7.41
1-Jun-04	337.00	204.00	360.00	218.00	0.20	0.25	3.60	1.30	7.53	7.17
1-Jul-04	311.00	196.00	334.00	209.00	0.19	0.23	5.00	0.50	7.46	6.66
1-Aug-04	292.00	176.00	348.00	211.00	0.20	0.22	1.20	0.50	7.42	6.83
1-Sep-04	330.00	199.00	353.00	219.00	0.20	0.24	1.50	1.00	7.50	6.84
1-Oct-04	382.00	222.00	410.00	244.00	0.21	0.26	1.60	0.60	7.70	6.92
1-Nov-04	233.00	143.00	268.00	163.00	0.19	0.22	2.80	1.40	7.56	7.10
1-Dec-04	241.00	159.00	262.00	170.00	0.19	0.22	3.50	2.20	7.45	6.79
1-Jan-05	293.00	164.00	364.00	203.00	0.21	0.25	4.10	3.80	7.43	7.05
1-Feb-05	277.00	187.00	336.00	240.00	0.18	0.21	4.10	3.80	7.38	7.01
1-Mar-05	311.00	203.00	335.00	227.00	0.19	0.23	3.60	3.10	7.78	7.02
1-Apr-05	385.00	259.00	613.00	415.00	0.18	0.20	3.10	2.50	7.61	7.16
1-May-05	291.00	195.00	327.00	219.00	0.19	0.22	2.60	1.10	7.51	6.90
1-Jun-05	352.00	205.00	387.00	218.00	0.21	0.24	2.20	1.20	7.44	7.18
1-Jul-05	332.00	186.00	439.00	235.00	0.23	0.27	1.50	1.10	7.30	6.98
1-Aug-05	329.00	180.00	370.00	201.00	0.22	0.24	1.50	0.90	7.29	6.86
1-Sep-05	354.00	193.00	404.00	220.00	0.22	0.25	1.50	0.60	7.11	6.79
1-Oct-05	322.00	184.00	436.00	260.00	0.22	0.28	1.90	1.30	7.35	7.11
1-Nov-05	329.00	180.00	405.00	206.00	0.22	0.24	2.30	1.00	7.28	7.00
1-Dec-05	277.00	166.00	329.00	185.00	0.21	0.24	4.90	3.00	7.47	7.01
1-Jan-06	245.00	167.00	258.00	170.00	0.18	0.21	4.20	3.40	7.41	6.90
1-Feb-06	314.00	181.00	376.00	207.00	0.21	0.24	4.10	3.50	8.62	6.82
1-Mar-06	295.00	189.00	354.00	226.00	0.19	0.22	3.70	3.30	7.88	7.08
1-Apr-06	297.00	211.00	311.00	222.00	0.18	0.22	3.60	2.70	7.23	6.67
1-May-06	304.00	226.00	328.00	244.00	0.17	0.19	3.10	1.70	6.92	6.53
1-Jun-06	337.00	220.00	344.00	223.00	0.19	0.22	2.60	0.70	7.18	6.42
1-Jul-06	380.00	237.00	398.00	258.00	0.20	0.22	1.40	0.20	7.30	6.76
1-Aug-06	289.00	183.00	336.00	210.00	0.20	0.21	1.70	1.20	6.90	6.60
1-Sep-06	320.00	204.00	348.00	233.00	0.20	0.25	2.20	1.80	7.42	6.89
1-Oct-06	326.00	209.00	350.00	226.00	0.20	0.25	2.10	1.20	7.25	6.77
1-Nov-06	318.00	210.00	457.00	287.00	0.19	0.25	2.50	1.60	7.71	6.83
1-Dec-06	240.00	177.00	288.00	212.00	0.17	0.21	3.50	2.90	7.97	7.02
1-Jan-07	234.00	158.00	287.00	179.00	0.18	0.23	4.00	3.60	7.89	7.12
1-Feb-07	252.00	184.00	281.00	198.00	0.17	0.20	4.30	3.80	8.14	7.11
1-Mar-07	287.00	205.00	313.00	230.00	0.17	0.20	4.10	3.40	8.02	7.18
1-Apr-07	295.00	209.00	336.00	230.00	0.17	0.20	3.50	1.60	8.00	6.89
1-May-07	307.00	216.00	328.00	230.00	0.17	0.20	2.70	2.30	7.74	6.68
1-Jun-07	282.00	188.00	313.00	212.00	0.18	0.20	2.10	1.00	7.70	6.67
1-Jul-07	393.00	261.00	438.00	305.00	0.18	0.21	1.40	0.90	7.59	7.14
1-Aug-07	308.00	208.00	261.00	238.00	0.18	0.22	1.60	0.70	7.72	7.11
1-Sep-07	296.00	190.00	346.00	223.00	0.19	0.24	1.60	0.80	7.61	6.99
1-Oct-07	356.00	236.00	405.00	260.00	0.19	0.24	1.80	0.80	7.50	6.94
1-Nov-07	298.00	229.00	323.00	236.00	0.17	0.20	2.30	1.70	7.66	7.06
1-Dec-07	326.00	221.00	388.00	249.00	0.18	0.21	3.00	1.20	8.31	6.93
1-Jan-08	282.00	175.00	321.00	228.00	0.20	0.25	3.70	3.10	7.56	6.36
1-Feb-08	325.00	172.00	349.00	178.00	0.22	0.25	4.10	3.40	7.77	6.81
1-Mar-08	333.00	192.00	419.00	239.00	0.21	0.24	4.00	3.50	8.01	7.05
1-Apr-08	388.00	230.00	425.00	280.00	0.21	0.23	3.40	1.30	8.01	7.34
1-May-08	350.00	218.00	382.00	241.00	0.20	0.23	3.60	1.20	8.15	7.20
1-Jun-08	333.00	204.00	348.00	223.00	0.21	0.23	2.00	1.20	7.67	7.33
1-Jul-08	414.00	234.00	510.00	290.00	0.21	0.24	1.50	0.70	7.98	7.44
AVERAGE	311.15	197.82	357.40	228.22	0.19	0.23	2.91	1.93	7.64	6.97
Maximum	414.00	261.00	613.00	415.00	0.23	0.28	5.00	3.80	8.62	7.44

	SOLIDS, T AVG LBS/DAY Value	SOLIDS, T AVG MG/L Value	SOLIDS, T MAX LBS/DAY Value	SOLIDS, T MAX MG/L Value
BRIDGEPORT POTW				
WA0024066D				
DMR (MONTHLY)				
INFLUENT				
IN1				
1-Jan-04	314.00	176.00	411.00	220.00
1-Feb-04	298.00	199.00	368.00	283.00
1-Mar-04	306.00	214.00	429.00	271.00
1-Apr-04	356.00	251.00	461.00	314.00
1-May-04	373.00	241.00	527.00	319.00
1-Jun-04	359.00	223.00	447.00	285.00
1-Jul-04	295.00	188.00	361.00	233.00
1-Aug-04	285.00	172.00	528.00	312.00
1-Sep-04	334.00	205.00	497.00	309.00
1-Oct-04	363.00	215.00	517.00	301.00
1-Nov-04	305.00	193.00	399.00	272.00
1-Dec-04	269.00	178.00	364.00	231.00
1-Jan-05	271.00	155.00	446.00	249.00
1-Feb-05	308.00	207.00	517.00	333.00
1-Mar-05	288.00	187.00	415.00	281.00
1-Apr-05	300.00	199.00	563.00	363.00
1-May-05	268.00	178.00	397.00	266.00
1-Jun-05	321.00	186.00	536.00	335.00
1-Jul-05	348.00	193.00	531.00	284.00
1-Aug-05	363.00	197.00	469.00	265.00
1-Sep-05	419.00	229.00	879.00	475.00
1-Oct-05	328.00	187.00	443.00	264.00
1-Nov-05	339.00	188.00	568.00	326.00
1-Dec-05	290.00	174.00	458.00	300.00
1-Jan-06	211.00	141.00	298.00	192.00
1-Feb-06	357.00	210.00	493.00	305.00
1-Mar-06	296.00	192.00	451.00	299.00
1-Apr-06	290.00	201.00	325.00	229.00
1-May-06	283.00	207.00	451.00	334.00
1-Jun-06	330.00	212.00	432.00	270.00
1-Jul-06	344.00	215.00	471.00	291.00
1-Aug-06	298.00	181.00	339.00	212.00
1-Sep-06	254.00	162.00	312.00	208.00
1-Oct-06	305.00	196.00	415.00	265.00
1-Nov-06	288.00	190.00	390.00	245.00
1-Dec-06	249.00	185.00	276.00	215.00
1-Jan-07	218.00	146.00	342.00	205.00
1-Feb-07	231.00	171.00	270.00	225.00
1-Mar-07	265.00	189.00	303.00	227.00
1-Apr-07	309.00	220.00	372.00	269.00
1-May-07	293.00	205.00	361.00	253.00
1-Jun-07	251.00	167.00	346.00	223.00
1-Jul-07	571.00	374.00	910.00	551.00
1-Aug-07	313.00	212.00	387.00	267.00
1-Sep-07	282.00	181.00	372.00	230.00
1-Oct-07	370.00	248.00	735.00	471.00
1-Nov-07	338.00	258.00	479.00	340.00
1-Dec-07	298.00	202.00	393.00	252.00
1-Jan-08	257.00	157.00	335.00	203.00
1-Feb-08	343.00	179.00	439.00	229.00
1-Mar-08	308.00	178.00	377.00	215.00
1-Apr-08	449.00	266.00	741.00	427.00
1-May-08	320.00	200.00	364.00	236.00
1-Jun-08	298.00	182.00	322.00	197.00
1-Jul-08	426.00	241.00	503.00	286.00
AVERAGE	315.36	200.05	446.09	281.13
Maximum	571.00	374.00	910.00	551.00

DFLOW OUTPUT

7Q10

Climatic year defined as Apr 1 - Mar 31

Gage

12438000 COLUMBIA RIVER AT BRIDGEPORT, WA

Period Days in Record Zero/missing1B3 Percentile Excur. per 3 Yrs

1969-2007 14,243 None 2.91E4 0.13% 1.00

7Q10 Percentile Excur. per 3 Yrs

4.48E4 1.96% 2.38

Harmonic Percentile

9.27E4 42.65%

30Q5

Climatic year defined as Apr 1 - Mar 31

Gage

12438000 COLUMBIA RIVER AT BRIDGEPORT, WA

Period Days in Record Zero/missing 1B3 Percentile Excur. per 3 Yrs

1969-2007 14,243 None 2.91E4 0.13% 1.00

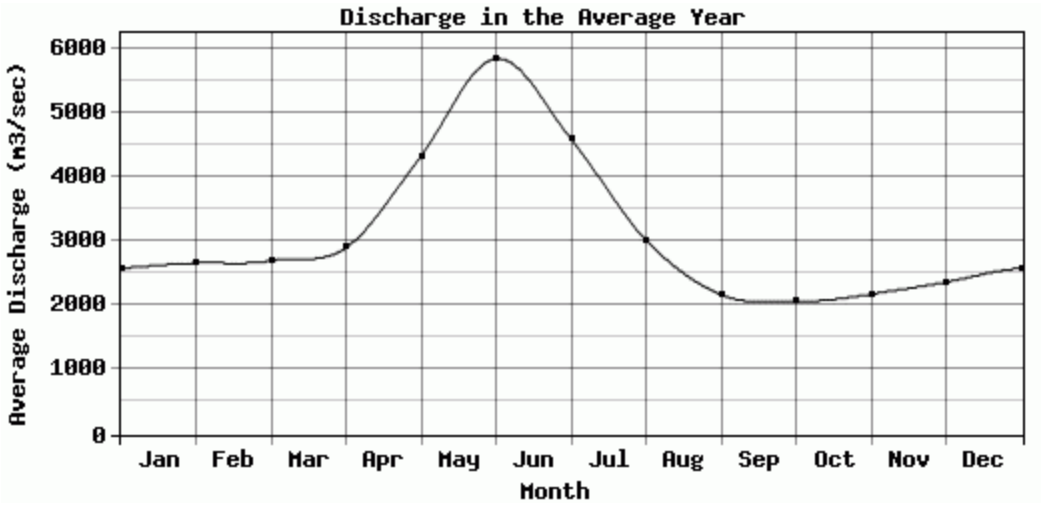
30Q5 Percentile Excur. per 3 Yrs

5.9E4 7.57% 16.69

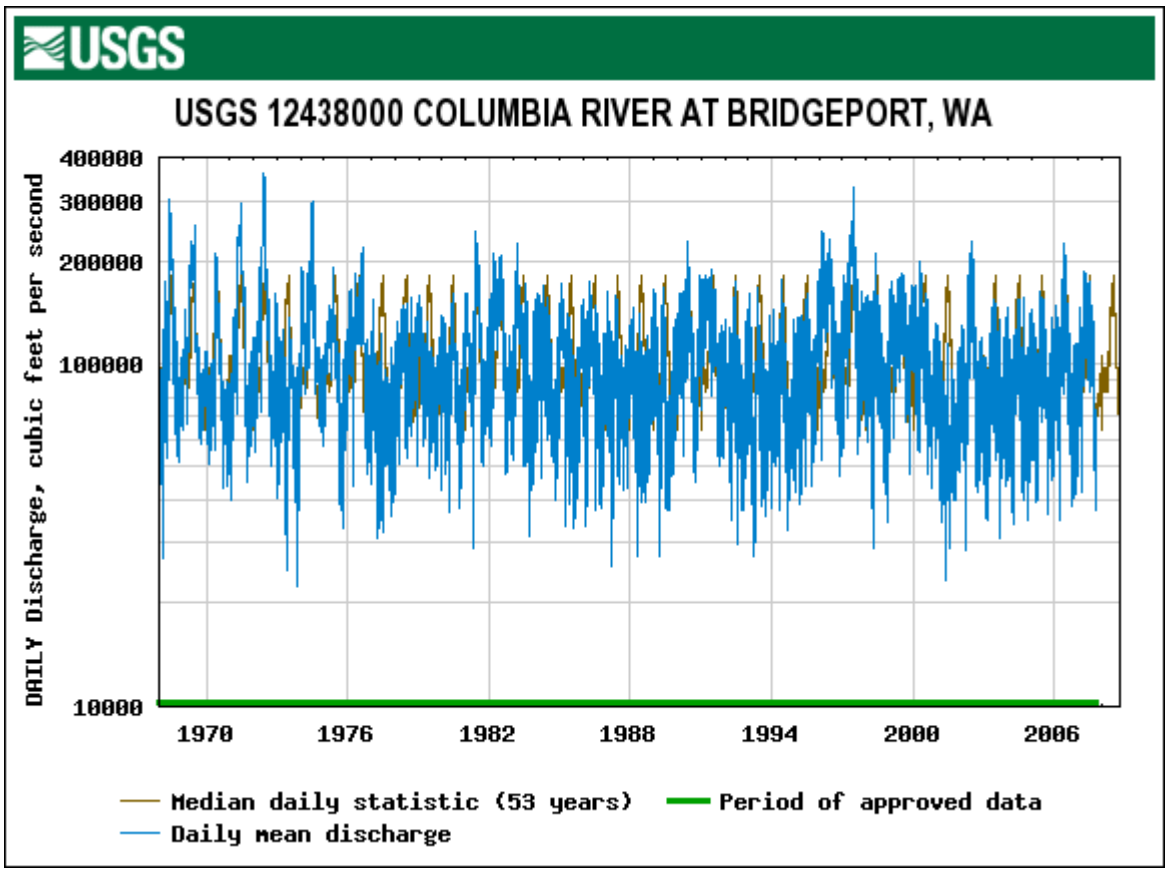
Harmonic Percentile

9.27E4 42.65%

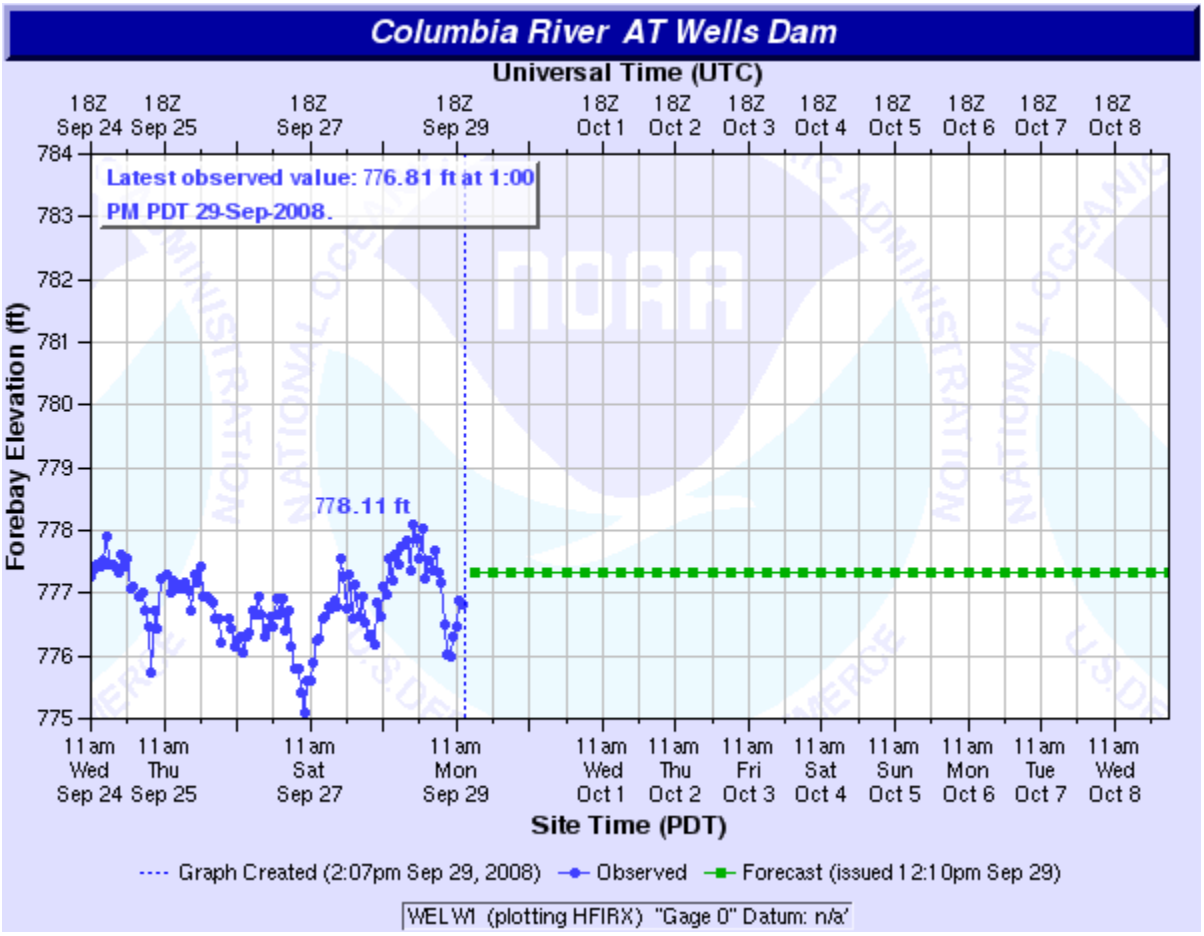
Sage 2008, Bridgeport WA USGS Station



USGS 2008, Bridgeport, WA



National Weather Service
Advanced Hydrologic Prediction Service, September 2008 Real-Time elevations at Wells Dam
www.weather.gov/ahps/



CORMIX OUTPUT

CORMIX SESSION REPORT:

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

CORMIX MIXING ZONE EXPERT SYSTEM

CORMIX Version 5.0GT

HYDRO1:Version-5.0.2.0 October,2008

SITE NAME/LABEL: Bridgeport
DESIGN CASE: 7Q10 Chronic
FILE NAME: C:\Program Files\CORMIX 5.0\Bridgeport.prd
Using subsystem CORMIX1: Single Port Discharges
Start of session: 12/02/2008--13:39:05
****

SUMMARY OF INPUT DATA:

AMBIENT PARAMETERS:
Cross-section = unbounded
Average depth HA = 7 m
Depth at discharge HD = 5.18 m
Ambient velocity UA = 1.0058 m/s
Darcy-Weisbach friction factor F = 0.0503
Calculated from Manning's n = 0.035
Wind velocity UW = 4 m/s
Stratification Type STRCND = U
Surface temperature = 19.80 degC
Bottom temperature = 19.80 degC
Calculated FRESH-WATER DENSITY values:
Surface density RHOAS = 998.2462 kg/m^3
Bottom density RHOAB = 998.2462 kg/m^3

DISCHARGE PARAMETERS: Single Port Discharge
Nearest bank = left
Distance to bank DISTB = 45 m
Port diameter D0 = 0.253 m
Port cross-sectional area A0 = 0.0503 m^2
Discharge velocity U0 = 0.26 m/s
Discharge flowrate Q0 = 0.013144 m^3/s
Discharge port height H0 = 1.7 m
Vertical discharge angle THETA = 30 deg
Horizontal discharge angle SIGMA = 270 deg
Discharge density RHO0 = 997.7710 kg/m^3
Density difference DRHO = 0.4752 kg/m^3

Buoyant acceleration GP0 = 0.0047 m/s^2
Discharge concentration C0 = 30 mg/l
Surface heat exchange coeff. KS = 0 m/s
Coefficient of decay KD = 0 /s

DISCHARGE/ENVIRONMENT LENGTH SCALES:
LQ = 0.22 m Lm = 0.06 m Lb = 0.00 m
LM = 1.81 m Lm' = 99999 m Lb' = 99999 m

NON-DIMENSIONAL PARAMETERS:
Port densimetric Froude number FR0 = 7.61
Velocity ratio R = 0.26

MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
Toxic discharge = no
Water quality standard specified = yes
Water quality standard CSTD = 30 mg/l
Regulatory mixing zone = yes
Regulatory mixing zone specification = distance
Regulatory mixing zone value = 96.62 m (m^2 if area)
Region of interest = 1000 m

****

HYDRODYNAMIC CLASSIFICATION:

```
*-----------------------*
| FLOW CLASS   = H1 |
*-----------------------*
```

This flow configuration applies to a layer corresponding to the full water depth at the discharge site.
Applicable layer depth = water depth = 5.18 m

****

MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

X-Y-Z Coordinate system:
Origin is located at the bottom below the port center:
45 m from the left bank/shore.
Number of display steps NSTEP = 100 per module.

NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing. It has no regulatory implication. However, this information may be useful for the discharge designer because the mixing in the NFR is usually sensitive to the discharge design conditions.
Pollutant concentration at NFR edge c = 0.0359 mg/l
Dilution at edge of NFR s = 835.3
NFR Location: x = 647.35 m

(centerline coordinates) y = -0.21 m
z = 5.18 m
NFR plume dimensions: half-width (bh) = 2.34 m
thickness (bv) = 2.34 m
Cumulative travel time: 661.1315 sec.

Buoyancy assessment:
The effluent density is less than the surrounding ambient water
density at the discharge level.
Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards
the surface.

FAR-FIELD MIXING SUMMARY:
Plume becomes vertically fully mixed at 820.15 m downstream.

PLUME BANK CONTACT SUMMARY:
Plume in unbounded section does not contact bank in this simulation.
********** TOXIC DILUTION ZONE SUMMARY **********
No TDZ was specified for this simulation.
********** REGULATORY MIXING ZONE SUMMARY **********
The plume conditions at the boundary of the specified RMZ are as follows:
Pollutant concentration c = 0.365371 mg/l
Corresponding dilution s = 82.1
Plume location: x = 96.63 m
(centerline coordinates) y = -0.16 m
z = 2.09 m
Plume dimensions: half-width (bh) = 0.49 m
thickness (bv) = 0.49 m
Cumulative travel time < 661.1315 sec. (RMZ is within NFR)
At this position, the plume is NOT IN CONTACT with any bank.
Furthermore, the specified water quality standard has indeed been met
within the RMZ. In particular:
The ambient water quality standard was encountered within a control
volume describing a portion of the discharge plume.
Therefore, the following plume conditions are a conservative estimate (with
lower concentrations or with larger dimensions) for the region at whose
boundary the standard is met:
Local boundary concentration = 30 mg/l
Corresponding dilution = 1
Water quality standard = 30 mg/l
Corresponding dilution s = 1
Plume location: x = 0 m
(centerline coordinates) y = 0 m
z = 1.7 m
Plume dimensions: half-width (bh) = 0.13 m
thickness (bv) = 0.13 m

Regulatory Mixing Zone Analysis:
The RMZ specification occurs before the near-field mixing regime (NFR) has been completed. The specification of the RMZ is highly restrictive.
********** FINAL DESIGN ADVICE AND COMMENTS **********
REMINDER: The user must take note that HYDRODYNAMIC MODELING by any known technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges the design configuration as highly complex and uncertain for prediction.

CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
CORMIX MIXING ZONE EXPERT SYSTEM
CORMIX Version 5.0GT
HYDRO1:Version-5.0.2.0 October,2008
SITE NAME/LABEL: Bridgeport
DESIGN CASE: 7Q10 Acute
FILE NAME: C:\Program Files\CORMIX 5.0\Bridgeport.prd
Using subsystem CORMIX1: Single Port Discharges
Start of session: 12/02/2008--13:36:25
****
SUMMARY OF INPUT DATA:

AMBIENT PARAMETERS:
Cross-section = unbounded
Average depth HA = 7 m
Depth at discharge HD = 5.18 m
Ambient velocity UA = 1.0058 m/s
Darcy-Weisbach friction factor F = 0.0503
Calculated from Manning's n = 0.035
Wind velocity UW = 4 m/s
Stratification Type STRCND = U
Surface temperature = 19.80 degC
Bottom temperature = 19.80 degC
Calculated FRESH-WATER DENSITY values:
Surface density RHOAS = 998.2462 kg/m^3
Bottom density RHOAB = 998.2462 kg/m^3

DISCHARGE PARAMETERS: Single Port Discharge
Nearest bank = left
Distance to bank DISTB = 45 m
Port diameter D0 = 0.253 m
Port cross-sectional area A0 = 0.0503 m^2
Discharge velocity U0 = 0.26 m/s
Discharge flowrate Q0 = 0.013144 m^3/s
Discharge port height H0 = 1.7 m
Vertical discharge angle THETA = 30 deg
Horizontal discharge angle SIGMA = 270 deg
Discharge density RHO0 = 997.7710 kg/m^3
Density difference DRHO = 0.4752 kg/m^3
Buoyant acceleration GP0 = 0.0047 m/s^2
Discharge concentration C0 = 30 mg/l
Surface heat exchange coeff. KS = 0 m/s
Coefficient of decay KD = 0 /s

DISCHARGE/ENVIRONMENT LENGTH SCALES:
LQ = 0.22 m Lm = 0.06 m Lb = 0.00 m
LM = 1.81 m Lm' = 99999 m Lb' = 99999 m

NON-DIMENSIONAL PARAMETERS:
Port densimetric Froude number FR0 = 7.61
Velocity ratio R = 0.26

MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
Toxic discharge = no
Water quality standard specified = yes
Water quality standard CSTD = 30 mg/l
Regulatory mixing zone = yes
Regulatory mixing zone specification = distance
Regulatory mixing zone value = 9.66 m (m^2 if area)
Region of interest = 1000 m

****

HYDRODYNAMIC CLASSIFICATION:

```
*----------------------*
| FLOW CLASS   = H1 |
*----------------------*
```

This flow configuration applies to a layer corresponding to the full water depth at the discharge site.
Applicable layer depth = water depth = 5.18 m

****

MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

X-Y-Z Coordinate system:
Origin is located at the bottom below the port center:
45 m from the left bank/shore.
Number of display steps NSTEP = 100 per module.

NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing. It has no regulatory implication. However, this information may be useful for the discharge designer because the mixing in the NFR is usually sensitive to the discharge design conditions.
Pollutant concentration at NFR edge c = 0.0359 mg/l
Dilution at edge of NFR s = 835.3
NFR Location: x = 647.35 m
(centerline coordinates) y = -0.21 m
z = 5.18 m
NFR plume dimensions: half-width (bh) = 2.34 m
thickness (bv) = 2.34 m
Cumulative travel time: 661.1315 sec.

Buoyancy assessment:
The effluent density is less than the surrounding ambient water density at the discharge level.
Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards the surface.

FAR-FIELD MIXING SUMMARY:
Plume becomes vertically fully mixed at 820.15 m downstream.

PLUME BANK CONTACT SUMMARY:
Plume in unbounded section does not contact bank in this simulation.
********** TOXIC DILUTION ZONE SUMMARY **********
No TDZ was specified for this simulation.
********** REGULATORY MIXING ZONE SUMMARY **********
The plume conditions at the boundary of the specified RMZ are as follows:
Pollutant concentration c = 1.932346 mg/l
Corresponding dilution s = 15.5
Plume location: x = 9.67 m

(centerline coordinates) y = -0.08 m
z = 1.77 m
Plume dimensions: half-width (bh) = 0.22 m
thickness (bv) = 0.22 m
Cumulative travel time < 661.1315 sec. (RMZ is within NFR)
At this position, the plume is NOT IN CONTACT with any bank.
Furthermore, the specified water quality standard has indeed been met within the RMZ. In particular:
The ambient water quality standard was encountered within a control volume describing a portion of the discharge plume.
Therefore, the following plume conditions are a conservative estimate (with lower concentrations or with larger dimensions) for the region at whose boundary the standard is met:
Local boundary concentration = 30 mg/l
Corresponding dilution = 1
Water quality standard = 30 mg/l
Corresponding dilution s = 1
Plume location: x = 0 m
(centerline coordinates) y = 0 m
z = 1.7 m
Plume dimensions: half-width (bh) = 0.13 m
thickness (bv) = 0.13 m

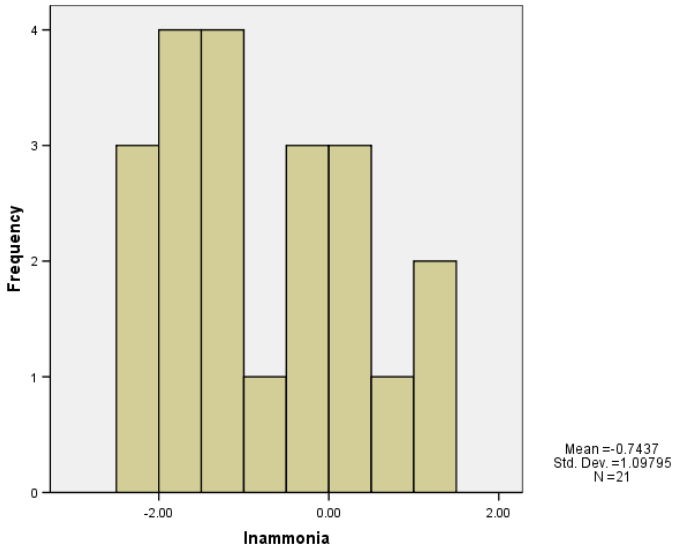
Regulatory Mixing Zone Analysis:
The RMZ specification occurs before the near-field mixing regime (NFR) has been completed. The specification of the RMZ is highly restrictive.

********** FINAL DESIGN ADVICE AND COMMENTS **********

REMINDER: The user must take note that HYDRODYNAMIC MODELING by any known technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges the design configuration as highly complex and uncertain for prediction.

SPSS Output

Effluent Ammonia, log-normalized



Statistics

lnammonia

N	Valid	21
	Missing	37
Percentiles	90	1.0273
	95	1.0986
	99	1.0986

Effluent Dissolved Oxygen

Statistics

MINDO

N	Valid	58
	Missing	0
Percentiles	1	.3000
	5	1.1550
	10	4.0000

Maximum Effluent pH

Statistics

maxpH

N	Valid	58
	Missing	0
Percentiles	90	7.6820
	95	7.8250
	99	7.9200

River pH

Statistics

rwpH

N	Valid	11
	Missing	47
Percentiles	90	8.2420
	95	8.2700
	99	8.2700

River Turbidity

Statistics

rwturbidity

N	Valid	11
	Missing	47
Percentiles	90	3.0000
	95	3.3000
	99	3.3000

River Dissolved Oxygen

Statistics

rwDO

N	Valid	12
	Missing	46
Percentiles	1	9.0700
	5	9.0700
	10	9.1000

Ammonia

Freshwater un-ionized ammonia criteria based on Chapter 173-201A WAC
Amended November 20, 2006

INPUT	
1. Temperature (deg C):	19.8
2. pH:	8.24
3. Is salmonid habitat an existing or designated use?	Yes
4. Are non-salmonid early life stages present or absent?	Present

OUTPUT	
1. Unionized ammonia NH3 criteria (mgNH3/L)	
Acute:	0.273
Chronic:	0.042
2. Total ammonia nitrogen criteria (mgN/L):	
Acute:	3.539
Chronic:	0.548

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

				State Water Quality Standard		Max concentration at edge of...		
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?
Parameter	Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*	
	1.00	1.00	10.0000	3539.0000	548.0000	277.91	60.58	NO
	0.95	0.95	2.8000	40.2000	17.8600	35.87	5.99	NO

CALCULATIONS									
Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor	
	Pn	*ug/L*	*CV*	*s*	*n*				COMMENTS

BOD and Dissolved Oxygen

Dissolved oxygen concentration following initial dilution.
References: EPA/600/6-85/002b and EPA/430/9-82-011

Based on Lotus File IDOD2.WK1 Revised 19-Oct-93

INPUT	
1. Dilution Factor at Mixing Zone Boundary:	82.1
2. Ambient Dissolved Oxygen Concentration (mg/L):	9.1
3. Effluent Dissolved Oxygen Concentration (mg/L):	1.15
4. Effluent Immediate Dissolved Oxygen Demand (mg/L):	4

OUTPUT	
Dissolved Oxygen at Mixing Zone Boundary (mg/L):	8.95

Streeter-Phelps analysis of critical dissolved oxygen sag.

Based on Lotus File DOSAG2.WK1 Revised 19-Oct-93

INPUT

1. EFFLUENT CHARACTERISTICS

Discharge (cfs):	0.46
CBOD5 (mg/L):	40
NBOD (mg/L):	5
Dissolved Oxygen (mg/L):	2
Temperature (deg C):	24

2. RECEIVING WATER CHARACTERISTICS

Upstream Discharge (cfs):	44800
Upstream CBOD5 (mg/L):	0.1
Upstream NBOD (mg/L):	0.02
Upstream Dissolved Oxygen (mg/L):	9.1
Upstream Temperature (deg C):	19.8
Elevation (ft NGVD):	1540
Downstream Average Channel Slope (ft/ft):	0.01
Downstream Average Channel Depth (ft):	30
Downstream Average Channel Velocity (fps):	3.3

3. REAERATION RATE (Base e) AT 20 deg C (day^-1): 0.11

Reference	Applic. Vel (fps)	Applic. Dep (ft)	Suggested Values
Churchill	1.5 - 6	2 - 50	0.12
O'Connor and Dobbins	.1 - 1.5	2 - 50	0.14
Owens	.1 - 6	1 - 2	0.09
Tsivoglou-Wallace	.1 - 6	.1 - 2	75.97

4. BOD DECAY RATE (Base e) AT 20 deg C (day^-1): 2.61

Reference	Suggested Value
Wright and McDonnell, 1979	0.39

OUTPUT

1. INITIAL MIXED RIVER CONDITION

CBOD5 (mg/L):	0.1
NBOD (mg/L):	0.0
Dissolved Oxygen (mg/L):	9.1
Temperature (deg C):	19.8

2. TEMPERATURE ADJUSTED RATE CONSTANTS (Base e)

Reaeration (day^-1):	0.11
BOD Decay (day^-1):	2.59

3. CALCULATED INITIAL ULTIMATE CBODU AND TOTAL BODU

Initial Mixed CBODU (mg/L):	0.1
Initial Mixed Total BODU (CBODU + NBOD, mg/L):	0.1

4. INITIAL DISSOLVED OXYGEN DEFICIT

Saturation Dissolved Oxygen (mg/L):	8.629
Initial Deficit (mg/L):	-0.47

5. TRAVEL TIME TO CRITICAL DO CONCENTRATION (days):	0.00
6. DISTANCE TO CRITICAL DO CONCENTRATION (miles):	0.00
7. CRITICAL DO DEFICIT (mg/L):	-0.47
8. CRITICAL DO CONCENTRATION (mg/L):	9.10

APPENDIX D—RESPONSE TO COMMENTS

No comments were received by the Department of Ecology.