FACT SHEET

May 18, 2011

The U.S. Environmental Protection Agency (EPA)
Proposes to Reissue a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA) to:

City of Wapato

Mailing Address:	Facility Address:
205 East Third Street	68172 Highway 97
Wapato, Washington 98951	Wapato, Washington, 98951

Permit Number:	WA-005022-9
Public Comment Start Date:	May 18, 2011
Public Comment Expiration Date:	June 17 2011

EPA Contact: Jennifer Wu, 206-553-6328, Wu.Jennifer@epa.gov
1-800-424-4372 ext. 3-6328 (within Region 10)

EPA Proposes NPDES Permit Reissuance.

EPA proposes to reissue an NPDES permit to the City of Wapato, the owner and operator of a municipal sewage treatment facility that provides secondary treatment and disinfection of wastewater on the Reservation of the Confederated Tribes and Bands of the Yakama Nation (hereafter referred to as "Yakama Nation"). In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the wastewater treatment plant to Drainage Way No. 2. The NPDES program is the primary permitting system under the federal Clean Water Act which governs all discharges to waters of the United States.

This Fact Sheet includes:

- Information on public comment, public hearing and appeal procedures;
- A description of the discharge(s);
- A listing of proposed effluent limitations and other conditions;
- A listing of proposed receiving water monitoring requirements;
- Technical material supporting the conditions in the permit.

Public Comment

Persons wishing to comment on or request a public hearing concerning the draft NPDES permit may do so in writing by the expiration date of the Public Notice. A request for a public hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be in writing and should be submitted to EPA as described in the Public Comments section of the attached Public Notice.

After the Public Notice expires and all comments have been considered, EPA's regional Director for the Office of Water and Watersheds will make a final determination regarding permit reissuance.

If no substantive comments are received, the tentative conditions in the draft permit will become final and the permit will become effective upon issuance. If comments are received, EPA will address the comments and issue the final permit along with a response to comments document. The permit will become effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days of the issuance date of the permit.

Documents are Available for Review

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's regional office in Seattle, Washington between 8:30 a.m. and 4:00 p.m., Monday through Friday.

United States Environmental Protection Agency, Region 10
1200 Sixth Avenue, Suite 900, OWW-130
Seattle, Washington 98101-3140
(206) 553-0060 or 1-800-424-4372 ext 0060 (within Alaska, Idaho, Oregon and Washington).

Draft permits, Fact Sheets and other information can also be found by visiting EPA Region 10's website at: http://yosemite.epa.gov/r10/WATER.NSF/NPDES+Permits/DraftPermitsID

The Fact Sheet and draft permit are also available at the following locations:

United States Environmental Protection Agency
Washington Operations Office
300 Desmond Dr. SE, Suite 102
Lacey, WA 98503
(360) 753-9457

Yakama Nation
Department of Natural Resources
Environmental Management Program
P.O. Box 151
Toppenish, Washington 98948

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City of Wapato
NPDES Permit Number: WA-005022-9
Facility Contact: Gary Potter, City of Wapato Public Works Director

Facility Mailing Address:
205 East Third Street
Wapato, WA 98951

Facility Location:
68172 Highway 97
Wapato, WA 98951

II. FACILITY INFORMATION

A. Facility Description

The City of Wapato owns and operates a municipal sewage treatment facility that provides secondary treatment and disinfection of wastewater. The facility and receiving waters are within the boundaries of the Yakama Nation. After treatment, the facility discharges the effluent in a single outfall to Drainage Way No. 2. Drainage Way No. 2 is within the Wapato Irrigation Project and drains into Wanity Slough, which eventually empties into the Yakima River.

The facility design flow is 1.16 million gallons per day (mgd) and has an actual average daily flow rate of 0.47 mgd. The City of Wapato municipal treatment facility supports 5,262 people. The plant receives domestic wastewater from commercial and residential sources. The plant also receives industrial wastewater from two local fruit packing plants that are non-categorical Significant Industrial Users (SIU). The collection system has no combined stormwater with sanitary wastewater sewers. A map of the facility can be found in Appendix A.

TABLE 1: Effluent Discharge Locations

Outfall	*Latitude/ Longitude*	*Description*	*Discharge Location*	*Current Average Flow*
001	N 46° 25' 59"/ E 120° 25' 17"	process and sanitary wastewater	Drainage Way No. 2	0.47 mgd

B. Permit History

On January 26, 2005, EPA reissued an NPDES permit to the City of Wapato. A permit renewal application was due on September 31, 2009, 180 days before the permit expired. No permit renewal application was submitted, and the permit expired on March 31, 2010. In a phone call on May 19, 2010, EPA requested a permit renewal application from the City of Wapato. On June 11, 2010, EPA received a letter from the City of Wapato explaining their intention to submit a permit renewal application by June 30, 2010. On June 23, 2010, EPA received a NPDES permit application for the facility. EPA noted detections of priority pollutants in Part D of the NPDES permit application and on July 28, 2010, requested additional monitoring by the city in an information request under Clean Water Act, Section 308. EPA received the results of the additional monitoring on September 2, 2010.

C. Treatment

The influent wastewater flows through an electronic, in-line flow meter and into the headworks. The headworks contain a communitor for grinding large influent solids and a pre-aeration chamber for removing the large, heavier material. From the headworks, the wastewater flows to a primary clarifier that removes settleable and floating materials. The primary clarifier effluent is pumped into two parallel Submerged Biological Contactors (SBC). The SBC effluent flows by gravity to two parallel Rotating Biological Contactor (RBC) units containing two shafts each. The RBC and SBC units remove soluble organic material and provide secondary treatment for the wastewater. Effluent from the RBC units flows into two parallel secondary clarifiers for removal of biological solids and then to the chlorine contact chambers for disinfection. Sulfur dioxide is added in a structure downstream of the contact tank for dechlorination. The final effluent wastewater is then discharged into Drainage Way No. 2.

Settleable and floating solids, as well as biological waste solids from the RBCs, SBC, and the primary and secondary clarifiers are pumped into the primary digester. This sludge is stabilized in the primary and secondary aerobic digesters and then dewaters in a centrifuge and on the sludge drying beds. The sludge is stockpiled on-site prior to disposal at the Cheyne municipal solid waste landfill.

III. RECEIVING WATER

A. Receiving Water and Low Flow Conditions

Drainage Way No. 2 runs in the east-west direction south of the wastewater treatment plant and primarily carries irrigation return flows during the irrigation season (April 1 through October 31). The rest of the year, Drainage Way No. 2 is dry and the effluent makes up the receiving water during critical low flows. Drainage Way No. 2 is within the Wapato Irrigation Project and eventually empties into the Yakima River via the Wanity Slough. The volume of flow changes in the drainage way according to whether it is the irrigation or non-irrigation season.

The City of Wapato collected monthly flow data in Drainage Way No. 2 from 2007 to 2010, April through September during the irrigation season (April 1 through October 31). Flow samples were collected upstream of Outfall No. 1. The data are as follows:

TABLE 2: Monthly Flows in Drainage Way No. 2 upstream of Outfall No. 1 in mgd

	April	May	June	July	August	September
2007	50 (77 cfs)	50 (77 cfs)	104 (161 cfs)[1], 140 (217 cfs)[2]	124 (192.5 cfs)	124 (192.5 cfs)	87 (56 cfs)
2008	34 (52 cfs)	50 (77 cfs)	52 (81 cfs)	67 (104 cfs)	63 (41 cfs)	68 (44 cfs)
2009	29 (45 cfs)	56 (87 cfs)	90 (140 cfs)	106 (165 cfs)	64 (41 cfs)	No data
2010	50 (77 cfs)	124 (192 cfs)	90 (140 cfs)	No data	No data	No data

1. Sample collected on June 7, 2007.
2. Sample collected on June 28, 2007.

The 2005 fact sheet (City of Wapato, 2005) showed a distinct seasonal difference for flows in Drainage Way No. 2 during the non-irrigation months (November 1 through March 31) and irrigation months (April 1 through October 31) based on weekly data collected in Drainage Way No. 2 from 1987 to 2005. These data showed flows ranging from 0 mgd in the winter months up to 151 mgd

(234 cfs) during summer months. In a letter from the City of Wapato to EPA dated June 9, 2010, the city also noted that during the non-irrigation season, the wastewater effluent is the only water in the ditch. Because of the seasonality of the drainage way, the flow is split into two seasons: the irrigation season (April 1 through October 31) and non-irrigation season (November 1 through March 31).

To calculate effluent limits, conservative assumptions were made for the receiving water flow so that effluent limits are protective of water quality standards. A low receiving water flow and a peak future facility discharge (design flow) are representative of a critical condition where dilution capability of the stream is restricted, and impacts from the effluent on the receiving water would be greatest.

The *Technical Support Document for Water Quality-based Toxics Control* (TSD, EPA 1991) recommends the use of the lowest 7-day average flow expected to occur once in 10 years (7Q10) for effluent limit calculations based on the chronic aquatic life criterion, and the lowest 1-day flow expected to occur once in 10 years (1Q10) for effluent limit calculations based on the acute aquatic life criterion. The 2005 Fact Sheet for Draft NPDES Permit No. WA-005022-9 states that the 7Q10 used to develop effluent limits for the Irrigation Season is 11.7 mgd, and the 7Q10 for the Non-irrigation Season is 0 mgd. In the Fact Sheet for Draft NPDES Permit No. WA-005022-9, City of Wapato, January 27, 1998, 7Q10 low flows were calculated based on weekly discharge monitoring report (DMR) data collected by the City of Wapato in Drainage Way No. 2 from 1988 through 1997. The 1998 permit used a 7Q10 of 11.9 mgd for the Irrigation Season and 0 mgd for the Non-irrigation Season *(Reference: Permit No. WA-005022-9, March 30, 1998, Appendix B)*. It should be noted that 7Q10 low flows used in the past two City of Wapato NPDES permits are similar and differ by only one percent.

Monthly receiving water data collected from April through September from 2007 through 2010 are too infrequent to calculate a 7Q10 or a 1Q10 low flow and also do not include data from October where low flows occurred from at least 1988 through 1997. The most accurate dataset is from 1988 through 1997, so the 7Q10 low flows used in this NPDES permit are 11.9 mgd for the Irrigation Season and 0 mgd for the Non-irrigation Season.

B. Water Quality Standards

General Information

Section 301(b)(1)(C) of the Clean Water Act (CWA) requires that NPDES permits contain limitations, including those necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to State law or regulations, or any Federal law or regulation, or required to implement any applicable water quality standard pursuant to the CWA.

Under the CWA implementing regulations, water quality standards consist of designated uses for waterbodies (e.g., aquatic life, contact recreation, etc), numeric or narrative criteria to protect those uses, and an antidegradation policy to maintain water quality (40 Code of Federal Regulations (CFR) Part 131). Such standards serve both as a description of the desired water quality for particular waterbodies and as a means of ensuring that such quality is attained and maintained.

Section 101(a) of the CWA states "…it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983…." EPA has treated this interim goal as a rebuttable presumption in its water quality standards regulation, and in implementing the water quality standards program. For example, EPA's water quality standards regulation requires States and Tribes to conduct a use attainability analysis whenever the State or Tribe wishes to remove a designated use that is specified in section 101((a)(2) of the CWA or to adopt subcategories of such uses which require less stringent criteria (see 40 CFR 131.10(j)). Furthermore, when EPA has found that the State did not conduct such an analysis as required above, EPA has used this rebuttable presumption, when promulgating Federal water quality standards (see EPA's promulgation of water quality standards for the State of Idaho, 62 FR 41161 (July 31, 1997), see also *Idaho Mining Association v. Browner,* 90 F. Supp 2d 1078 (D. Idaho 2000)(upholding the rebuttable presumption approach). Furthermore, EPA believes that the objectives of restoring and maintaining water quality support the designation of the most protective attainable use for the waterbody. For example, if full primary contact recreation use is not attainable, EPA would nevertheless include some requirements in the discharge permit to limit bacterial contamination in order to provide the next best attainable level of protection (e.g., secondary contact recreational use or a seasonal recreational use if EPA determined such uses were attainable).

Washington State Water Quality Standards

The City of Wapato sewage treatment facility and Drainage Way No. 2 are within the boundaries of the Yakama Nation in south central Washington. The State of Washington is downstream from the discharge. The State of Washington has EPA-approved water quality standards; however, Washington does not have the authority to issue NPDES permits on tribal lands. Moreover, since Washington does not have Clean Water Act authority on tribal lands or in tribal waters, the Washington water quality standards are not directly applicable within the tribal reservation. EPA regulation 40 CFR 122.4(d) does, however, prohibit EPA from issuing a permit when the "imposition of conditions cannot ensure compliance with the applicable water quality requirement of all affected states," including downstream states. Since Washington State waters are over 15 miles downstream of the effluent discharge from the facility, the effluent limitations in this permit are not likely to affect Washington water quality standards provided there is adequate assimilative capacity in the receiving waters on tribal land. However, if the receiving waters already exceed the water quality standard then the effluent limitations in the permit must ensure that Washington water quality standards will be achieved when the discharge reaches waters under Washington's jurisdiction. This can be achieved by ensuring that the effluent discharge meets the water quality criteria prior to being discharged to the receiving water.

Yakama Nation Tribal Water Quality Standards

In 1987, Congress amended the CWA to add Section 518 which allows the Administrator of EPA to treat a Tribe in the same manner as a State (i.e., commonly referred to as "treatment as a State" (TAS)) for purposes of various Clean Water Act provisions (e.g., implementing the water quality standards program, and developing water quality standards for CWA purposes) provided that the Tribe meets certain eligibility criteria. EPA's implementing regulations at 40 CFR 131.8 contain the criteria in Section 518 of the CWA that Tribes must meet in order to be eligible to administer a water quality standards program. The regulation at 40 CFR 131.8 also establishes procedures for the EPA Regional Administrator to receive and make determinations on Tribal applications.

The Yakama Nation submitted an application for TAS in 1994. However, EPA is awaiting additional information from the Yakama Nation before it can approve the TAS application. In November 2005, the Yakama Nation adopted the *Yakama Nation Water Quality Standards*. However, because the Yakama Nation does not have TAS status, there are no EPA-approved water quality standards for Clean Water Act permitting purposes on the Yakama Nation reservation.

In 1993, EPA issued the *Guidance on EPA's NPDES and Sludge Management Permit Procedures on Federal Indian Reservations* (from Cynthia Dougherty to Water Management Division Directors Regions I – X, November 16, 1993) which set forth EPA's position on NPDES permitting on tribal lands. This memo states that EPA Regions should work with Tribes who have adopted water quality standards not yet approved by EPA to ensure that, to the extent practicable, NPDES permits issued on the reservation achieve compliance with those water quality standards. In addition, the memo states that "[u]ntil a Tribe is authorized under Section 303 [i.e., has TAS], EPA is the certification authority." 40 CFR § 121.21(b) requires that EPA issue 401 certifications where water quality standards have been established but there is no state/agency who has the authority to issue the certification. This regulatory section implements Section 401(d) of the Clean Water Act which requires that a certification set forth the effluent limitations and other limitations and monitoring requirements necessary to assure that the permittee complies with the appropriate sections of the CWA, and with any appropriate requirements of State law.

Given the EPA guidance memo as well as the regulatory/statutory provisions, EPA believes it is appropriate to consider the Yakama Nation water quality standards when determining the applicable designated uses and criteria for Drainage Way No. 2 as long as the water quality standards are consistent with Section 303 of the CWA, as well as EPA's implementing regulations at 40 CFR 131, and they are protective of downstream waters (i.e., Washington State waters).

Moreover, it should be noted that EPA has reviewed the State of Washington WQS and the Yakama Nation WQS and found that they are very similar. As such, EPA has determined that using the Yakama Nation WQS will be protective of the downstream waters in Washington State.

Designated Uses for Drainage Way No. 2

Drainage Way No. 2 is part of the Wapato Irrigation Project. The Yakama Nation's water quality standards generally classify the Wapato Irrigation Project as Class IV waters (see Yakama Nation Water Quality Standards, 21.2.3.37). Class IV waters are protected for: agricultural water supply and/or drainage, livestock watering, and domestic water, but only at the discretion of the Officer-in-Charge. However, the Yakama Nation water quality standards for Class IV waters (see section 20.1.6.1) states:

"…Note that since their construction, incidental to their designated uses, these waters have been subject to other beneficial uses and sustained or enhanced other resources, notably cultural uses, wildlife, … and fisheries. Because [sic] the stock water and domestic water designated uses are sensitive uses requiring stringent standards it is assumed that these standards for Class IV waters shall be of sufficient quality to sustain these additional uses…"

Additionally, the Yakama water quality criteria for Class IV waters, at Part 20.1.6.2, states:

"…waters discharged from Class IV waters into ground waters or a different class of waters shall be of such quality as to ensure that the receiving water is in compliance with the standards assigned to the receiving water…".

As stated previously, Drainage Way No. 2 is a tributary to the Yakima River via Wanity Slough, which are both designated as Class III waters. Therefore, Drainage Way No. 2 should also be designated as Class III waters. The beneficial uses for Class III waters are cultural and religious uses, anadromous spawning, rearing and migration, aquatic life, wildlife habitat, recreation, ground water recharge, agricultural water supply and/or drainage, and livestock watering.

Applicable Water Quality Criteria

The designated uses with the most protective water quality criteria in the Yakama Nation Water Quality Standards are anadromous spawning, rearing and migration, and cultural and religious uses. The water quality criteria associated with these designated uses will also be protective of the other applicable designated uses (e.g., aquatic life, wildlife habitat, etc).

The Yakama Nation Water Quality Standards do not contain specific criteria for BOD or total suspended solids. However, the water quality criteria for the pollutants expected to be present in the Wapato effluent are presented in Table 3 on the following page.

TABLE 3: Yakama Nation Water Quality Criteria

Parameter	Yakama Nation water quality criteria
pH	pH must be within the range of 6.5 to 8.5 standard units with a human-caused variation within the above range of less than 0.2 standard units (see Yakama Nation WQS 20.1.5.2)
Bacteria	E.coli bacteria levels shall 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 10 sample points exist) greater than 200 colonies/100 mL (see Yakama Nation WQS 20.1.5.2)
Total Ammonia	Irrigation season: Acute aquatic life criterion = 5 mg/L (see Yakama Nation WQS 13.3.3.3) Chronic aquatic life criterion = 1.4 mg/L (see Yakama Nation WQS 13.3.3.3,) Non-irrigation season: Acute aquatic life criterion = 9.5 mg/L (see Yakama Nation WQS 13.3.3.3) Chronic aquatic life criterion = 2.8 mg/L (see Yakama Nation WQS 13.3.3.3,) (The criteria are developed using the 95th percentile temperature and pH data. For the irrigation season, there were 33 samples collected in Drainage Way No. 2 from 5/10/01 to 9/20/07. The 95th percentile temperature is 22°C, and the 95th percentile pH is 8.0 s.u. For the non-irrigation season, there is no flow in Drainage Way No. 2, and the effluent becomes the receiving water. There were 30 effluent samples collected during the non-irrigation season from 11/30/05 to 4/30/10. The 95th percentile temperature is 18°C, and the 95th percentile pH is 7.7 s.u.).
Dissolved Oxygen	August 15 – May 31: exceed 10 mg/L to protect salmon spawning June 1 – August 14: exceed 8.5 mg/L (see Yakama Nation WQS 20.1.5.2). See discussion below.
Temperature	During non-irrigation season: 16°C as a 7-day daily average with no single daily maximum over 18^{o}C (see Yakama Nation WQS 20.1.5.2) During irrigation season: 18°C as a 7-day daily average for Wapato Irrigation Project and Wanity Slough with no single daily maximum temperature exceeding 20 °C (see Yakama Nation WQS 20.1.5.3.1.7).
Aesthetics Values	All waters, including any established mixing zones, shall be free from substances, materials, floating debris, oil, grease, or scum attributable to any point source discharge or nonpoint source activity that: are in amounts sufficient to be visually displeasing, deleterious, a nuisance, or which interfere directly or indirectly with any beneficial use; will settle to form bottom or shoreline deposits which are putrescent, visually displeasing, or otherwise objectionable or will significantly alter the physical, chemical or biological properties of the bottom or shoreline; are in amounts that cause a visible sheen, film, iridescent appearance, or any discoloration of the surface of the water, on any objects in the water, on the adjoining shoreline, or on nearby sediments (see Yakama Nation WQS 13.3.2).
Nutrients	To the extent feasible, waters shall be free from excess nutrients that cause or contribute to undesirable or nuisance aquatic life or produce adverse physiological response in humans, animals, or plants as defined below, unless it is determined by the Department that a persistent exceedence of the criteria listed in the following sections is attributable to natural conditions, or conditions unrelated to management actions. Occasional short duration non-compliant nutrient conditions resulting from natural causes, or intermittent high densities of periphyton, macrophytes, or plankton blooms related to fish carcass nutrients, beaver droppings, leaf fall, naturally high concentrations resulting from native soils, or other natural sources typical to the ecoregion, or periodic events, such as floods, shall not be considered as a non-compliant condition for purposes of this title. Nutrient loadings in excess of these criteria resulting from anthropogenic actions, which are addressable by changes in

	management, (e.g., improved stormwater management practices), shall be considered as non-compliant conditions and dealt with accordingly (Yakama Nation 20.1.5.4). Total Phosphorus shall not exceed a median of 30 μg/L as sampled throughout a year (Yakama Nation 20.1.5.4.1). Total Nitrogen shall not exceed a median value of 0.36 mg/L as sampled throughout the year (Yakama Nation 20.1.5.4.1). Periphyton chlorophyll *a* shall not exceed a yearly median value of 150 mg/m^2 more than once in ten years to account for natural variations in flow (e.g. 7Q10), solar exposure or other dynamic natural causes, as determined by sampling of representative stream reaches selected by the Department and regularly sampled (Yakama Nation 20.1.5.4.3).
Toxic Substances	Toxic substances shall not be introduced in waters of the Yakama Nation in amounts, concentrations, or combinations which adversely affect the beneficial uses, cause acute or chronic toxicity to the indigenous aquatic biota; are harmful to human, animal, plant or aquatic life; chemically change to harmful forms in the environment; accumulate in sediments or bioaccumulate in aquatic life or wildlife to levels that adversely affect public health, safety or welfare…(see Yakama Nation WQS 13.3.3)
Cadmium	Acute freshwater dissolved metals criterion = 0.8 μg/L (see Yakama Nation WQS, Appendix B) Chronic freshwater dissolved metals criterion = 0.4 μg/L (see Yakama Nation WQS, Appendix B) The criteria are developed using 37 mg/L, the 5^{th} percentile hardness data from Drainage Way No. 2. The 5^{th} percentile is based on 11 samples collected in July and August 2010 from Drainage Way No. 2. The 5^{th} percentile hardness is 37 mg/L.
Copper	Acute freshwater dissolved metals criterion = 5.5 μg/L (see Yakama Nation WQS, Appendix B) Chronic freshwater dissolved metals criterion = 4.0 μg/L (see Yakama Nation WQS, Appendix B) The criteria are developed using 37 mg/L, the 5^{th} percentile hardness data from Drainage Way No. 2. The 5^{th} percentile is based on 11 samples collected in July and August 2010 from Drainage Way No. 2.
Zinc	Acute freshwater dissolved metals criterion = 52 μg/L (see Yakama Nation WQS, Appendix B) Chronic freshwater dissolved metals criterion = 52 μg/L (see Yakama Nation WQS, Appendix B) The criteria are developed using 37 mg/L, the 5^{th} percentile hardness data from Drainage Way No. 2. The 5^{th} percentile is based on 11 samples collected in July and August 2010 from Drainage Way No. 2.
Mercury	Human health criterion for consumption of water and organism = 0.0054 μg/L (see Yakama Nation WQS 23.6) Human health criterion for consumption of organism only = 0.0055 μg/L (see Yakama Nation WQS 23.6)
Chloroform	Human health criterion for consumption of water and organism = 4.5 μg/L (see Yakama Nation WQS 23.6) Human health criterion for consumption of organism only = 22 μg/L

	(see Yakama Nation WQS 23.6)
Methylene Chloride	Human health criterion for consumption of water and organism = 4.4 μg/L (see Yakama Nation WQS 23.6) Human health criterion for consumption of organism only = 73 μg/L (see Yakama Nation WQS 23.6)
Chlorine	Acute freshwater dissolved metals criterion = 11 μg/L (see Yakama Nation WQS 23.6) Chronic freshwater dissolved metals criterion = 19 μg/L (see Yakama Nation WQS 23.6)

Other Applicable Water Quality Standards- Mixing Zones

It is not always necessary to meet all water quality criteria within the discharge pipe to protect the integrity of the water body as a whole. Sometimes it is appropriate to allow for ambient concentrations above the criteria in a small area near the outfall. These areas are called mixing zones. Whether to allow mixing zones is a matter of State or Tribal discretion. Mixing zone characteristics should be established to ensure that:
(1) mixing zones do not impair the integrity of the water body as a whole,
(2) there is no lethality to organisms passing through the mixing zone, and
(3) there are no significant health risks, considering likely pathways of exposure (*Water Quality Standards Handbook: Second Edition*, Chapter 5, EPA-8238B-94-005a).

Additionally, it is EPA's position that mixing zones should not be authorized for bacteria in rivers and streams (see November 12, 2008 memo from Ephraim King on *Initial Zones of Dilution for Bacteria in Rivers and Streams Designated for Primary Contact Recreation*).

The Yakama Nation Water Quality standards do not allow mixing zones for acute aquatic life criteria (Yakama Nation WQS, 16.3), wetlands, intermittent or ephemeral streams, lakes or ponds. However, the standards do allow a maximum of 20% of the 7Q10 flow for chronic aquatic life criteria (Yakama Nation WQS, Section 16.11.4).

Both the Washington Water Quality Standards and the Yakama Nation Water Quality Standards confer authority to allow a mixing zone to the State and the Tribe, respectively. EPA does not have authority to issue mixing zones. However, in this case, Washington State does not have jurisdiction over these waters and the Yakama Nation does not have TAS. EPA believes it is not reasonable to allow a mixing zone for the discharge to Drainage Way No. 2 during the Non-irrigation Season, since the 7Q10 low flow is zero. Based on the Yakama Nation water quality standards, no mixing zone will be allowed for acute aquatic life criteria, and 20% of the low flow will be used for chronic aquatic life criteria if there is available assimilative capacity in the waterbody for a particular pollutant.

C. Water Quality Limited Streams

A water quality limited segment is any waterbody, or definable portion of a water body, where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards. Data collected in Drainage Way No. 2 indicates that the waterbody is not meeting tribal water quality standards for the Yakama Nation for dissolved oxygen.

Section 303(d) of the Clean Water Act requires States to develop a plan, known as a Total Maximum Daily Load management plan (TMDL), for water bodies listed as water quality limited. The TMDL documents the amount of a pollutant a waterbody can assimilate without violating a state's water quality standards and allocates that load to known point sources and nonpoint sources.

In 1997, the State of Washington Department of Ecology issued a Total Maximum Daily Load

(TMDL) for sediment and DDT in the Lower Yakima River, waters downstream of Yakama Nation. The State of Washington is in the process of developing an updated TMDL for toxics and published a report on toxics in the Lower Yakima River in 2009. Drainage Way No. 2 is not part of the TMDL because it is on tribal waters, and the state has no jurisdiction on tribal lands. The drainage way is not included in the Yakima River TMDL, and the City of Wapato has no wasteload allocation (WLA) from these TMDLs.

IV. PROPOSED EFFLUENT LIMITATIONS

A. Basis for Effluent Limitations

In general, the Clean Water Act requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits (see CWA 301(b), 33 USC § 1311(b)). A technology-based effluent limit requires a minimum level of treatment for a point source based on currently available treatment technologies. A water quality-based effluent limit is designed to ensure that the water quality standards of a water body are being met. The bases for the proposed effluent limits and pollutant-specific analyses are provided in Appendices C and D**.**

B. Proposed Effluent Limitations

The following summarizes the proposed effluent limitations in the draft permit:

1. The effluent pH range must be between 6.5 and 8.5 standard units (s.u.).
2. For BOD_5 and TSS, the monthly average effluent removal must not be less than 85 percent.
3. There must be no discharge of floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses.
4. Tables 4 and 5 summarize the proposed effluent limitations for BOD_5, TSS, bacteria, chlorine, copper, zinc, ammonia, and whole effluent toxicity.

Table 4. Proposed Effluent Limitations Compared to Current Limitations for Outfall 001 during the Irrigation Season (April 1 – October 31)						
Parameters	*Average Monthly*		*Average Weekly*		*Maximum Daily*	
	Proposed	*Current*	*Proposed*	*Current*	*Proposed*	*Current*
BOD_5 mg/L	30	30	45	45	-----	-----
lbs/day	290	290	435	435	-----	-----
TSS mg/L	30	30	45	45	-----	-----
lbs/day	290	290	435	435	-----	-----
E. Coli bacteria, Colonies #/100mL[1]	100	100	200	200	-----	-----
Total Ammonia as N						
mg/L	1.2	1.2	-----	-----	2.5	2.5
lbs/day	11.9	11.9	-----	-----	24.0	24.0
Total Residual Chlorine[2]						
μg/L	7.5	18	-----	-----	19	24
lbs/day	0.073	0.18	-----	-----	0.18	0.23
Total Copper						
μg/L	3.4	-----	-----	-----	5.5	-----
lbs/day	0.033	-----	-----	-----	0.053	
Total Zinc						
μg/L	25	-----	-----	-----	52	-----
lbs/day	0.24	-----	-----	-----	0.50	-----
Whole Effluent Toxicity	1.5 TUa, c[3]	-----	-----	-----	3.0 TUa, c	-----

Footnotes:

1. E. coli bacteria must both not exceed a geometric mean value of 100 colonies/100mL and not have more than 10% of all samples obtained for calculating the geometric mean value exceeding 200 colonies/100mL.
2. The average monthly limit of chlorine is not quantifiable using EPA approved analytical methods. The permittee will be in compliance with the average monthly effluent limit provided the total chlorine residual is at or below the compliance evaluation level of 19 μg/L.
3. TUa,c is when acute toxicity is being expressed in chronic toxic units, and should be treated as TUc, which is defined in Part I.D.2.d of the permit.

Table 5. Proposed Effluent Limitations Compared to Current Limitations for Outfall 001 during the Non-Irrigation Season (November 1 – March 31)						
Parameters	*Average Monthly*		*Average Weekly*		*Maximum Daily*	
	Proposed	*Current*	*Proposed*	*Current*	*Proposed*	*Current*
BOD_5 mg/L	30	30	45	45	-----	-----
lbs/day	290	290	435	435	-----	-----
TSS mg/L	30	30	45	45	-----	-----
lbs/day	290	290	435	435	-----	-----
E. Coli bacteria, Colonies #/100mL[1]	100	100	200	200	-----	-----
Total Ammonia as N						
mg/L	1.3	1.3	-----	-----	2.7	2.7
lbs/day	13	13	-----	-----	25.8	25.8
Total Residual Chlorine[2]						
μg/L	7.5	10	-----	-----	19	13
lbs/day	0.073	0.097	-----	-----	0.18	0.13
Total Copper						
μg/L	3.4	-----	-----	-----	5.5	-----
lbs/day	0.033	-----	-----	-----	0.053	
Total Zinc						
μg/L	25	-----	-----	-----	52	-----
lbs/day	0.24	-----	-----	-----	0.50	-----
Whole Effluent Toxicity[3]	1.0 TUc[3]	-----	-----	-----	1.6 TU c	-----

Footnotes:

1. E. coli bacteria must both not exceed a geometric mean value of 100 colonies/100mL and not have more than 10% of all samples obtained for calculating the geometric mean value exceeding 200 colonies/100mL.
2. The average monthly limit for chlorine is not quantifiable using EPA approved analytical methods. The permittee will be in compliance with the average monthly limit provided the total chlorine residual is at or below the compliance evaluation level of 19 μg/L.
3. For the non-irrigation season only, the monthly compliance level for chronic WET is established as a monthly median limit, not an average monthly limit (See Appendix E, Section IV).

C. Compliance Schedules for Whole Effluent Toxicity, Copper and Zinc Limits

The facility is currently not in compliance with ammonia limits from the 2005 NPDES permit. Whole effluent toxicity testing indicates that *ceriodaphnia* experience toxicity when exposed to wastewater treatment effluent. The City of Wapato is beginning planning to upgrade their plant to address ammonia levels. Ammonia contributes to toxicity in effluent, and until the upgrades to the plant occur, the permittee likely cannot comply with the proposed water quality-based effluent limits for whole effluent toxicity. The proposed monthly limit and daily compliance limits for whole effluent toxicity during the irrigation season are 1.5 TUa,c and 3.0 TUa,c, respectively. During the non-irrigation season, the limits are 1.0 TUc (monthly median) and 1.6 TUc, respectively. Whole Effluent Toxicity Results in 2006, 2007, and 2008 ranged from 3.3 TUc to 12.5 TUc for *ceriodaphnia* survival and reproduction.

The facility will also not be in compliance with copper and zinc limits. Copper data collected between July and August 2010 ranged from 2.5 to 8.3 μg/L. The proposed copper limits year-round are an average monthly limit of 3.4 μg/L and a maximum daily limit of 5.5 μg/L. Zinc levels ranged from 12.3 to 109 μg/L. The proposed year-round limits for zinc are an average monthly limit of 25 μg/L and a maximum daily limit of 52 μg/L. Federal regulations (40 CFR 122.47) and the Yakama Nation Water Quality Standards (Yakama Nation Water Quality Standards, Section 18) allow for compliance schedules in permits. The Yakama Nation's compliance schedule rule allows compliance schedules "to ensure final compliance with all water quality criteria in the shortest practicable time but not to exceed five years unless "extenuating circumstances" occur. The federal compliance schedule rule allows compliance schedules "when appropriate," requires compliance with effluent limits "as soon as possible," and requires "interim requirements and the dates for their achievement."

The draft NPDES permit proposes to allow compliance schedules for whole effluent toxicity, copper and zinc. The proposed compliance schedule for whole effluent toxicity ends on December 1, 2014. The permittee must comply with the NPDES permit limits for copper and zinc no later than December 1, 2015. The permit includes interim requirements and the dates for their achievement in compliance with 40 CFR 122.47.

V. MONITORING REQUIREMENTS

A. Basis for Effluent and Receiving Water Monitoring Requirements

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required in the future, and/or to monitor effluent impacts on the receiving water. Therefore, receiving water, effluent, and biological monitoring have been incorporated into the draft permit. The permittee is responsible for conducting the monitoring and for reporting results with Discharge Monitoring Reports (DMRs) to EPA.

B. Proposed Effluent Monitoring Requirements

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA approved test methods (40 CFR Part 136), and if the Method Detection Limits for the test methods are less than the effluent limits. Table 6 presents the proposed effluent monitoring requirements for the draft permit.

TABLE 6: Proposed Monitoring Frequency of Effluent

Parameter	*Sample Location*	*Sample Frequency*	*Sample Type*
Flow, mgd	Influent or effluent	Continuous	Recording
BOD_5, [1,2]mg/L	Influent and effluent	1/week	24-hour composite
TSS, [1,2]mg/L	Influent and effluent	1/week	24-hour composite
pH, S.U.	Effluent	Daily	Grab

Dissolved oxygen, mg/L	Effluent	1/week	Grab
Chlorine, Total Residual μg/L	Effluent	5/week	Grab
E.coli bacteria, Colonies #/100 mL	Effluent	5/week	Grab
Temperature, °C	Effluent	Daily	Grab
Total Ammonia as N, μg/L	Effluent	1/ week	24-hour composite
Cadmium, Total Recoverable μg/L	Effluent	1/week	24-hour composite
Copper, Total Recoverable μg/L	Effluent	1/week	24-hour composite
Zinc, Total Recoverable μg/L	Effluent	1/week	24-hour composite
Mercury, Total, μg/L	Influent and effluent	1/month (1st year), 1/quarter (after 1st year)	24-hour composite
Total Phosphorus (mg/L)	Effluent	1/month	24-hour composite
Total Nitrogen (mg/L)	Effluent	1/month	24-hour composite
Footnotes 1. Effluent and Influent sampling to be done within the same 24-hour period. 2. 24-hour composite samples must be collected in intervals of no less than 15 minutes apart (total 96 samples) in a 24-hour time period.			

In addition to the table above, the current permit is requiring the effluent to be monitored for the parameters specified in Appendix B. These parameters are required to be monitored by 40 CFR 122.21(j)(4) and submitted with the renewal application 180 days prior to expiration of the Final Permit. Each parameter is to be monitored a total of three times and all of the parameters must be sampled on the same day of each sampling event. The first sampling event must be taken once during the months of January, February, or March of the first year of the Final Permit. The second sampling event must be taken once during the months of April, March, or June of the second year of the Final Permit. The third and final event must be taken once during the months of July, August, or September of the third year of the Final Permit.

C. Whole Effluent Toxicity Testing

The federal regulations require publicly owned treatment works (POTWs) with design influent flows equal to or greater than 1.0 mgd, or POTWs with approved pretreatment programs, to submit results of whole effluent toxicity (WET) testing (40 CFR 122.21(j)(1)). Additionally, the Yakama Nation's narrative water quality standards for toxics states, "Toxic substances shall not be introduced in waters of the Yakama Nation in amounts, concentrations, or combinations which adversely affect the beneficial uses, [and] cause acute or chronic toxicity to the indigenous aquatic biota….". The regulation requires 4 WET tests during the permit cycle to be submitted with the renewal application 180 days prior to expiration of the Final Permit. Upon review of the WET data for the facility submitted during the previous permit cycle, it was determined that the facility's effluent has reasonable potential for acute and chronic WET. As a result, water quality-based chronic WET limits were included in the draft permit. To ensure compliance with the WET limits, the draft permit requires quarterly WET monitoring, once during January to March, once during April to June, once during July to September, and once during October to December. The timing of quarterly testing must be such that two tests are conducted during the irrigation season and two tests are conducted during the non-irrigation season.

D. Proposed Receiving Water Monitoring

The purpose of the receiving water monitoring is to determine receiving water quality conditions as part of the effort to evaluate the reasonable potential for the discharge to cause an instream excursion above water quality criteria (40 CFR 122.44). The upstream station should be located upstream of the influence of the effluent. There should be two downstream monitoring stations located where the effluent and receiving water are fully mixed. Table 7 presents the proposed receiving water monitoring requirements for the draft permit.

TABLE 7: Proposed Receiving Water Monitoring

Parameter	*units*	*Sampling Frequency*	*Type of Sample*	*Location*
pH	standard units	1/month	Grab	Upstream and 2 Downstream
Flow	mgd	1/week	Grab	Upstream
Hardness, $CaCO_3$	mg/L	1/month	Grab	Upstream
Temperature	°C	1/day	Grab	Upstream and 2 Downstream
Total Ammonia as N	mg/L	1/month	Grab	Upstream and 2 Downstream
BOD_5	mg/L	1/week	Grab	Upstream
DO	mg/L	1/week	Grab	Upstream and 2 Downstream
TSS	mg/L	1/month	Grab	Upstream and 2 Downstream
Total Phosphorus as P	mg/L	1/month	Grab	Upstream and 2 Downstream
Total Nitrogen as N	mg/L	1/month	Grab	Upstream and 2 Downstream

Downstream total phosphorus, total nitrogen, ammonia, pH, and temperature data will also be collected to gain a better understanding of nutrient concentrations. Yakima River is listed on Washington's 303(d) list, a list of impaired waters compiled under Section 303(d) of the CWA).

The permittee will select the sampling locations and submit them to EPA and the Yakama Nation Environmental Protection Program for approval. The samples will be collected during the third and fourth year of the permit.

VI. SPECIAL CONDITIONS

A. Quality Assurance Plan (QAP)

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is complete, accurate and representative of the environmental or effluent condition. The facility is required to update and implement the Quality Assurance Plan (QAP) within 60 days of the effective date of the final permit. The QAP must be prepared in accordance with EPA guidance documents (*EPA Requirements for Quality Assurance Project Plans*, EPA/QA/R-5, and (*Guidance for Quality Assurance Project Plans*, EPA/QA/G-5), and consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The QAP must be retained on site and made available to EPA upon request.

B. Mercury Minimization Plan

The national policy in section 101(a)(3) of the CWA states that discharges of toxic substances be prohibited. The Yakama Nation's narrative water quality standards for toxics states "Toxic substances must not be introduced in waters of the Yakama Nation in amounts, concentrations, or combinations which adversely affect the beneficial uses, cause acute or chronic toxicity to the indigenous aquatic biota….".

In the City of Wapato's permit application, the facility reported detections of total mercury in its effluent. The maximum concentration was 0.79 µg/L and the average concentration was 0.4 µg/L. The Yakama Nation water quality standard for total mercury based on human health is 0.0054 µg/L for consumption of water and organism and 0.0055 µg/L for consumption of organism only. In comparison, Washington's acute criterion for mercury (dissolved fraction) is 2.1 µg/L, and the chronic criterion (total recoverable) is 0.012 µg/L. It should be noted that in both cases, the City of Wapato values are above both the Yakama Nation and Washington water quality standards. The Yakima River, which is downstream of Drainage Way No. 2 is on the 303(d) list for mercury. Mercury is a persistent chemical that bioaccumulates in the food web, because it is difficult for organisms to metabolize. As a result, mercury concentrations can increase exponentially from plants, to fish, and to people. Therefore, it is important to limit any potential sources of mercury that may contribute to downstream mercury impairment in the Yakima River.

The City of Wapato monitored mercury concentrations in its effluent in July and August 2010 as part of EPA's information request under CWA Section 308. The results showed that mercury was below the detection limit of 0.3 µg/L in all cases. The mercury detection limit is too high to evaluate whether mercury concentrations in effluent exceed water quality standards. This permit does not include effluent limits for mercury. However, this permit requires a mercury minimization plan to ensure that mercury sources are controlled. Mercury monitoring is required in this permit and will be evaluated during the next permit re-issuance to see whether mercury limits are needed in the next permit. During the first year of the permit, mercury must be analyzed in effluent once per month. In the rest of the permit, mercury must be sampled in effluent at least quarterly.

The mercury minimization plan should include the following elements:

1. A Program Plan which includes the City of Wapato's commitments for:

- Identification of potential sources of mercury that contribute to discharge levels;
- Reasonable, cost-effective activities designed to reduce or eliminate mercury loadings from identified sources;
- Tracking mercury source reduction implementation and mercury source monitoring;
- Quarterly monitoring of POTW influent and effluent
- Resources and staffing

2. Implementation of cost-effective control measures for direct and indirect contributors and
3. An annual status report submitted to the US EPA, which includes:
   - A list of potential mercury sources;
   - A summary of actions to reduce or eliminate mercury discharges that will make progress towards meeting water quality standards;
   - Mercury source reduction implementation, source monitoring results, influent and effluent, results for the previous year;
   - Proposed adjustments to the Program Plan based on findings from the previous year.

For more guidance, see the EPA Region 5 Mercury Pollutant Minimization Program Guidance, November 2004.

C. Whole Effluent Toxicity (WET) Testing

The national policy in section 101(a)(3) of the CWA states that discharges of toxic substances in toxic amounts be prohibited. The Yakama Nation's narrative water quality standards for toxics states "Toxic substances shall not be introduced in waters of the Yakama Nation in amounts, concentrations, or combinations which adversely affect the beneficial uses, cause acute or chronic toxicity to the indigenous aquatic biota….". In addition, the federal regulation at 40 CFR §122.44(d)(1) requires the permitting authority to determine if a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion of a narrative criterion for whole effluent toxicity. To make this determination, effluent WET testing is required. The WET tests use vertebrate and invertebrate species or plants to measure the aggregate effect of all toxicants in the effluent. Table 8 summarizes the test results:

TABLE 8a: Whole Effluent Toxicity Results (1994-1995)

Date	*Parameter*	*Ceriodaphnia dubia*		*P. promelas*		*O. mykiss*
		Survival	*Reproduction*	*Survival*	*Reproduction*	*Survival*
December 1994	NOEC	25%	6.25%	100%	100%	100%
	Toxic Units (TU)	4	16	< 1	< 1	< 1
March 1995	NOEC	100%	50%	100%	100%	100%
	Toxic Units (TU)	< 1	2	< 1	< 1	< 1
May 1995	NOEC	100%	100%	100%	100%	100%
	Toxic Units (TU)	< 1	< 1	< 1	< 1	< 1
August 1995	NOEC	100%	100%	100%	100%	100%
	Toxic Units (TU)	< 1	< 1	< 1	< 1	< 1
October 1995	NOEC	100%	25%	100%	100%	100%
	Toxic Units (TU)	< 1	4	< 1	< 1	< 1

Table 8b: Whole Effluent Toxicity Results (2006-2008)

Date	*Parameter*	*Ceriodaphnia*		Fathead Minnow	
		Survival	*Reproduction*	*Survival*	*Growth*
February 2006	NOEC	25%	12.5%	100%	100%
	IC_{25}	30.6%	15.3%		
	Toxic Units (TU)	3.3	6.5	< 1	< 1
June 2007	NOEC	6.25%	6.25%	100%	100%
	IC_{25}	9.4%	8.0%		
	Toxic Units (TU)	10.6	12.5	< 1	< 1
September 2008	NOEC	25%	25%	100%	100%
	IC_{25}	22%	28%		
	Toxic Units (TU)	4.5	3.6	< 1	< 1

An analysis of the data and other calculations related to whole effluent toxicity is included in Appendices D and E.

D. Sewage Sludge (Biosolids)

Under Section 405 of the Clean Water Act EPA has the authority to issue biosolids-only permits for the purpose of regulating biosolids. EPA may issue a biosolids-only permit for this facility at a later date, if appropriate. In the absence of a biosolids-only permit, biosolids management and disposal activities at the facility are subject to the national standards at 40 CFR 503. The regulations are self-implementing, therefore the permittee must comply with them.

E. Sanitary Sewer Overflows and Proper Operation and Maintenance of the Collection System

Untreated or partially treated discharges from separate sanitary sewer systems are referred to as sanitary sewer overflows (SSOs). SSOs may present serious risks of human exposure when released to certain areas, such as streets, private property, basements, and receiving waters used for drinking water, fishing and shellfishing, or contact recreation. Untreated sewage contains pathogens and other pollutants, which are toxic. SSOs are not authorized under this permit. Pursuant to the NPDES regulations, discharges from separate sanitary sewer systems authorized by NPDES permits must meet effluent limitations that are based upon secondary treatment. Further, discharges must meet any more stringent effluent limitations that are established to meet EPA-approved state water quality standards.

The permit contains language to address SSO reporting and public notice and operation and maintenance of the collection system. The permit requires that the Permittee identify SSO occurrences and their causes. In addition, the permit establishes reporting, record keeping and third party notification of SSOs. Finally, the permit requires proper operation and maintenance of the collection system. The following specific permit conditions apply:

Immediate Reporting - The Permittee is required to notify the EPA of an SSO within 24 hours of the time the Permittee becomes aware of the overflow (See 40 CFR 122.41(l)(6)).

Written Reports - The Permittee is required to provide the EPA a written report within five days of the time it became aware of any overflow that is subject to the immediate reporting provision. (See 40 CFR 122.41(l)(6)(i)).

Third Party Notice – The permit requires that the Permittee establish a process to notify specified third parties of SSOs that may endanger health due to a likelihood of human exposure; or unanticipated bypass and upset that exceeds any effluent limitation in the permit or that may endanger health due to a likelihood of human exposure. The Permittee is required to develop, in consultation with appropriate authorities at the local, county, and/or state level, a plan that describes how, under various overflow (and unanticipated bypass and upset) scenarios, the public, as well as other entities, would be notified of overflows that may endanger health. The plan should identify all overflows that would be reported and to whom, and the specific information that would be reported. The plan should include a description of lines of communication and the identities of responsible officials. (See 40 CFR 122.41(l)(6)).

Record Keeping -The Permittee is required to keep records of SSOs. The Permittee must retain the reports submitted to the EPA and other appropriate reports that could include work orders associated with investigation of system problems related to a SSO, that describe the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the SSO. (See 40 CFR 122.41(j)).

Proper Operation and Maintenance -The permit requires proper operation and maintenance of the collection system. (See 40 CFR 122.41(d) and (e)). SSOs may be indicative of improper operation and maintenance of the collection system. The Permittee may consider the development and implementation of a capacity, management, operation and maintenance (CMOM) program.

The Permittee may refer to *Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems* (EPA 305-B-05-002). This guide identifies some of the criteria used by EPA inspectors to evaluate a collection system's management, operation and maintenance program activities. Owners/operators can review their own systems against the checklist (Chapter 3) to reduce the occurrence of sewer overflows and improve or maintain compliance. The CMOM Guide is currently available on the EPA website at: "www.epa.gov/npdes/sso/featuredinfo.cfm."

VII. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act of 1973

Section 7 of the Endangered Species Act requires Federal agencies to consult with the National Oceanic and Atmospheric Administration-Fisheries (NOAA-Fisheries) and the U. S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species.

There are three species listed as threatened near the City of Wapato facility: Middle Columbia River steelhead (*O.mykiss*), Bull trout (*Salvelinus confluentus*), and Ute Ladies'-tresses (*spiranthes diluvialis*).

EPA has determined that the issuance of this permit will have no effect on Bull trout, Mid-Columbia steelhead, or Ute Ladies'-tresses, EPA made the determination that Bull trout are not in the area of the discharge, and Ute Ladies'-tresses is not found within streams and therefore will not be impacted. Steelhead are within the area of the discharges and EPA made the determination that there will be no effect on steelhead because the draft permit contains effluent limitations based on criteria that are designed to be protective of aquatic life.

EPA will provide the NOAA-Fisheries with copies of the fact sheet, draft permit, and Biological Evaluation during the comment period. Any comments received by the Agency will be considered before final issuance of the permit. (see Biological Evaluation for further details).

B. Essential Fish Habitat (EFH)

EFH is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act requires EPA to consult with the NOAA-Fisheries when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. EPA has tentatively determined that the reissuance of this permit will not adversely affect any EFH species in the vicinity of the discharge, therefore consultation is not required for this action. This fact sheet and the draft permit will be submitted to NOAA-Fisheries for review during the public notice period. Any recommendations received from NOAA-Fisheries regarding EFH will be considered prior to final reissuance of this permit. See Appendix G for further details.

C. Water Quality Standards Certification

Since the discharge is from a facility located within the boundaries of the Yakama Reservation, and the Tribe is not authorized under Section 303 of the CWA, EPA is the certification authority (see 40 CFR 121.1(e), and 40 CFR 121.21(b)).

D. Interstate Waters

Under Section 401(a)(2) of the CWA, EPA must give notice of this permit action to any affected state. Notice has been given to Washington Department of Ecology. A copy of the proposed permit action has also been provided to the Yakama Nation.

E. Standard Permit Provisions

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

F. Permit Expiration

Section 402(1)(B) of the Clean Water Act requires that NPDES permits are issued for a period not to exceed five years. Therefore, this permit will expire five years from the effective date of the permit.

G. Facility Changes or Alterations

In accordance with 40 CFR §122.41(l), the facility is required to notify EPA and the Yakama Nation's Environmental Management Program of any planned physical alteration or operational changes to the facility. This requirement has been incorporated into the proposed permit to ensure that EPA and the Yakama Nation are notified of any potential increases or changes in the amount of pollutants being discharged and evaluate the impact of the pollutant loading on the receiving water.

VIII. REFERENCES

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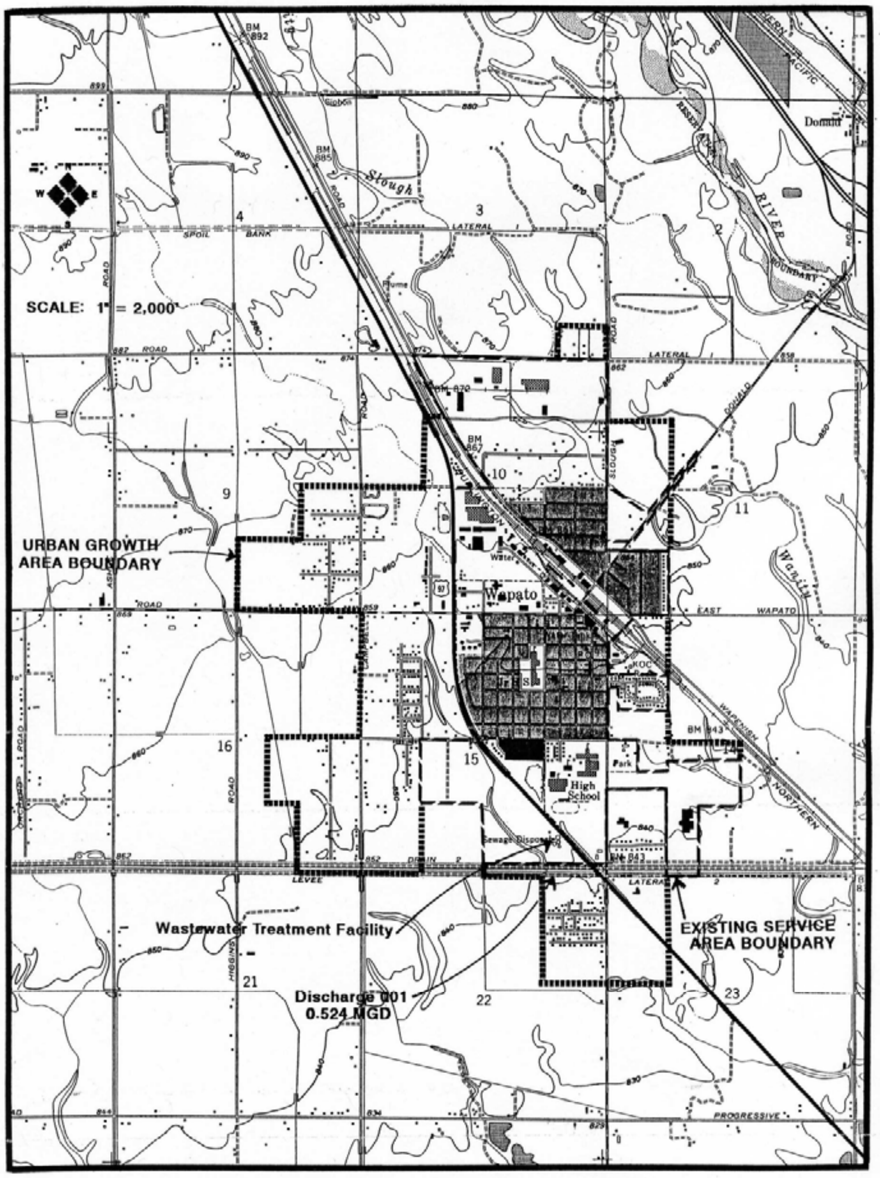
Yakama Nation, 2005. *The Yakama Nation Water Quality Standards, Final Draft.* Yakama Nation Environmental Management Program, November 2005.

IX. ACRONYMS

BMPs	Best management practices
BOD	Biochemical oxygen demand
BOD_5	Biochemical oxygen demand, five-day
^oC	Degrees Celsius
CFR	Code of Federal Regulations
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
LA	load allocation
lb	pounds
mg/L	milligrams per liter
µg/L	micrograms per liter
mgd	million gallons per day
mL	milliliter
N	Nitrogen
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric turbidity units
OWW	Office of Water and Watersheds
QAP	Quality assurance plan
s.u.	Standard units
sp.	Species
TMDL	Total Maximum Daily Load
TSD	Technical Support Document (EPA, 1991)
TSS	Total suspended solids
TU_c	Chronic toxic unit
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WQBEL	Water quality-based effluent limit

APPENDIX A - Location of City of Wapato Wastewater Treatment Plant Facility



LOCATION MAP

City of Wapato Wastewater Treatment Facility

September 25, 2002 **Figure 1**

APPENDIX B - PROPOSED EFFLUENT MONITORING

Table B-1 Proposed Monitoring Frequency of Effluent	
Parameter	**Sample Type**
Nitrate/Nitrite,[1] mg/L	24 hour composite
Kjeldahl Nitrogen, [1] mg/L	24 hour composite
Oil and Grease, mg/L	grab
Phosphorous, [1] mg/L	24 hour composite
Total Dissolved Solids, [1] mg/L	24 hour composite
Metals, Cyanide and total phenols	
Antimony, [1,2] µg/L	24 hour composite
Arsenic, [1,2] µg/L	24 hour composite
Beryllium, [1,2] µg/L	24 hour composite
Cadmium, [1,2] µg/L	24 hour composite
Chromium,[1,2] µg/L	24 hour composite
Copper, [1,2] µg/L	24 hour composite
Lead, [1,2] µg/L	24 hour composite
Mercury, [1,2] µg/L	24 hour composite
Nickel, [1,2] µg/L	24 hour composite
Selenium, [1,2] µg/L	24 hour composite
Silver, [1,2] µg/L	24 hour composite
Thallium, [1,2] µg/L	24 hour composite
Zinc, [1,2] µg/L	24 hour composite
Cyanide total, µg/L	grab
Total phenolic compounds,µg/L	grab
Volatile Organic Compounds	
Acrolein,µg/L	grab
Acrylonitrile,µg/L	grab
Benzene,µg/L	grab

Table B-1 Proposed Monitoring Frequency of Effluent	
Parameter	**Sample Type**
Bromoform,µg/L	grab
Carbon tetrachloride,µg/L	grab
Chlorobenzene,µg/L	grab
Chlorodibromomethane,µg/L	grab
Chloroethane,µg/L	grab
2-chloroethylvinyl ether,µg/L	grab
Chloroform,µg/L	grab
Dichlorobromomethane,µg/L	grab
1.1-dichloroethane,µg/L	grab
1,2-dichloroethane,µg/L	grab
Trans-1,2-dichloroethylene,µg/L	grab
1,1-dichloroethylene,µg/L	grab
1,2-dichloropropane,µg/L	grab
1,3-dichloropropylene,µg/L	grab
Ethylbenzene,µg/L	grab
Methyl bromide,µg/L	grab
Methyl chloride,µg/L	grab
Methylene chloride,µg/L	grab
1,1,2,2-tetrachloroethane,µg/L	grab
Tetrachloroethylene,µg/L	grab
Toluene,µg/L	grab
1,1,1-trichloroethane, µg/L	grab
1,1,2-trichloroethane, µg/L	grab
Trichloroethylene, µg/L	grab
Vinyl chloride, µg/L	grab
Acid-extractable compounds	
P-chloro-m-creso, [1] µg/L	24 hour composite
2-chlorophenol, [1] µg/L	24 hour composite

Table B-1 Proposed Monitoring Frequency of Effluent	
Parameter	**Sample Type**
2,4-dichlorophenol, [1] µg/L	24 hour composite
2,4-dimenthylphenol,µg/L	24 hour composite
4,6-dinitro-o-cresol, [1] µg/L	24 hour composite
2,4-dinitrophenol, [1] µg/L	24 hour composite
2-nitrophenol, [1] µg/L	24 hour composite
4-nitrophenol, [1] µg/L	24 hour composite
Pentachlorophenol, [1] µg/L	24 hour composite
Phenol, [1] µg/L	24 hour composite
2,4,6-trichlorophenol, [1] µg/L	24 hour composite
Base-neutral compounds	
Acenaphthene, [1] µg/L	24 hour composite
Acenaphthylene, [1] µg/L	24 hour composite
Anthracene, [1] µg/L	24 hour composite
Benzidine, [1] µg/L	24 hour composite
Benzo(a)anthracene, [1] µg/L	24 hour composite
Benzo(a)pyrene, [1] µg/L	24 hour composite
3,4 benzofluoranthene, [1] µg/L	24 hour composite
Benzo(ghi)perylene, [1] µg/L	24 hour composite
Benzo(k)fluoranthene, [1] µg/L	24 hour composite
Bis (2-chloroethoxy) methane, [1] µg/L	24 hour composite
Bis (2-chloroethyl) ether, [1] µg/L	24 hour composite
Bis (2-chloroisopropyl) ether, [1] µg/L	24 hour composite
Bis (2-ethylhexyl) phthalate, [1] µg/L	24 hour composite
4-bromophenyl phenyl ether, [1] µg/L	24 hour composite
Butyl benzyl phthalate, [1] µg/L	24 hour composite
2-chloronaphthalene, [1] µg/L	24 hour composite

Table B-1 Proposed Monitoring Frequency of Effluent	
Parameter	**Sample Type**
4-chlorophenyl phenyl ether, [1] µg/L	24 hour composite
Chrysene, [1] µg/L	24 hour composite
Di-n-butyl phthalate, [1] µg/L	24 hour composite
Di-n-octyl phthalate, [1] µg/L	24 hour composite
Dibenzo(a,h)anthracene, [1] µg/L	24 hour composite
1,2-dichlorobenzene, [1] µg/L	24 hour composite
1,3-dichlorobenzene, [1] µg/L	24 hour composite
1,4-dichlorobenzene, [1] µg/L	24 hour composite
3,3-dichlorobenzidine, [1] µg/L	24 hour composite
Diethyl phthalate, [1] µg/L	24 hour composite
Dimethyl phthalate, [1] µg/L	24 hour composite
2,4-dinitrotoluene, [1] µg/L	24 hour composite
2,6-dinitrotoluene, [1] µg/L	24 hour composite
1,2-diphenylhydrazine, [1] µg/L	24 hour composite
Fluoranthene, [1] µg/L	24 hour composite
Fluorene, [1] µg/L	24 hour composite
Hexachlorobenzene, [1] µg/L	24 hour composite
Hexachlorobutadiene, [1] µg/L	24 hour composite
Hexachlorocyclo-pentadiene, [1] µg/L	24 hour composite
Hexachloroethane, [1] µg/L	24 hour composite
Indeno(1,2,3-cd)pyrene, [1] µg/L	24 hour composite
Isophorone, [1] µg/L	24 hour composite
Naphthalene, [1] µg/L	24 hour composite
Nitrobenzene, [1] µg/L	24 hour composite
N-nitrosodi-n-propylamine, [1] µg/L	24 hour composite
N-nitrosodimenthylamine, [1] µg/L	24 hour composite
N-nitrosodiphenylamine, [1] µg/L	24 hour composite

Table B-1 Proposed Monitoring Frequency of Effluent	
Parameter	**Sample Type**
Phenanthrene, [1] µg/L	24 hour composite
Pyrene, [1] µg/L	24 hour composite
1,2,4,-trichlorobenzene, [1] µg/L	24 hour composite

Footnotes;
1. 24 hour composite must be collected in intervals of no less than 15 minutes apart (total 96 samples) in a 24 hour time period.
2. Metals are to be analyzed as total recoverable.

APPENDIX C - CITY OF WAPATO RECEIVING WATER DATA

Station Upstream of Outfall 001							
Date	pH (su)	Temperature (°C)	Total Ammonia (as N) (mg/L)	Flow (cfs)	TSS (mg/L)	BOD (mg/L)	DO (mg/L)
8/9/2007	7.4	21	0.331	193	21	2.5	9.8
9/20/2007	7.7	19.5	0.199	87	12	0	9.9
7/26/2007	8.1	22	0.635	193	16	1.1	9.7
6/28/2007	7.4	21	0.131	140	1	0.6	8.6
6/7/2007	7.4	18	0.066	104	28	3.6	10.3
5/10/2007	8	19.2	0.410	77	16	0.2	10.8
4/26/2007	8.6	16.4	0.108	77	11	0	10.6
9/11/2008	7.9	19	0.191	68	11	1	9.6
8/21/2008	7.8	19	0.270	63	7	2	9.2
7/24/2008	8	19.6	0.387	104	13	1	9.3
6/5/2008	7.4	15.9	no result	81	39	0.3	10.6
5/15/2008	7.5	19	0.059	77	30	2	10.7
4/24/2008	7.9	12	0.089	52	23	1	11.7
8/27/2009	7.7	20.4	0.023	63.8	12	0	8.9
7/23/2009	7.7	21.8	0.048	165	7	0	8.8
6/25/2009	7.9	19.6	0.166	140	18	NA*	9.3
5/21/2009	7.7	15	0.081	87	48	NA	10.5
4/23/2009	8	12.3	0.078	44.5	42	2.1	11.3
6/24/2010	7.8	19.4	0.180	140	21	2	9.1
5/27/2010	7.6	14	0.180	192	37	No result	10.2
4/15/2010	7.8	14.1	0.091	77	7	1	10.7
Max	**8.6**	**22**	**0.635**	**193**	**48**	**3.6**	**11.7**
Min	**7.4**	**12**	**0.0233**	**44.5**	**1**	**0**	**8.6**
Average	**7.8**	**18.0**	**0.2**	**106.0**	**20.0**	**1.0**	**10.0**

* All negative numbers are denoted as NA.

Station located 50 Feet Downstream of Outfall 001						
Date	pH (su)	Temperature (°C)	Total Ammonia (as N) (mg/L)	TSS (mg/L)	BOD (mg/L)	DO (mg/L)
9/20/2007	7.5	19.5	0.140	6	0	10.1
8/9/2007	7.5	21	0.319	16	5.6	9.7
7/26/2007	7.6	22	0.442	9	2.2	9.7
6/28/2007	7.7	20	0.531	10	0.4	8.6
6/7/2007	7.2	18	0.068	20	3.3	10.5
5/10/2007	7.9	17.8	0.461	13		11
4/26/2007	8.4	15.9	0.134	17	0	10
9/11/2008	8	19	0.050	9	0.7	9.5
8/21/2008	7.8	19	0.128	3	1.6	9
7/24/2008	8	19.9	0.083	16	2	9.5

Station located 50 Feet Downstream of Outfall 001						
6/5/2008	7.4	15.8	no result	42	0.9	10.6
5/15/2008	7.6	17	0.100	33	2	10.7
4/24/2008	8.1	12.3	0.095	22	2	12.1
8/27/2009	7.7	20.7	0.212	11	0	8.9
7/23/2009	7.8	22.4	0.053	15	0	8.7
6/25/2009	7.9	20.5	0.071	20	0.3	8.1
5/21/2009	7.7	15	0.081	48	NA	10.5
4/23/2009	8	12.3	0.078	42	2.1	11.3
6/24/2010	7.8	19.9	0.397	18	2	9.2
5/27/2010	7.7	13.5	0.941	41	No result	10.2
4/15/2010	7.8	14.1	0.197	7	0.3	10.4
Max	**8.4**	**22.4**	**0.941**	**48**	**5.6**	**12.1**
Min	**7.2**	**12.3**	**0.0497**	**3**	**0**	**8.1**
Average	**7.8**	**17.9**	**0.2**	**19.9**	**1.3**	**9.9**

Station Located 300 feet downstream of Outfall 001						
Date	pH (su)	Temperature (°C)	Total Ammonia (as N) (mg/L)	TSS (mg/L)	BOD (mg/L)	DO (mg/L)
9/20/2007	7.7	19.7	0.111	7	0	10.3
8/9/2007	7.7	21	0.232	11	No result	9.5
7/26/2007	7.7	22	0.812	12	1.4	9.7
6/28/2007	7.9	20	0.338	13	No result	8.7
6/7/2007	7.3	17	0.061	24	3	10.8
5/10/2007	8	17.8	0.404	11	No result	11.1
4/26/2007	8.5	16.3	0.070	19	1	10.2
9/11/2008	8	20	0.083	11	1	9.3
8/21/2008	7.7	20	0.181	3	1	9
7/24/2008	8.1	20	0.046	14	0.06	9.5
6/5/2008	7.5	15.9	no result	36	1.2	10.9
5/15/2008	7.8	18	0.072	32	2	10.9
4/24/2008	8.1	12.5	0.082	21	2	12
8/27/2009	7.7	21.2	0.119	8	0	9.1
7/23/2009	7.8	23.6	0.077	12	0	8.6
6/25/2009	7.9	20.9	0.470	23	0.3	9.5
5/21/2009	7.8	17	0.080	36	NA	10.7
4/23/2009	7.6	13.4	0.191	65	2.7	11.3
6/24/2010	7.9	20	0.097	20	1	9.4
5/27/2010	7.7	14	0.989	12	no result	10.3
4/15/2010	7.9	15.1	0.142	10	0.3	10.4
Max	**8.5**	**23.6**	**0.989**	**65**	**3**	**12**

Min	**7.3**	**12.5**	**0.0459**	**3**	**0**	**8.6**
Average	**7.8**	**18.4**	**0.2**	**19.0**	**1.0**	**10.1**

APPENDIX D
BASIS FOR EFFLUENT LIMITATIONS

I. Statutory and Regulatory Basis for Effluent Limits

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

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

II. Technology-Based Effluent Limits

The 1972 Clean Water Act required publicly owned treatment works (POTWs) to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the Act established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977.

More specifically, Section 301(b)(1)(B) of the Clean Water Act requires that EPA develop secondary treatment standards for POTWs as defined in Section 304(d)(1) of the CWA. Based on this statutory requirement, EPA developed secondary treatment regulations which are specified in 40 CFR Part 133.102. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH and have been included in Table D-1

Table D-1: Secondary Treatment Requirements

Parameter	Average Monthly	Average Weekly	Percent Removal
BOD_5	30 mg/L	45 mg/L	85%
TSS	30 mg/L	45 mg/L	85%
pH	between 6.0 and 9.0 standard units		

BOD_5 and TSS, mass based limits: Federal regulations at (40 CFR § 122.45 (f)) require BOD and TSS limitations to be expressed as mass based limits using the design flow of the facility. The loading is calculated as follows: concentration X design flow X conversion factor of 8.34.

BOD_5 and TSS loading, monthly average = 30 mg/l X 1.16 mgd X 8.34 = 290 lbs/day
BOD_5 and TSS loading, weekly average = 45 mg/l X 1.16 mgd X 8.34 = 435 lbs/day

III. Water Quality-based Evaluation

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

The regulations at 40 CFR 122.44(d)(1) implement section 301(b)(1)(C) of the Clean Water Act. These regulations require that NPDES permits include limits for all pollutants or parameters which "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any water quality standard, including narrative criteria for water quality." The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation (WLA).

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

A. Determine the appropriate water quality criteria
B. Determine whether there is "reasonable potential" to cause or contribute to an exceedance of water quality criteria
C. If there is "reasonable potential", develop a WLA
D. Develop effluent limitations based on WLA

The following sections provide a detailed discussion of each step. Appendix E provides the reasonable potential analysis.

A. Determine Water Quality Criteria

The first step in developing water quality-based limits is to determine the applicable water quality criteria. The applicable criteria for this waterbody are presented in Table 3 of Section III.C of this fact sheet.

B. Reasonable Potential Evaluation

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

EPA used the recommendations in Chapter 3 of the Technical Support Document for Water Quality-based Toxics Control (TSD, EPA 1991) to conduct this "reasonable potential" analysis for the City of Wapato Wastewater Facility. The Reasonable Potential Analysis for ammonia, copper, zinc, chlorine, and whole effluent toxicity are found in Appendix E

The maximum expected receiving water concentration C_d is determined using the following mass balance equation.

$$C_d*Q_d = (C_e*Q_e) + (C_u*MZ * Q_u) \quad \text{or} \qquad \text{(Equation 1)}$$

$$C_d = \frac{(C_e*Q_e) + (C_u*MZ*Q_u)}{Q_d} \qquad \text{(Equation 2)}$$

where,

C_d = receiving water concentration downstream of the effluent discharge
C_e = maximum projected effluent concentration
= maximum reported effluent value X reasonable potential multiplier

Q_e = maximum effluent flow
C_u = upstream concentration of pollutant
Q_d = flow downstream of the effluent discharge
= Q_e + (MZ X Q_u)
Q_u = upstream flow
MZ = Mixing Zone; the mixing zone allows for 20% of the upstream flow for chronic value. No mixing zone is allowed for acute criteria, so the mixing zone is 0% for the acute value.

When no mixing zone is allowed Equation 2 becomes:

$$C_d = C_e \qquad \text{(Equation 3)}$$

Section 1 through 4 below discusses each of the factors used in the mass balance equation to calculate C_d. Section 5 discusses the actual "reasonable potential" calculation for the City of Wapato's discharge.

1. Effluent Concentration (C_e)

   The maximum projected effluent concentration (C_e) in the mass balance equation is calculated using the statistical approach recommended in the TSD. The maximum projected effluent concentration is calculated by multiplying the maximum reported effluent concentration by a reasonable potential multiplier (RPM). The reasonable potential multiplier accounts for uncertainty in the data due to a limited data set and effluent variability. The multiplier decreases as the number of data points increases and variability of the data decreases. Variability is measured by the coefficient of variation (CV) of the data. When there are not enough data to reliably determine a CV, the TSD recommends using 0.6 as a default value. A partial listing of reasonable potential multipliers can be found in Table 3-1 of the TSD.

   EPA evaluated the most recent City of Wapato permit application, discharge monitoring reports *(*DMRs) from May 2005 to April 2010, whole effluent toxicity results, and information on priority pollutants obtained from the 308 information request to determine the maximum reported effluent concentrations. See Table D-2, and D-3 in section 5, below*,* for a summary of maximum reported effluent concentrations, reasonable potential multipliers, and maximum projected effluent concentrations.

2. Effluent Flow

   The effluent flow used in the equation is the facility's design flow of the facility of 1.16 mgd.

3. Upstream Concentration (C_u)

   The upstream concentration in the mass balance equation is based on a reasonable worst-case estimate of the pollutant concentration upstream from the City of Wapato's discharge. The 95th percentile of the ambient data is generally used as an estimate of worst-case. These percentiles were calculated for the data submitted by the City of Wapato. Where there were no data to determine the ambient concentration, zero was used in the mass balance equation.

4. Upstream Flow/Mixing Zones

   As stated in section III.B of the Fact Sheet the 7Q10 is 11.9 MGD during the

Irrigation Season (Apr. 1 through Oct. 31), and 0 MGD for the Non-irrigation Season (Nov. 1 through March 31).

Dischargers are generally not authorized to use the entire upstream flow for dilution of their effluent. Instead, the standards contain the following considerations on mixing zones for determining compliance with chronic criteria:

The size of the mixing zone must comply with the following:

- Not to extend in a downstream direction for a distance from the discharge greater than 300 feet plus depth of water over the discharge, or extended upstream for a distance of over one hundred feet.
- Not to utilize greater than 20% of the flow.
- Not occupy greater than 20% of the width of the water body.
- For the acute criteria, there is no mixing zone allowed.

During the non-irrigation season no mixing zone is allowed. During the irrigation season 20% of the 7Q10 flow is allowed for the chronic criteria, and no mixing zone is allowed for the acute criterion.

5. “Reasonable Potential” Calculation

Table D-2 and D-3 present a summary of the reasonable potential calculations for ammonia, copper, zinc, chlorine and whole effluent toxicity. More detailed reasonable potential calculations are presented in Appendix E.

Table D-2: Reasonable Potential Calculations for Irrigation Season (April 1 through October 31)

Parameter	Max Reported Concentration	Number Of Samples	CV	Reasonable Potential Multiplier	Max Projected Effluent Concentration	Projected Downstream Concentration (Cd)		Most Stringent Criterion		Reasonable Potential to exceed?	
						Cd(acute)	Cd(chronic)	Acute	Chronic	Acute	Chronic
Ammonia, mg/L	11	35	0.48	1.7	18	18	6.4	5.0	1.4	Yes	Yes
Copper, µg/L	8.3	12	0.37	1.9	16	16	5.2	5.5	4.0	Yes	Yes
Zinc, µg/L	109	12	0.66	2.9	316	316	104	52	52	Yes	Yes
Chlorine, µg/L	NA	NA	NA	NA	NA	NA	NA	11	19	Yes	Yes
Whole Effluent Toxicity, toxic units	12.5 TUc	6	0.6	3.8	48	4.9 TUc,a	16 TUc	0.3 TUa	1 TUc	Yes	Yes

NOTE: 1. See Appendix E for Reasonable Potential Analysis.

Table D-3: Reasonable Potential Calculations for Non-Irrigation Season (November 1 through March 31)

Parameter	Max Reported Concentration	Number Of Samples	CV	Reasonable Potential Multiplier	Max Projected Effluent Concentration	Projected Downstream Concentration (Cd)		Most Stringent Criterion		Reasonable Potential to exceed?	
						Cd(acute)	Cd(chronic)	Acute	Chronic	Acute	Chronic
Ammonia, mg/L	9	25	0.5	1.9	18	18	18	9.5	2.8	Yes	Yes
Copper, µg/L	8.3	12	0.37	1.9	16	16	16	5.5	4.0	Yes	Yes
Zinc, µg/L	109	12	0.66	2.9	316	316	316	52	52	Yes	Yes
Chlorine, µg/L	NA	NA	NA	NA	NA	NA	NA	11	19	Yes	Yes
Whole Effluent Toxicity, toxic units	12.5	6	0.6	3.8	48	4.9 TUc,a	48 TUc	0.3TUa	1TUc	Yes	Yes

NOTE: 1. See Appendix E for Reasonable Potential Analysis.

C. Wasteload Allocation and Long Term Average Concentration Development

Once EPA has determined that a water quality-based limit is required for a pollutant, the first step in determining a permit limit is development of a wasteload allocation (WLA) for the pollutant. A WLA is the concentration (or loading) of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water. Waste Load Allocations can be calculated in different ways such as: based on a mixing zone; based on a WLA established as part of a TMDL; or based on meeting water quality criteria at "end-of-pipe." WLAs for this permit were calculated in two ways:

1) Irrigation Season: for copper, zinc, ammonia, chlorine, and whole effluent toxicity where the chronic criteria has a 20% mixing zone, and the acute criteria has no mixing zone, and
2) Non-irrigation Season – for copper, zinc, ammonia, chlorine, and whole effluent toxicity based on meeting water quality criteria at "end-of-pipe".

The following paragraphs briefly summarize the two methods for developing WLAs used for this permit.

1. Mixing zone-based WLA

A mixing zone is an area where an effluent discharge undergoes initial dilution, it is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented. The Yakama Nation water quality standards authorize mixing zones and provide mixing zone requirements (Yakama Nation WQS, Section 16).

The Yakama Nation regulation states that the mixing zone must not use more than twenty percent (20%) of the stream flow and, for acute criteria, there must be no mixing zone (Yakama Nation WQS, Section 16.3). The regulation also limits mixing zone dimensions upstream and downstream from the discharge point as well as limiting the percent of the width of the receiving water that is available for mixing. These dimensions of a mixing zone are determined from modeling the receiving water and the effluent.

During the irrigation season 20% of stream flow is used as a mixing zone for chronic aquatic life criteria, and no mixing zone was allowed for acute aquatic life criteria. The lack of specific data on Drainage Way No. 2 near the outfall prevented a more detailed analysis of the resulting mixing zone dimensions during the irrigation season.

The wasteload allocation (WLA) is calculated using a mass balance equation which accounts for effluent flow, available dilution, when appropriate, background concentrations and flow, and the Yakama Nation water quality criteria. When the receiving water exceeds the criterion for the pollutant or there is no mixing zone for a particular pollutant then there is no dilution available for the effluent and the water quality criterion becomes the WLA. The chronic WLAs for ammonia, zinc, copper and chlorine were developed using a mixing zone during the irrigation season.

2. "End-of-Pipe" WLA

In some cases, there is no dilution available, either because the receiving water exceeds the criteria or because a mixing zone for a particular pollutant has not been allowed. When there is no dilution, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee does not contribute to any exceedances of the criterion. The following WLAs were developed based on no mixing zone:

Bacteria
It is EPA's position that mixing zones should not be authorized for bacteria in rivers and streams (see November 12, 2008 memo from Ephraim King on *Initial Zones of Dilution for Bacteria in Rivers and Streams Designated for Primary Contact Recreation*). Therefore, even if there was assimilative capacity in the river a mixing zone would not be authorized for bacteria.

pH
A mixing zone has not been allowed for pH, as the facility is capable of meeting the criteria at the end-of-pipe.

Metals and Whole Effluent Toxicity During the Irrigation Season
During the irrigation season, the acute WLAs for ammonia, copper, zinc, chlorine, and whole effluent toxicity were developed based on no mixing zone. The Yakama Nation water quality standards policy does not allow mixing zones for acute criteria. The chronic WLAs are based on a mixing zone of 20% of the receiving stream.

Metals and Whole Effluent Toxicity During the Non-Irrigation Season
During the non-irrigation season, the acute and chronic WLAs for ammonia, copper, zinc, chlorine, and whole effluent toxicity were developed based on no mixing zone. During the non-irrigation season, the 7Q10 flow of Drainage Way No. 2 is zero, so there is no water in the receiving water for mixing.

D. Permit Limit Derivation

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

The daily maximum limit is based on the CV of the data and the probability basis, while the monthly average limit is dependent on these two variables and the monitoring frequency. As recommended in the TSD, EPA used a probability basis of 95 percent for monthly average limit calculation and 99 percent for the daily maximum limit calculation. As with the reasonable potential calculation, when there were not enough data to calculate a CV, EPA assumed a CV of 0.6 for both monthly average and daily maximum calculations. See Appendix E for development of water quality based effluent limits. The NPDES regulations at 40 CFR 122.45(d) require that permit limits for publicly owned treatment works (POTW) be expressed as average monthly limits (AMLs) and average weekly limits (AWLs) unless impracticable. Additionally, federal regulations do not prohibit a Permittee from increasing their sampling events above what is required in an NPDES permit. This is significant because a Permittee may collect as many samples as necessary during a week to bring the average of the data set below the average weekly effluent limit. In such cases, spikes of a pollutant could be masked by the increased sampling. While this is not a concern with pollutants that are not toxic, such as total suspended solids or phosphorus, it is a significant concern when toxic pollutants, such as chlorine, ammonia, zinc and copper, are being discharged. Using a maximum daily limit will ensure that spikes do not occur, and will be protective of aquatic life. In this case, an average weekly limit is not protective of water quality standards, therefore, it is not included in the permit. The final permit contains an average monthly limit and a maximum daily limit for chlorine, ammonia, zinc, copper, and whole effluent toxicity.

E. Antidegradation

Overview

EPA is required under Section 301(b)(1)(C) of the Clean Water Act (CWA) and implementing regulations (40 CFR 122.4(d) and 122.44(d)) to establish conditions in NPDES permits that ensure compliance with State and tribal water quality standards, including antidegradation requirements. In the Yakama Nation water quality standards, the applicable antidegradation standard is as follows: "Existing uses and the level of water quality necessary to protect existing uses shall be maintained and protected. Where designated uses of the waterbody are impaired, there shall be no further lowering of the water quality with respect to the pollutant or pollutants which cause the impairment (Yakama Nation Water Quality Standards, 14.1.2)."

The antidegradation policy of the state of the Yakama Nation is divided into three tiers of protection:

- Tier 1 - maintain and protect existing in-stream water uses and the water quality necessary to protect such existing uses whether or not such uses are included in the water quality standards as was explained in section 2.0.3. This applies a minimum level of protection to all waters addressed in these standards.

- Tier 2 - maintain and protect those waters where the existing water quality is better for any parameter of the water quality criteria as set forth in the standards. Such water quality must be maintained and protected unless the Yakama Nation finds that allowing lower water quality for any parameter to what is established in the standards is necessary for important economic or social development in the area in which the waters are located.

- Tier 3 - maintain and protect high quality waters that constitute an outstanding national resource such as waters of exceptional cultural, recreational or ecological significance, such as springs used as drinking water, other cultural or religious uses or exceptionally high quality waters vital to a proper functioning ecosystem.

As explained in detail below, the reissued permit ensures that "the existing in stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected" consistent with the requirements of 40 CFR 131.12(a)(1) and Yakama Nation WQS 14.1.2. Relative to the prior permit issued in 2005, the reissued permit does not allow lower water quality for those parameters where the receiving water quality "exceeds levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water," except for ammonia. Ammonia effluent limits are higher for two reasons: 1) The 2005 NPDES permit for the City of Wapato uses Washington water quality standards, and the new permit uses Yakama Nation tribal water quality standards. Water quality standards for Washington and Yakama Nation both use equations to calculate ammonia numeric criterion based on temperature and pH, but they are slightly different. 2) The equations use temperature and pH to determine ammonia limits. The current permit uses temperature and pH collected from 2005 through 2010, which is different than those used in the 2005 permit. This has resulted in an increased ammonia permit limit calculation.

Tier 2 of the antidegradation policy states that water quality must be maintained and protected where the existing water quality is better for any parameter of the water quality criteria as set forth in the standards. Currently, Drainage Way No. 2 is not impaired for ammonia, and is therefore at an existing water quality that is better than the water quality criterion. Tier 2 does not allow for increased ammonia effluent limits. Therefore, the ammonia limits from the 2005 permit will be used for the current permit in order to comply with Tier 2 of the antidegradation policy.

For all other parameters, effluent limits are the same or more stringent. Finally, the antidegradation policy for outstanding resource waters is not applicable in this reissued permit because Yakama Nation did not designate Drainage Way No. 2 as an "outstanding resource waters" (Yakama Nation WQS 14.1.4).

The draft reissued permit ensures compliance with the Yakama Nation's antidegradation policy and CWA regulations because the permit conditions ensure protection of existing uses and do not allow lower water quality relative to the applicable water quality standards. Under the circumstances of this draft reissued permit, EPA may issue an NPDES permit even though the Yakama Nation has not yet identified methods for implementing its antidegradation policy. In its antidegradation analysis below, EPA is applying a parameter-by-parameter approach in determining compliance with Yakama Nation's antidegradation requirements.

EPA Antidegradation Analysis

Protection of Existing Uses (Yakama Nation WQS 14.1.2 and 40 CFR 131.12(a)(1))

The segment of Drainage Way No. 2 that receives the City of Wapato's discharge is an irrigation ditch that eventually feeds into the Yakima River via the Wanity Slough. The Yakama Nation water quality standards designate irrigation ditches and canals as Class IV waters (Yakama Nation WQS 20.1.6. However, the Yakama Nation water quality standards has a site-specific temperature and water use condition for Wanity Slough that provides Class III protections because of the presence of salmonids in the irrigation system. This is stated as follows:

"… Wanity Slough, although a natural waterway, is interconnected with the irrigation system, and is populated by salmonids, hence the same temperature variance applied to Marion and Harrah Drains shall apply as an interim temperature standard until such time as the Yakima River basin Water Enhancement Project actions eliminate the need for interconnection with the WIP irrigation system; at that time the interim temperature standard shall no longer apply and Wanity Slough shall be considered as a regular Class III water for purposes on this Title (20.1.5.3.1.7)."

Therefore, Class III beneficial uses apply in Drainage Way No. 2. This includes the following beneficial uses: cultural and religious uses, salmonid rearing and spawning, wildlife habitat, wildlife habitat, and agricultural and industrial water supply (20.1.5.1).

Tier 3 of the antidegradation policy does not apply, since Drainage Way No. 2 has not been designated an outstanding resource water. Tier 2 applies since the 2005 permit includes ammonia effluent limits that are higher than the water quality criteria. Tier 2 of the antidegradation policy does not allow for higher ammonia effluent limits, so the 2005 ammonia effluent limits remain in the current permit.

Summary

As explained above, the effluent limits in the draft reissued permit are adequately stringent to ensure that existing uses are maintained and protected, in compliance with Yakama Nation water quality standards and 40 CFR 131.12(a)(1).

The effluent limits in the reissued permit are as stringent as or more stringent than the corresponding limits in prior permit for all parameters. The reissuance of the City of Wapato NPDES permit will therefore not allow lower water quality relative to the prior permit, in compliance with Yakama Nation Section 14 and 40 CFR 131.12(a)(2).

Statutory Prohibitions on Backsliding

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

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, WQBELs may be revised as long as the revision is consistent with the State's antidegradation policy. Additionally, Section 402(o)(2) contains exceptions to the general prohibition on backsliding in 402(o)(1).

According to the *U.S. EPA NPDES Permit Writers' Manual* (EPA-833-B-96-003) the 402(o)(2) exceptions are applicable to WQBELs (except for 402(o)(2)(B)(ii) and 402(o)(2)(D)) and are independent of the requirements of 303(d)(4). Therefore, WQBELs may be relaxed as long as either the 402(o)(2) exceptions or the requirements of 303(d)(4) are satisfied.

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

IV. Pollutant-specific Analysis

The following parameters have been evaluated for compliance with technology and water quality-based criteria. The more stringent criteria has been included in the draft permit when applicable.

A. Biochemical Oxygen Demand and Total Suspended Solids

Water quality-based criteria are not available for BOD_5 and TSS, therefore, the technology-based criteria for secondary treatment apply. These include a weekly average limit of 45 mg/l and a monthly average limit of 30 mg/l. The technology-based limits also require 85% removal of BOD and TSS. The removal requirements are determined using the 30-day average values of the effluent concentrations.

Federal regulations at (40 CFR § 122.45 (b) and 122.45 (f)) require BOD5 and TSS limitations to be expressed as mass-based limits using the design flow (1.16 mgd) of the facility. The loading is calculated as follows:

concentration X design flow X conversion factor (8.34).

Using this formula, the facility's BOD5 and TSS permit limits are:

monthly average = 30 mg/l X 1.16 mgd X 8.34 = 290 lbs/day
weekly average = 45 mg/l X 1.16 mgd X 8.34 = 435 lbs/day

B. Dissolved Oxygen

Dissolved oxygen data were collected monthly at three locations in Drainage Way No. 2 from 2007 to 2010, April through September. The locations were 1) upstream of Outfall 001; 2) 50 feet downstream of Outfall 001; and 3) 300 feet downstream of Outfall 001. Dissolved oxygen levels varied from 8.1 mg/L (June 2009, 50 feet downstream) to 12.1 mg/L (August 2008, 50 feet downstream) both at locations downstream of the facility. Dissolved oxygen were also collected monthly in effluent and range from 5.4 mg/L to 7.7 mg/L. Monthly effluent samples of BOD5 show removals above 95%, and compliance with the 30 mg/L monthly average and 45 mg/L weekly average.

Table 3. Dissolved Oxygen (mg/L) in Drainage Way No. 2

	April	May	June	July	August	September
2007						
Upstream	10.6	10.8	10.3[1], 8.6[2]	9.7	9.8[3]	**9.9**
50' downstream	10.0	11.0	10.5[1], 8.6[2]	9.7	9.7[3]	10.1
300' downstream	10.2	11.1	10.8[1], 8.7[2]	9.7	9.5[3]	10.3
2008						
Upstream	11.7	10.7	10.6	9.3	**9.2**[4]	**9.6**
50' downstream	12.1	10.7	10.6	9.5	**9.0**[4]	**9.5**
300' downstream	12.0	10.9	10.9	9.5	**9.0**[4]	**9.3**
2009						
Upstream	11.3	10.5	9.3	8.8	**8.9**[5]	No data
50' downstream	10.9	10.5	**8.1**	8.7	**8.9**[5]	No data
300' downstream	11.3	10.7	9.5	8.6	**9.1**[5]	No data
2010						
Upstream	10.7	10.2	9.1	No data	No data	No data
50' downstream	10.4	10.2	9.2	No data	No data	No data
300' downstream	10.4	10.3	9.4	No data	No data	No data
Yakama Tribal Water Quality Standards (August 15- May 31)						10
Yakama Tribal Water Quality Standards (June 1 – August 14)						8.5
Washington Water Quality Standards						8.0

1. Sample collected on June 7, 2007.
2. Sample collected on June 28, 2007.
3. Sample collected on August 9, 2007.
4. Sample collected on August 21, 2008.
5. Sample collected on August 27, 2009.

Based on DO monthly data in Drainage Way No. 2, the stream meets the Yakama tribal water quality standards for dissolved oxygen during non-spawning periods with one violation in June 2009. During the spawning season in August and September 2008 and in August 2009, DO does not meet water quality criteria upstream and downstream of the facility. Excursions of the DO criteria are in bold in Table 3. Changes in DO levels, upstream to downstream, range from an increase in DO of 0.5 mg/L to a decrease of 0.3 mg/L.

Dissolved oxygen is a characteristic of a water body that can be affected by several different parameters such as temperature, physical characteristics (stream velocities, percent sediments, etc.), nutrients, sunlight, ammonia, etc. EPA is requiring the facility to monitor for BOD_5 and dissolved oxygen in effluent and in Drainage Way No. 2. EPA is also requiring that the facility measure the length, width and cross-sectional area for Drainage Way No. 2, so the Streeter-Phelps equation can be used to assess the impact of the facility's effluent on downstream DO in the next permit cycle.

C. Temperature

The Yakama Nation water quality standard for temperature is the following: During non-irrigation season: 16°C as a 7-day daily average (Yakama Nation WQS 20.1.5.2); During irrigation season: 18°C as a 7-day daily average for Wapato Irrigation Project and Wanity Slough with no single daily maximum temperature exceeding 20°C.

Ambient and effluent monitoring for temperature have been incorporated into the draft permit to determine if effluent limits for temperature may be necessary in the future.

D. Bacteria

The Yakama Nation water quality standard for bacteria is the following: E. coli bacteria levels must both not exceed a geometric mean value of 100 colonies/100ml and not have more than 10% of all samples obtained for calculating the geometric mean value exceeding 200.

The City of Wapato's 2005 NPDES permit uses the Washington water quality standard for bacteria, which is fecal coliform limits of 100 colonies #/100mL as a monthly average and 200 colonies #/100mL as a weekly average. EPA evaluated 60 samples of effluent data from discharge monitoring reports (DMRs) from May 2005 to April 2010. Average fecal coliform levels ranged from 1.3 to 41 colonies #/100mL and maximum fecal coliform levels from 2 to 135 colonies#/100mL. The geometric mean of the maximum fecal coliform levels is 14 colonies#/100mL, and there are no values over 200 colonies#/100mL. Current fecal coliform limits are protective of water quality standards.

E. Total Ammonia (as N)

The toxicity of ammonia is dependent upon pH and temperature, and the criteria are also pH and temperature dependent. EPA calculated the acute and chronic ammonia criteria using pH and temperature values.

The acute and chronic criteria for the protection of freshwater are as follows: Irrigation Season - 5 mg/L and 1.4 mg/L, respectively; and Non-Irrigation Season - 9.5 mg/L and 2.8 mg/L, respectively. For the irrigation season, these values were derived by using the 95th percentile of the pH and temperature data in Drainage Way No. 2 from 33 samples collected from 2001 through 2007. For the non-irrigation season, the effluent temperature was used to develop the chronic criterion because there is no flow in the drainage canal. The ammonia criteria were derived from pH and temperature effluent data collected from November 1 – April 31, 2005-2010.

Appendix E, Section 1. entitled Ammonia Limits describes the data and calculations used to calculate criteria, complete a reasonable potential analysis, and calculate water quality based effluent limits. As stated in the Antidegradation section, ammonia limits higher than the 2005 permit limits are not allowed. Therefore, the ammonia limits from the 2005 permit are the current permit limits. Table D-3 shows the permit limits for ammonia as nitrogen during the irrigation and non-irrigation seasons.

Table D-3. Ammonia as Nitrogen

	Irrigation Season	**Non-irrigation Season**
Average Monthly Limit	1.2 mg/l, 12 lbs/day	1.3 mg/l, 13 lbs/day
Maximum Daily Limit	2.5 mg/l, 24 lbs/day	2.7 mg/l, 26 lbs/day

F. Total Residual Chlorine

The acute and chronic water quality criteria for total residual chlorine for protection of aquatic life (Yakama Nation Water Quality Standards) are 19 µg/L and 11 µg/L, respectively.

The previous permit contains total residual chlorine levels based on Washington water quality standards, which were an average monthly limit of 18 µg/L and a maximum daily limit of 24 µg/L. The effluent limits for chlorine are not quantifiable using EPA-approved analytical methods. The DMRs from May 2005 to April 2010 reported all total residual chlorine to be below 19 µg/L.

It is not possible to assess what the actual total residual chlorine levels because of the method detection limit. To be conservative, it is assumed that total residual chlorine levels are at 19 µg/L, and therefore have a reasonable potential to exceed the Yakama Nation water quality standards. Therefore, the draft permit contains total residual chlorine as monthly average and maximum daily limits laid out in Table D-3. The effluent limits for chlorine are not quantifiable using EPA approved analytical methods. Therefore, the facility will be in compliance if the chlorine limits are below the interim minimum level of 19 µg/L. See Appendix E for the calculations.

Table D-3. Chlorine		
	Irrigation Season	**Non-irrigation Season**
Average Monthly Limit	13 µg/L	7.5 µg/L
Maximum Daily Limit	19 µg/L	13 µg/L

G. pH

In addition to limits on BOD_5 and TSS, 40 CFR 133.102 requires that effluent pH be within the range of 6.0 to 9.0 s.u. for POTWs. Also, the Yakama Nation water quality standards for protection of class III waters requires pH to be between 6.5 to 8.5 standard units with a human-caused variation within the above range of less than 0.2 standard units (see Yakama Nation WQS 20.1.5.2).

EPA evaluated 60 samples of effluent data from discharge monitoring reports (DMRs) from May 2005 to April 2010. One exceedance occurred on July 31, 2008 when pH reached 9.5 S.U. EPA also evaluated receiving water data from April 2007 to April 2010 to assess impacts from the effluent on receiving waters during the irrigation season (April 1 to October 31). All values downstream of Outfall No. 1 were between 6.5 and 8.5.

The prior permit has pH effluent limits of 6.5 to 8.5 S.U. The Code of Federal Regulations (CFR) 122.44(I) contains anti-backsliding regulations that restrict the relaxation of water quality standards. Therefore, the current permit retains pH effluent limits to be between 6.5 and 8.5 S.U.

H. Aesthetic Values

The Yakama Nation water quality standards (13.3.2) require that surface waters shall be free from substances, materials, floating debris, oil, grease, or scum attributable to any point source discharge or nonpoint source activity that are in objectionable amounts. The prior permit includes requirements that restricts the impairment of aesthetic values. Based on the backsliding regulations, CFR 122.44(I), there must be no discharge of floating, suspended, or submerged matter or any kind in concentrations causing nuisances or objectionable conditions or that may impair designated beneficial uses.

I. Priority Pollutants

40 C.F.R. 122.21(j)(4) requires that certain priority pollutants be monitored. Six priority pollutants were detected in the City of Wapato's permit application: cadmium, copper, mercury, zinc, methylene chloride, chloroform and total phenolic compounds.

EPA sent the City of Wapato a Clean Water Act 308 information request to collect data for hardness in the upstream receiving waters. This data was used to calculate hardness-dependent water quality criteria (i.e., cadmium, copper, and zinc.) Additionally, the facility was requested to conduct additional effluent monitoring for the cadmium, copper, mercury, zinc, methylene chloride, chloroform and total phenolic compounds

EPA received the requested information from the City of Wapato on September 2, 2010. EPA then calculated the 5^{th} percentile of hardness in Drainage Way No. 2 of 37 mg/L $CaCO_3$ based on 11 samples collected in July and August 2010. This value was used to calculate the acute and chronic criteria for cadmium, copper, and zinc. Table D-5 shows the measured data with values above water quality criterion in bold.

Table D-4. Yakama Nation Criteria

Parameter	Yakama Nation WQS* (Acute, Freshwater), µg/L	Yakama Nation WQS* (Chronic, Freshwater), µg/L	Yakama Nation WQS* (Human health, water and organism), µg/L	Yakama Nation WQS* (Organism only), µg/L
Cadmium	0.8	0.4	NA	NA
Copper	5.5	4.0	NA	NA
Mercury	0.005	0.006	0.0054	0.0055
Zinc	51.6	51.6		
Total Phenolic Compounds	None	None		
Chloroform	None	None	4.5	22
Methylene Chloride	None	None	4.4	73

Table D-5. Priority Pollutants detected in City of Wapato WWTP effluent

Date	Cadmium (µg/L)	Copper (µg/L)	Mercury (µg/L)	Zinc (µg/L)	Total Phenolic Compounds	Chloroform	Methylene Chloride
8/20/10	< 0.3	not collected	< 0.3	30.8	nd	nd	Nd
7/2/05	**25.9**	**8.3**	**0.79**	**86.8**	52	1.7	0.9
7/19/10	<0.3	**4.35**	<0.3	37.4	nd	1.3	Nd
7/23/10	<0.3	**4.26**	<0.3	28.4	nd	2.7	Nd
7/27/10	<0.3	2.5	<0.3	**87**	nd	2.7	Nd
7/30/10	<0.3	4.8	<0.3	**109**	0.02	1.9	Nd
8/3/10	<0.3	3.55	<0.3	**78.6**	0.0097	2.6	Nd
8/6/10	<0.3	**4.26**	<0.3	50.5	nd	1.7	Nd
8/10/10	<0.3	**4.2**	<0.3	36	nd	1.5	Nd
8/13/10	<0.3	2.86	<0.3	13.5	nd	1.3	Nd
8/16/10	<0.3	3.22	<0.3	12.3	nd	nd	Nd
8/17/10	<0.3	2.9	<0.3	28	missing	missing	missing
8/18/10	<0.3	3.7	<0.3	27	nd	1.2, 2.2	Nd

For methylene chloride and chloroform, no values exceeded the water quality criteria. For total phenolic compounds, there are no water quality criteria in the Yakama Nation standards or in federal Clean Water Act standards. As a result, EPA did not do a reasonable potential analysis for these parameters.

For cadmium and mercury, only one value exceeded the Yakama Nation water quality standards. The detection limit for mercury is three orders of magnitude above the water quality criteria, so it is unclear whether mercury violates standards. The draft permit requires the permittee to monitor mercury using a sensitive analytical test method. Additionally, a mercury minimization plan will be required in the draft permit to assess and control sources of mercury that may be introduced into the POTW. For cadmium, the violation is 3 orders of magnitude higher than the standard. All other monitoring data showed levels below the detection limit and the water quality criteria. The permit does not set effluent limits for cadmium, but requires that cadmium be monitored in the next permit cycle.

Copper and zinc exceeded standards, and EPA completed reasonable potential analyses for both. The data and calculations for copper and zinc are detailed in Appendix E. Both copper and zinc showed a reasonable potential to violate water quality standards in the receiving water. Therefore, the new permit includes limits on copper and zinc for the Irrigation (April 1-October 31) and Non-Irrigation Season (November 1- March 31).

Table D-6. Copper		
	Irrigation Season	**Non-irrigation Season**
Average Monthly Limit	5.5 µg/L	5.5 µg/L
Maximum Daily Limit	3.4 µg/L	3.4 µg/L

Table D-7. Zinc		
	Irrigation Season	**Non-irrigation Season**
Average Monthly Limit	52 µg/L	24 µg/L
Maximum Daily Limit	52 µg/L	24 µg/L

J. Nutrients

The Yakama Nation water quality standards require that surface waters be free from excess nutrients that cause or contribute to undesirable or nuisance aquatic life or produce adverse physiological responses in humans, animals and plants. Eutrophication from excess nutrients in the Lower Yakima River has been noted since 2001. The Marion Drain downstream of Wanity Slough and Yakima River have shown increasing signs of nutrient enrichment showing signs of algal blooms and increased turbidity (USGS, 2009). It is believed that excess nutrients, such as phosphorus and nitrogen could be the cause of this problem. Phosphorus and nitrogen monitoring have been included in the permit to determine if a significant amount is coming from the City of Wapato POTW.

K. Whole Effluent Toxicity

The Yakama Nation water quality standards require that toxic substances shall not be introduced in water of the Yakama Nation in amounts, concentrations, or combinations which adversely affect the beneficial uses, cause acute or chronic toxicity to the indigenous aquatic biota, harm human, animal or aquatic life, or chemically change to harmful forms in the environment. Whole effluent toxicity tests are used to measure the amount of toxicity in effluent. In the last permit cycle, three WET tests were completed in 2006, 2007, and 2008. In each of these years, Toxic Units for *Ceriodaphnia* exceeded the criteria of 1 TU_c for survival and reproduction with values ranging from 3.3 TU_c to 12.5 TU_c. For fathead minnow, no toxicity was observed.

EPA completed reasonable potential analyses included in Appendix E. Table D-8 includes the permit limits for whole effluent toxicity.

Table D-8. Whole Effluent Toxicity		
	Irrigation Season	**Non-irrigation Season**
Average Monthly Limit* **	1.5 TUa,c**	1.0 TUc***
Maximum Daily Limit	3 TUa,c**	1.6 TUc

**TUa,c is when acute toxicity is being expressed in chronic toxic units (TUc). TUa,c should be treated as TUc, which is defined in Part I.D.2.d of the permit.

*** For the non-irrigation season only, the monthly compliance level for chronic WET is established as a monthly median limit, not an average monthly limit.

APPENDIX E
Reasonable Potential Analysis and Derivation of Water Quality Based Effluent Limits

This appendix presents the reasonable potential analysis and derivation of water quality based effluent limitations for ammonia, copper, zinc, chlorine, and whole effluent toxicity.

I. AMMONIA

A. Reasonable Potential Analysis

Step 1: Determine the appropriate criteria

1A. Determine the uses

Drainage Way No. 2 is a Class III water under the Yakama Nation water quality standards and is protected for the following uses: cultural and religious uses, anadromous and resident fish migration, spawning and rearing for those species historically found in these waters, aquatic life support, wildlife habitat, recreation, groundwater recharge, agricultural water supply, livestock watering, and industrial water supply (Yakama Nation WQS, 20.1.5.1). Site-specific temperature and water use conditions also apply during irrigation as laid out in Section 20.1.5.3.

1B. Determine the most stringent criteria to protect the uses

The most stringent criterion associated with these uses is for the protection of fish. The acute and chronic criteria for ammonia are dependent on pH and temperature and are different for the irrigation and non-irrigation season.

The equations to determine the chronic and acute criteria for ammonia toxicity in freshwater are in the Yakama Nation WQS Appendix C:

Where salmonid fish are present:

$CMC = 0.275/(1+10^{7.204-pH}) + 39.0/(1+10^{pH-7.204})$

Where fish early life stages are present
$CCC = [0.0577/(1+10^{7.688-pH}) + 2.487/(1+10^{pH-7.688})]$ X Min(2.85, $1.45*10^{0.028*(25-T)}$)

1B1) Calculate the acute and chronic criteria for the Irrigation season (April 1 through October 31). EPA used pH and temperature data collected from Drainage Way No. 2 upstream of the outfall during irrigation months. Data were collected from May 2001 through April 2010 (Draft Fact Sheet, 2005, Appendix C; Appendix C). The 95th percentile of pH was 8.15, and the 95th percentile of temperature was 22°C.

$CMC_{irrigation} = 0.275/(1+10^{7.204-8.15}) + 39.0/(1+10^{8.15-7.204}) = 5.0$ mg/L
$CMC_{irrigation}$ = 5.0 mg/L

$CCC_{irrigation} = [0.0577/(1+10^{7.688-8.15}) + 2.487/(1+10^{8.15-7.688})]$ X Min(2.85, $1.45*10^{0.028*(25-22)}$)
$CCC_{irrigation}$ = 1.4 mg/L

1B2) Calculate the acute and chronic criteria for the non-irrigation season. During the irrigation season, the 7Q10 is 0 mgd. Therefore, the critical condition occurs when there the water in Drainage Way No. 2 is 100% effluent. EPA used pH and temperature data from the DMR data collected during non-irrigation months (November 1 through March 31) from November 2005 through April 2010. The 95th percentile of pH was 7.7 and the

95th percentile was 18°C.

$CMC_{irrigation}$ = 0.275/(1+10$^{7.7-8.15}$) + 39.0/(1+10$^{7.7-7.204}$) = 3.3 mg/L
$CMC_{irrigation}$ = 9.5 mg/L

$CCC_{irrigation}$ = [0.0577/(1+10$^{7.7-8.15}$) + 2.487/(1+10$^{7.7-7.688}$)] X Min(2.85, 1.45*10$^{0.028*(25-18)}$)
$CCC_{irrigation}$ = 2.8 mg/L

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

2A. Determine the "reasonable potential" multiplier

The "reasonable potential" multiplier is based on the coefficient of variation (CV) of the data and the number of data points. Where there are fewer than 10 data points to calculate a CV, the TSD recommends using 0.6 as a default value.

In this case, during the irrigation season, there were 35 data points from April 1 through October 31, 2005 - 2010, and the CV of the data set is 0.48. Using the equations in section 3.3.2. of the TSD, the "reasonable potential" multiplier (RPM) is calculated as follows:

p_n = (1 - confidence level)$^{1/n}$

where,
p_n = the percentile represented by the highest concentration
n = the number of samples

p_n = (1-0.99)$^{1/35}$
p_n = 0.88

This means that the largest value in the data set of 35 data points is greater than the 88th percentile.

This brings the ratio to 88th/99th which does not equal 1. Therefore, the ratio of the 99th percentile to the Xth percentile is calculated, based on the equation:

C_p = exp(zσ - 0.5σ^2)

where,
σ^2 = ln(CV^2 +1)
CV = coefficient of variation =0.48

σ = square root [ln(0.48^2 +1)]
= 0.45
σ^2 = 0.207

z = normal distribution value
= 2.33 for the 99th percentile
= 1.2 for the 88th percentile

C_{99} = exp(2.33 X 0.45 - 0.5 X 0.45^2) = 2.6

C_{88} = exp(1.2 X 0.45 - 0.5 X 0.45^2) = 1.5

$RPM_{irrigation}$ $= C_{99}/C_{88} = 2.6/1.5 = 1.7$

During the non-irrigation season, there were 25 data points from November 1 through March 31, 2005 - 2010, and the CV of the data set is 0.5. Using the equations in section 3.3.2. of the TSD, the "reasonable potential" multiplier (RPM) is calculated as follows:

$p_n = (1-0.99)^{1/25}$
$p_n = 0.83$

This means that the largest value in the data set of 25 data points is greater than the 83rd percentile.

This brings the ratio to 83rd/99th which does not equal 1. Therefore, the ratio of the 99th percentile to the 83rd percentile is calculated, based on the equation:

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

where,

$\sigma^2 = \ln(CV^2 + 1)$
CV = coefficient of variation = 0.50

σ = square root $[\ln(0.50^2 + 1)]$
= 0.48
$\sigma^2 = 0.223$

z = normal distribution value
= 2.33 for the 99th percentile
= 1.0 for the 83rd percentile

$C_{99} = \exp(2.33 \text{ X } 0.48 - 0.5 \text{ X } 0.48^2) = 2.7$

$C_{83} = \exp(1.0 \text{ X } 0.48 - 0.5 \text{ X } 0.48^2) = 1.4$

$RPM_{non\text{-}irrigation}$ $= C_{99}/C_{83} = 2.7/1.4 = 1.9$

2B. Calculate the Maximum Projected Effluent Concentration

Irrigation Season
The maximum reported effluent criteria for ammonia was 10.5 mg/L. This was based on 35 samples collected during the irrigation season from April 2005 through October 31, 2009. The 95th percentile of the upstream concentration of ammonia during the irrigation season was 0.84 mg/L. This was based on 30 samples collected in Drainage Way No. 2 during the irrigation season from May 2001 through October 2002 and April 2007 through June 2010.

C_e = maximum reported effluent criteria X $RPM_{irrigation}$

C_e = 11 mg/L X 1.7 = 18 mg/L

Non-irrigation Season
The maximum reported effluent criteria for ammonia was 9.0 mg/L. This was based on 25 samples collected during the non-irrigation season from November 2005 through March 31, 2010. There is no data for ammonia in Drainage Way No. 2 upstream of Outfall No. 1, so C_u = 0 mg/L.

During the non-irrigation season, the 7Q10 flow of Q_u is 0 mgd.

C_e = maximum reported effluent criteria X $RPM_{non\text{-}irrigation}$

C_e = 9.0 mg/L X 1.9 = 18 mg/L

2C. Calculate the concentration of the pollutant at the edge of the mixing zone

There is reasonable potential to exceed criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the criterion. The maximum projected concentration is calculated from the following equation (See Section IIIB to see how the equation below is derived):

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

where,

C_d = receiving water concentration at the edge of the mixing zone
C_e = maximum projected effluent concentration
= maximum reported effluent concentration * reasonable potential multiplier
Q_e = maximum effluent flow (1.16 mgd)
C_u = upstream concentration of pollutant (irrigation: 0.84 mg/l, non-irrigation: 0 mg/L)
Q_u = upstream flow 11.9 mgd for acute and chronic during Irrigation Season, and 0 mgd for acute and chronic during Non-irrigation Season.
%MZ = % of upstream flow allowed for mixing zone (0% for acute and 20% for chronic)

Irrigation Season
For the acute criterion, the mixing zone is 0%, since no mixing is allowed.

$$C_d = C_e$$

C_d = 18 mg/L

For the chronic criterion, the mixing zone is 20%.

$$C_d = \frac{(18 \text{ mg/L} \times 1.16 \text{ mgd}) + (0.84 \text{ mg/L} \times 11.9 \text{ mgd} \times 0.2)}{1.16 \text{ mgd} + (11.9 \text{ mgd} \times 0.2)}$$

C_d = 6.4 mg/L

Non-irrigation Season
For the acute criteria, the mixing zone is 0%.

$$C_d = C_e$$

$$\mathbf{C_d = 18\ mg/L}$$

For the chronic criterion, use the chronic flow

$$C_d = \underline{C_e}$$

$$\mathbf{C_d = 18\ mg/L}$$

The projected concentrations are compared with the criterion to determine if there is reasonable potential for the water quality criteria to be exceeded. The reasonable potential analysis shows that projected maximum concentrations for acute and chronic criteria in both irrigation and non-irrigation seasons are at or greater than the criteria. Therefore, limits must be included in the permit.

Table E – 1. Ammonia Reasonable Potential Analysis

Ammonia	**Irrigation**			**Non-Irrigation**		**Reasonable Potential?**
	Projected C_d	**Criterion**	**Reasonable Potential?**	**Projected C_d**	**Criterion**	
Acute	18 mg/L	5 mg/L	YES	18 mg/L	9.5 mg/L	YES
Chronic	6.4 mg/L	1.4 mg/L	YES	18 mg/L	2.8 mg/L	YES

B. CALCULATE WATER QUALITY BASED EFFLUENT LIMITS

Step 1: Calculate the wasteload allocations

Wasteload allocations (WLAs) are calculated using the same mass balance equation used to calculate the concentration of the pollutant at the edge of the mixing zone. However, C_d becomes the acute or chronic criteria and C_e is the acute or chronic WLA. The equation is rearranged to solve for the WLA, becoming:

$$WLA = \frac{(C_d\ Q_u\ X\ \%MZ) + (C_d\ X\ Q_e) - (C_u\ X\ Q_u\ X\ \%MZ)}{Q_e} \qquad \text{(Equation 4)}$$

When no mixing zone is allowed Equation 4 becomes:

WLA = water quality criterion

Irrigation Season

For the acute criterion,

WLA_a = acute water quality criterion

$$\mathbf{WLA_a = 5\ mg/L}$$

For the chronic criterion

WLA_c = ($\underline{1.4\ mg/L\ X\ 11.9\ mgd\ X\ 20\%) + (1.4\ mg/L\ X\ 1.16\ mgd) - (0.84\ mg/L\ X\ 11.9\ mgd\ X\ 20\%)}$

1.16 mgd

$\mathbf{WLA_c}$ **= 2.5 mg/L**

Non-irrigation Season

For the acute criterion,

WLA_a =acute water quality criterion

$\mathbf{WLA_a}$ **= 9.5 mg/L**

For the chronic criterion

WLA_c = chronic water quality criterion

$\mathbf{WLA_c}$ **= 2.8 mg/L**

Table E-2. Ammonia Wasteload Allocations

Ammonia WLAs	Irrigation Season	Non-Irrigation Season
Acute	5 mg/L	9.5 mg/L
Chronic	2.5 mg/L	2.8 mg/L

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

$$LTA_a = WLA_a \times \exp[0.5\sigma^2 - z\sigma]$$

$$LTA_c = WLA_c \times \exp[0.5\sigma_{30}^2 - z\sigma_{30}]$$

where,

σ^2 = $\ln(CV^2 + 1)$

σ_{30}^2 = $\ln(CV^2/30 + 1)$

z = 2.326 for 99th percentile probability basis

Irrigation Season

For the irrigation season, the CV is 0.48, $\sigma = 0.45$, $\sigma_{30} = 0.087$

$$\sigma = (\ln(0.48^2 + 1))^{1/2} = 0.45$$

$$\sigma_{30} = (\ln(0.48^2/30 + 1))^{1/2} = 0.087$$

LTA_a = 5 mg/L X $\exp[0.5 \times 0.45^2 - 2.326 \times 0.45]$

$\mathbf{LTA_a}$ **= 1.9 mg/L**

LTA_c = 2.5 mg/L X $\exp[0.5 \times 0.087^2 - 2.326 \times 0.087]$

$\mathbf{LTA_c}$ **= 2.0 mg/L**

Non-irrigation Season

For the non-irrigation season, the CV is 0.50, σ = 0.48, σ_{30}= 0.092

$$\sigma = (\ln (0.50^2 + 1))^{1/2} = 0.48$$

$$\sigma_{30} = (\ln (0.50^2/30 + 1))^{1/2} = 0.092$$

LTA_a = 9.5 X exp[0.5 X 0.48^2 - 2.326 X 0.48]

LTA_a = 3.5 mg/L

LTA_c = 2.8 X exp[0.5 X 0.092^2 - 2.326 X 0.092]

LTA_c = 2.3 mg/L

The LTAs are compared and the most stringent is used to develop the daily maximum and monthly average permit limits. In this case, the acute LTA is the most stringent for the Irrigation Season and the chronic LTA is the most stringent for the Non-irrigation Season.

Table E-3. Ammonia LTAs

Ammonia LTAs	Irrigation Season	Non-Irrigation Season
Acute	1.9 mg/L	3.5 mg/L
Chronic	2.0 mg/L	2.3 mg/L
Most stringent	1.9 mg/L (acute)	2.3 mg/L (chronic)

Step 2: Derive the maximum daily (MDL) and average monthly (AML) permit limits

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

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

where:

σ = $(\ln(CV^2 + 1))^{1/2}$; irrigation: 0.45, non-irrigation: 0.48
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation; irrigation: 0.48; non-irrigation: 0.50

Irrigation Season

MDL= 1.9 mg/L X exp[2.326 X 0.45 - 0.5 X 0.45^2]

MDL= 5.0 mg/L

Non-irrigation Season

MDL= 2.3 mg/L X exp[2.326 X 0.48 - 0.5 X 0.48^2]

MDL= 6.2 mg/L

The average monthly limit is calculated as follows:

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

where:

σ = $[\ln(CV^2/n + 1)]^{1/2}$; irrigation: 0.33, non-irrigation: 0.34
z = 1.645 for 95th percentile probability basis
CV = coefficient of variation; irrigation: 0.48, non-irrigation: 0.50
n = number of sampling events required per month (the data was based on 2 samples per month, so n=2)

Irrigation Season

$$AML = 1.9 \text{ mg/L} \times \exp[1.645 \times 0.33 - 0.5 \times 0.33^2]$$

AML= 3.1 mg/L

Non-irrigation Season

$$AML = 2.3 \text{ mg/L} \times \exp[1.645 \times 0.34 - 0.5 \times 0.34^2]$$

AML= 3.8 mg/L

Table E-3 Ammonia NPDES Calculations

Ammonia Monthly and Daily Limits	Irrigation Season	Non-Irrigation Season
MDL	5.0 mg/L	6.2 mg/L
AML	3.1 mg/L	3.8 mg/L

Comparing these with 2005 permit limits, the MDL and AML for irrigation and non-irrigation seasons are higher. Based on the antidegradation Tier 2 analysis, higher permit limits are not allowed. Therefore, the ammonia limits from 2005 apply to the current permit, as shown in Table E-4.

Table E-4 Ammonia NPDES Permit Limits

Ammonia Monthly and Daily Limits	Irrigation Season	Non-Irrigation Season
MDL	1.2 mg/L	1.3 mg/L
AML	2.5 mg/L	2.7 mg/L

II. COPPER

A. REASONABLE POTENTIAL ANALYSIS

Step 1: Determine the appropriate criteria

1A. Determine the uses

Drainage Way No. 2 is a Class III water under the Yakama Nation water quality standards and is protected for the following uses: cultural and religious uses, anadramous and resident fish migration, spawning and rearing for those species historically found in these waters, aquatic life support, wildlife habitat, recreation, groundwater recharge, agricultural water supply, livestock watering, and industrial water supply (Yakama Nation WQS, 20.1.5.1). Site-specific temperature and water use conditions also apply during irrigation as laid out in Section 20.1.5.3.

1B. Determine the most stringent criteria to protect the uses

The most stringent criterion associated with these uses is for the protection of fish. The acute and chronic criteria for copper are dependent on hardness for the irrigation and non-irrigation season. The TSD recommends that a 5^{th} percentile of the hardness be used to calculate toxicity. The 5^{th} percentile of hardness is 37 mg/L based on 11 samples collected in Drainage Way No. 2 upstream of the discharge from July and August 2010.

The equations to determine the chronic and acute criteria for copper in freshwater are in Yakama Nation WQS Appendix B. The NPDES permit regulations require that permit limits be expressed as total, not dissolved, so the conversion factor to convert total to dissolved is not used. There are no hardness data for the non-irrigation season, so the same CMC and CCC apply year-round.

CMC = exp[0.9422 X ln(37mg/L) -1.700]
CMC = 5.5 μg/L

CCC = exp[0.8545 X ln(37mg/L) -1.702]
CCC = 4.0 μg/L

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

2A. Determine the "reasonable potential" multiplier

The "reasonable potential" multiplier is based on the coefficient of variation (CV) of the data and the number of data points. Where there are fewer than 10 data points to calculate a CV, the TSD recommends using 0.6 as a default value.

In this case, during the irrigation season, there were 12 data points collected primarily in July and August 2010 as part of the Section 308 information request. The CV of the data set is 0.37. Using Table 3.1 in section 3.3.2. of the TSD, the "reasonable potential" multiplier (RPM) is 1.9.

During the non-irrigation season, no data are available. The permit assumes that data collected during the irrigation period is representative of total copper values that occur year-round. Also, the effluent is 100% of the downstream flow at the 0 mgd 7Q10 flow of the non-irrigation season (November 1- March 31). Therefore, Drainage Way No. 2 is more vulnerable to impacts from effluent during the non-irrigation season. In the next permit cycle, the total copper data will be evaluated to determine whether permit limits are necessary in non-irrigation months. For this permit, the following parameters are the same for both irrigation and non-irrigation seasons: maximum effluent concentration of total copper, CV, RPM.

2B. Calculate the Maximum Projected Effluent Concentration.

Irrigation Season

The maximum reported effluent criteria for total copper was 8.3 μg/L based on 12 samples collected in July and August 2010 and one sample reported in the permit application. There were no data collected upstream, so the upstream concentrations of total copper are 0 mg/L.

C_e = maximum reported effluent criteria X $RPM_{irrigation}$

C_e = 8.3 μg/L X 1.9 = 16 μg/L

2C. Calculate the concentration of the pollutant at the edge of the mixing zone.

For the acute criterion, the mixing zone is 0%, since no mixing is allowed.

C_d = C_e = 16 μg/L

For the chronic criterion, the mixing zone is 20%.

$$C_d = \frac{(16\ \mu g/L * 1.16\ mgd) + (0.0\ \mu g/L * 11.9\ mgd * 20\%)}{1.16\ mgd + (11.9\ mgd * 20\%)}$$

C_d = 5.2 μg/L

Non-irrigation Season

The only data for copper were the 12 samples collected in July and August 2010 and one sample reported in the permit application. The C_e is the same as above at 16 μg/L. During the non-irrigation season, the 7Q10 flow of Q_u is 0 mgd, so there is no mixing zone. As a result, for the acute and chronic criterion, $C_d = C_e$ = 16 μg/L.

The projected concentrations are compared with the criterion to determine if there is reasonable potential for the water quality criteria to be exceeded. The reasonable potential analysis shows that projected maximum concentrations for acute and chronic conditions for copper in both irrigation and non-irrigation seasons are at or greater than the criteria. Therefore, limits must be included in the permit.

Table E-5. Copper Reasonable Potential Analysis

Copper	**Irrigation**			**Non-Irrigation**		**Reasonable Potential?**
	Projected C_d	**Criterion**	**Reasonable Potential?**	**Projected C_d**	**Criterion**	
Acute	16 μg/L	5.5 μg/L	YES	16 μg/L	5.5 μg/L	YES
Chronic	5.2 μg/L	4 μg/L	YES	16 μg/L	4 μg/L	YES

B. CALCULATE WATER QUALITY-BASED EFFLUENT LIMITS.

Step 1: Calculate the wasteload allocations

Wasteload allocations (WLAs) are calculated using the same mass balance equation used to calculate the concentration of the pollutant at the edge of the mixing zone. However, C_d becomes the acute or chronic criteria and C_e is replaced by the acute or chronic WLA. The equation is rearranged to solve for the WLA, becoming:

$$WLA_a = \frac{(C_d\ Q_u\ X\ \%MZ) + (C_d\ X\ Q_e) - (C_u\ X\ Q_u\ X\ \%MZ)}{Q_e} \quad \text{(Equation 4)}$$

When no mixing zone is allowed, Equation 4 becomes:

WLA = water quality criterion

Q_e

Irrigation Season
For the acute criterion,

WLA_a = acute water quality criterion
WLA_a = 5.5 μg/L

For the chronic criterion, the mixing zone

$$WLA_c = \frac{(4\ \mu g/L \times 11.9\ mgd \times 0.2) + (4\ \mu g/L \times 1.16\ mgd) - (0\ \mu g/L \times 11.9\ mgd \times 0.2)}{1.16\ mgd}$$

WLA_c = 12 μg/L

Non-irrigation Season
For the acute criterion,

WLA_a = acute water quality criterion
WLA_a = 5.5 μg/L

For the chronic criterion

WLA_c = chronic water quality criterion = 4.0 μg/L

Table E-6 Copper Wasteload Allocations

Copper WLAs	Irrigation Season	Non-Irrigation Season
Acute	5.5 μg/L	5.5 μg/L
Chronic	12 μg/L	4.0 μg/L

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

$$LTA_a = WLA_a \times \exp[0.5\sigma^2 - z\sigma]$$

$$LTA_c = WLA_c \times \exp[0.5\sigma_{30}^2 - z\sigma_{30}]$$

where,

σ^2 = $\ln(CV^2 + 1)$

σ_{30}^2 = $\ln(CV^2/30 + 1)$

z = 2.326 for 99th percentile probability basis

Irrigation Season

For the irrigation season, the CV is 0.37, σ = 0.36, σ_{30}= 0.067

$$\sigma = (\ln (0.37^2 + 1))^{1/2} = 0.36$$

$$\sigma_{30} = (\ln (0.37^2/30 + 1))^{1/2} = 0.067$$

LTA_a = 5.5 μg/L X exp[0.5 X 0.36^2 - 2.326 X 0.36]

LTA_a = 2.5 μg/L
LTA_c = 12 μg/L X exp[0.5 X 0.067^2 - 2.326 X 0.067]

LTA_c = 10 μg/L

Non-irrigation Season

For the non-irrigation season, the same data set applies where CV is 0.37, σ = 0.36, σ_{30}= 0.067.

LTA_a = 5.5 μg/L X exp[0.5 X 0.36^2 - 2.326 X 0.36]

LTA_a = 2.5 μg/L

LTA_c = 4.0 μg/L X exp[0.5 X 0.067^2 - 2.326 X 0.067]

LTA_c = 3.4 μg/L

The LTAs are compared and the most stringent is used to develop the daily maximum and monthly average permit limits. In this case, the acute LTA is the most stringent for the Irrigation Season and the chronic LTA is the most stringent for the Non-irrigation Season.

Table E-7. Copper Long-Term Averages

Copper LTAs	Irrigation Season	Non-Irrigation Season
Acute	2.5 µg/L	2.5 µg/L
Chronic	10 µg/L	3.4 µg/L
Most stringent	2.5 µg/L	2.5 µg/L

Step 2: Derive the maximum daily (MDL) and average monthly (AML) permit limits

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

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

where:

σ = $(\ln(CV^2 + 1))^{1/2}$ = 0.36
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = 0.37

The same data set applies for both the irrigation and non-irrigation season, so the values for σ, z, and CV are the same year-round. The most stringent criteria for both the irrigation and non-irrigation seasons are 2.5 µg/L. The MDL and AML apply year-round.

$$MDL = 2.5\ \mu g/L \times \exp[2.326 \times 0.36 - 0.5 \times 0.36^2]$$

MDL= 5.5 µg/L

The average monthly limit is calculated as follows:

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

where:

σ = square root $[\ln(CV^2/n + 1)]$; 0.18
z = 1.645 for 95th percentile probability basis
CV = coefficient of variation; 0.37
n = number of sampling events required per month , n = 4

$$AML = 2.5\ \mu g/L \times \exp[1.645 \times 0.18 - 0.5 \times 0.18^2]$$

AML= 3.4 µg/L

Table E-8. Copper NPDES Permit Limits

Copper Monthly and Daily Limits	Irrigation Season	Non-Irrigation Season
MDL	5.5 µg/L	5.5 µg/L
AML	3.4 µg/L	3.4 µg/L

III. Zinc

Step 1: Determine the appropriate criteria

1A. Determine the uses

Drainage Way No. 2 is a Class III water under the Yakama Nation water quality standards and is protected for the following uses: cultural and religious uses, anadramous and resident fish migration, spawning and rearing for those species historically found in these waters, aquatic life support, wildlife habitat, recreation, groundwater recharge, agricultural water supply, livestock watering, and industrial water supply (Yakama Nation WQS, 20.1.5.1). Site-specific temperature and water use conditions also apply during irrigation as laid out in Section 20.1.5.3.

1B. Determine the most stringent criteria to protect the uses

The most stringent criterion associated with these uses is for the protection of fish. The acute and chronic criteria for copper are dependent on hardness for the irrigation and non-irrigation season. The TSD recommends that a 5^{th} percentile of the hardness be used to calculate toxicity. The 5^{th} percentile of hardness is 37 mg/L based on 11 samples collected in Drainage Way No. 2 upstream of the discharge from July and August 2010.

The equations to determine the chronic and acute criteria for zinc in freshwater are in Yakama Nation WQS Appendix B. The NPDES permit regulations require that permit limits be expressed as total, not dissolved, so the conversion factor to convert total to dissolved is not used. There are no hardness data for the non-irrigation season, so the same CMC and CCC will apply year-round.

CMC = exp [0.8473 X ln (37mg/L) + 0.884]
CMC = 52 μg/L

CCC = exp [0.8473 X ln (37mg/L) + 0.884]
CCC = 52 μg/L

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

2A. Determine the "reasonable potential" multiplier

The "reasonable potential" multiplier is based on the coefficient of variation (CV) of the data and the number of data points. Where there are fewer than 10 data points to calculate a CV, the TSD recommends using 0.6 as a default value.

In this case, during the irrigation season, there were 12 data points collected primarily in July and August 2010 as part of the Section 308 information request. The CV of the data set is 0.66. Using Table 3.1 in section 3.3.2. of the TSD, the "reasonable potential" multiplier (RPM) is 2.9.

During the non-irrigation season, no data are available. The permit assumes that data collected during the irrigation period is representative of total zinc values that occur year-round. Also, the effluent is 100% of the downstream flow during the non-irrigation season (November 1- March 31) when the 7Q10 flow of the upstream receiving waters is 0 mgd. Therefore, Drainage Way No. 2 is more vulnerable to impacts from effluent during the non-irrigation season. In the next permit cycle, the total zinc data will be evaluated to determine whether permit limits are necessary in non-irrigation months. For this permit, the following parameters are the same for both irrigation and non-irrigation seasons: maximum effluent concentration of total copper, CV, RPM.

2B. Calculate the Maximum Projected Effluent Concentration.

The maximum reported effluent criteria for total zinc was 109 μg/L based on 12 samples collected in July and August 2010 and one sample reported in the permit application. There were no data collected upstream, so the upstream concentrations of total copper are 0 μg/L.

C_e = maximum reported effluent criteria * $RPM_{irrigation}$

C_e = 109 μg/L * 2.9 = 316 μg/L

2C. Calculate the concentration of the pollutant at the edge of the mixing zone.

There is reasonable potential to exceed criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the criterion. The maximum projected concentration is calculated from the following equation (See Section IIIB to see how the equation below is derived):

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

where,

C_d	=	receiving water concentration at the edge of the mixing zone
C_e	=	maximum projected effluent concentration
	=	maximum reported effluent concentration * reasonable potential multiplier
Q_e	=	maximum effluent flow (1.16mgd)
C_u	=	upstream concentration of pollutant (irrigation: 0.84 mg/l, non-irrigation: 0 mg/L)
Q_u	=	upstream flow 11.9 mgd for acute and chronic during Irrigation Season, and 0 mgd for acute and chronic during Non-irrigation Season.
%MZ =		% of upstream flow allowed for mixing zone (0% for acute and 20% for chronic)

Irrigation Season

For the acute criterion, the mixing zone is 0%, since no mixing is allowed.

C_d = C_e = 316 μg/L

For the chronic criterion, the mixing zone is 20%.

$$C_d = \frac{(316\ \mu g/L \times 1.16\ mgd) + (0.0\ \mu g/L \times 11.9\ mgd * 20\%)}{1.16\ mgd + (11.9\ mgd \times 20\%)}$$

C_d = 104 μg/L

Non-irrigation Season

The only data for zinc were the 12 samples collected in July and August 2010 and one sample reported in the permit application. The C_e is the same as above at 316 μg/L. During the non-irrigation season, the 7Q10 flow of Q_u is 0 mgd, so there is no mixing zone. As a result, for the acute and chronic criterion, C_d = C_e = 316 μg/L.

The projected concentrations are compared with the criterion to determine if there is reasonable potential for the water quality criteria to be exceeded. The reasonable potential analysis shows that projected maximum concentrations for acute and chronic conditions for copper in both irrigation and non-irrigation seasons are at or greater than the criteria. Therefore, limits must be included in the permit.

Table E-9. Zinc Reasonable Potential Analysis

Zinc	Irrigation		Reasonable Potential?	Non-Irrigation		Reasonable Potential?
	Projected C_d	Criterion		Projected C_d	Criterion	
Acute	316 µg/L	52 µg/L	YES	316 µg/L	52 µg/L	YES
Chronic	104 µg/L	52 µg/L	YES	316 µg/L	52 µg/L	YES

B. CALCULATE WATER QUALITY-BASED EFFLUENT LIMITS.

Step 1: Calculate the wasteload allocations

Wasteload allocations (WLAs) are calculated using the same mass balance equation used to calculate the concentration of the pollutant at the edge of the mixing zone. However, C_d becomes the acute or chronic criteria and C_e is replaced by the acute or chronic WLA. The equation is rearranged to solve for the WLA, becoming:

$$WLA_a = \frac{(C_d\ Q_u\ X\ \%MZ) + (C_d\ X\ Q_e) - (C_u\ X\ Q_u\ X\ \%MZ)}{Q_e} \quad \text{(Equation 4)}$$

When no mixing zone is allowed, Equation 4 becomes:

WLA = water quality criterion

Irrigation Season
For the acute criterion,

WLA_a = acute water quality criterion
WLA_a = 52 µg/L

For the chronic criterion,

$$WLA_c = \frac{(52\ \mu g/L *11.9\ mgd*20\%) + (52\ \mu g/L *1.16\ mgd) - (0\ \mu g/L *11.9\ mgd *20\%)}{1.16\ mgd}$$

WLA_c = 160 µg/L

Non-irrigation Season
For the acute criteria,

WLA_a = acute water quality criterion = 52 µg/L

For the chronic criterion

WLA_c = chronic water quality criterion = 52 µg/L

Table E-10. Zinc Wasteload Allocations

Zinc WLAs	Irrigation Season	Non-Irrigation Season
Acute	52 µg/L	52 µg/L
Chronic	160 µg/L	52 µg/L

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

$LTA_a = WLA_a \times \exp[0.5\sigma^2 - z\sigma]$

$LTA_c = WLA_c \times \exp[0.5\sigma_{30}^2 - z\sigma_{30}]$

where,

$\sigma^2 = \ln(CV^2 + 1)$
$\sigma_{30}^2 = \ln(CV^2/30 + 1)$
$z = 2.326$ for 99th percentile probability basis

Irrigation Season

For the irrigation season, the CV is 0.66, $\sigma = 0.60$, $\sigma_{30} = 0.12$

$\sigma = (\ln (0.66^2 + 1))^{1/2} = 0.60$

$\sigma_{30} = (\ln (0.66^2/30 + 1))^{1/2} = 0.12$

$LTA_a = 52\ \mu g/L \times \exp[0.5 \times 0.60^2 - 2.326 \times 0.60]$
$LTA_a = 15\ \mu g/L$
$LTA_c = 158\ \mu g/L \times \exp[0.5 \times 0.12^2 - 2.326 \times 0.12]$
$LTA_c = 120\ \mu g/L$

Non-irrigation Season

For the non-irrigation season, the same data set applies where CV is 0.66, $\sigma = 0.60$, $\sigma_{30} = 0.12$.

$LTA_a = 52\ \mu g/L \times \exp[0.5 \times 0.60^2 - 2.326 \times 0.60]$

$LTA_a = 15\ \mu g/L$

$LTA_c = 52\ \mu g/L \times \exp[0.5 \times 0.12^2 - 2.326 \times 0.12]$

$LTA_c = 39\ \mu g/L$

The LTAs are compared and the most stringent is used to develop the daily maximum and monthly average permit limits. In this case, the acute LTA is the most stringent for the Irrigation Season and the chronic LTA is the most stringent for the Non-irrigation Season.

Table E-11. Zinc Long-Term Averages

Zinc LTAs	Irrigation Season	Non-Irrigation Season
Acute	15 µg/L	15 µg/L
Chronic	120 µg/L	39 µg/L
Most stringent	15 µg/L	15 µg/L

Step 2: Derive the maximum daily (MDL) and average monthly (AML) permit limits

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

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

where:

σ	=	square root $(\ln(CV^2 + 1)) = 0.60$
z	=	2.326 for 99^{th} percentile probability basis
CV	=	coefficient of variation = 0.66

The same data set applies for both the irrigation and non-irrigation season, so the values for σ, z, and CV are the same year-round. The most stringent criteria for both the irrigation and non-irrigation seasons are 15 μg/L. The MDL and AML apply year-round.

MDL= 15 μg/L X exp[2.326 X 0.60 - 0.5 X 0.60^2]

MDL= 52 μg/L

The average monthly limit is calculated as follows:

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

where:

σ = square root $[\ln(CV^2/n + 1)]$; 0.32
z = 1.645 for 95^{th} percentile probability basis
CV = coefficient of variation; 0.66
n = number of sampling events required per month = 4
AML= 15 μg/L X exp[1.645 X 0.32 - 0.5 X 0.32^2]

AML= 25 μg/L

Table E-12. Zinc NPDES Permit Limits

Zinc Monthly and Daily Limits	**Irrigation Season**	**Non-Irrigation Season**
MDL	52 μg/L	52 μg/L
AML	25 μg/L	25 μg/L

IV. TOTAL RESIDUAL CHLORINE

Step 1: Determine the appropriate criteria

1A. Determine the uses

Drainage Way No. 2 is a Class III water under the Yakama Nation water quality standards and is protected for the following uses: cultural and religious uses, anadramous and resident fish migration, spawning and rearing for those species historically found in these waters, aquatic life support, wildlife habitat, recreation, groundwater recharge, agricultural water supply, livestock watering, and industrial water supply (Yakama Nation WQS, 20.1.5.1). Site-specific temperature and water use conditions also apply during irrigation as laid out in Section 20.1.5.3.

1B. Determine the most stringent criteria to protect the uses

The most stringent criterion associated with these uses is for the protection of fish. The acute and chronic criteria for chlorine are 11 μg/L and 19 μg/L, respectively (Yakama Nation Water Quality Standards, Appendix B).

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

The EPA method detection limit is 19 μg/L. DMR reports from 2005 through 2010 show that total residual chlorine levels are below 19 μg/L. However, there is no way to assess whether levels are above or below the Yakama Nation water quality standards. To be conservative, we assume that all levels are at 19 μg/L and thus show a reasonable potential of exceeding standards.

B. CALCULATE WATER QUALITY-BASED EFFLUENT LIMITS.

Step 1: Calculate the wasteload allocations

Wasteload allocations (WLAs) are calculated using the same mass balance equation used to calculate the concentration of the pollutant at the edge of the mixing zone. However, C_d becomes the acute or chronic criteria and C_e is replaced by the acute or chronic WLA. The equation is rearranged to solve for the WLA, becoming:

$$WLA_a = \frac{(C_d\ Q_u \text{ X } \%MZ) + (C_d \text{ X } Q_e) - (C_u \text{ X } Q_u \text{ X } \%MZ)}{Q_e} \quad \text{(Equation 4)}$$

When no mixing zone is allowed, Equation 4 becomes:

WLA = water quality criterion

Irrigation Season

For the acute criterion,

WLA_a = acute water quality criterion

WLA_a = 19 μg/L

For the chronic criterion,

$$WLA_c = \frac{(11\ \mu g/L *11.9 \text{ mgd}*20\%) + (11\ \mu g/L *1.16 \text{ mgd}) - (0\ \mu g/L *11.9 \text{ mgd} *20\%)}{1.16 \text{ mgd}}$$

WLA_c = 33 μg/L

Non-irrigation Season
For the acute criteria,

$$\mathbf{WLA_a = \text{acute water quality criterion} = 19\ \mu g/L}$$

For the chronic criterion

$$\mathbf{WLA_c = \text{chronic water quality criterion} = 11\ \mu g/L}$$

Table E-10. Zinc Wasteload Allocations

Zinc WLAs	Irrigation Season	Non-Irrigation Season
Acute	19 μg/L	19 μg/L
Chronic	33 μg/L	11 μg/L

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

$$LTA_a = WLA_a \times \exp[0.5\sigma^2 - z\sigma]$$

$$LTA_c = WLA_c \times \exp[0.5\sigma_{30}^2 - z\sigma_{30}]$$

where,

$\sigma^2 = \ln(CV^2 + 1)$
$\sigma_{30}^2 = \ln(CV^2/30 + 1)$
z = 2.326 for 99th percentile probability basis

Irrigation Season

For the irrigation season, the CV is 0.6, $\sigma = 0.55$, $\sigma_{30} = 0.11$

$$\sigma = (\ln(0.6^2 + 1))^{1/2} = 0.55$$

$$\sigma_{30} = (\ln(0.6^2/30 + 1))^{1/2} = 0.11$$

$$LTA_a = 19\ \mu g/L \times \exp[0.5 \times 0.55^2 - 2.326 \times 0.55]$$

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

$$LTA_c = 11\ \mu g/L \times \exp[0.5 \times 0.11^2 - 2.326 \times 0.11]$$

$$\mathbf{LTA_c = 26\ \mu g/L}$$

Non-irrigation Season

For the non-irrigation season, the same data set applies where CV is 0.6, $\sigma = 0.55$, $\sigma_{30} = 0.11$.

$$LTA_a = 19\ \mu g/L \times \exp[0.5 \times 0.55^2 - 2.326 \times 0.55]$$

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

$$LTA_c = 11\ \mu g/L \times \exp[0.5 \times 0.11^2 - 2.326 \times 0.11]$$

LTA_c = 8.6 µg/L

The LTAs are compared and the most stringent is used to develop the daily maximum and monthly average permit limits. In this case, the acute LTA is the most stringent for the Irrigation Season and the chronic LTA is the most stringent for the Non-irrigation Season.

Table E-11. Total Residual Chlorine Long-Term Averages

Chlorine LTAs	Irrigation Season	Non-Irrigation Season
Acute	6.1 µg/L	6.1 µg/L
Chronic	26 µg/L	8.6 µg/L
Most stringent	6.1 µg/L	6.1 µg/L

Step 2: Derive the maximum daily (MDL) and average monthly (AML) permit limits

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

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

where:

σ = square root $(\ln(CV^2 + 1))$ = 0.55
z = 2.326 for 99^{th} percentile probability basis
CV = coefficient of variation = 0.60
LTA = 6.1 µg/L

The most stringent long-term average for the Irrigation and Non-Irrigation Seasons are the same, so the MDL and AML are the same for both seasons:

MDL= 6.1 µg/L X exp[2.326 X 0.55 - 0.5 X 0.55^2]
MDL= 19 µg/L

The average monthly limit is calculated as follows:

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

where:

σ = square root $[\ln(CV^2/n + 1)]$; 0.13
z = 1.645 for 95^{th} percentile probability basis
CV = coefficient of variation; 0.60
n = number of sampling events required per month (the data was based on 5 samples per month, so n=20)

AML= 6.1 µg/L X exp[1.645 X 0.13 - 0.5 X 0.13^2]

AML= 7.5 µg/L

Table E-12. Total Residual Chlorine NPDES Permit Limits

Total Residual Chlorine Monthly and Daily Limits	Irrigation Season	Non-Irrigation Season

MDL	19 µg/L	19 µg/L
AML	7.5 µg/L	7.5 µg/L

IV. WHOLE EFFLUENT TOXICITY

Step 1: Determine the appropriate criteria

1A. Determine the uses

Drainage Way No. 2 is a Class III water under the Yakama Nation water quality standards and is protected for the following uses: cultural and religious uses, anadramous and resident fish migration, spawning and rearing for those species historically found in these waters, aquatic life support, wildlife habitat, recreation, groundwater recharge, agricultural water supply, livestock watering, and industrial water supply (Yakama Nation WQS, 20.1.5.1). Site-specific temperature and water use conditions also apply during irrigation as laid out in Section 20.1.5.3.

1B. Determine the most stringent criteria to protect the uses

The most stringent criterion associated with these uses is for the protection of fish. The acute criterion for whole effluent toxicity is 0.3 TUa (acute toxic units), and the chronic criterion is 1 TUc (chronic toxic unit). (EPA Regions 8, 9, and 10 Toxicity Training Tool, January 2010).

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

2A. Determine the "reasonable potential" multiplier

The "reasonable potential" multiplier is based on the coefficient of variation (CV) of the data and the number of data points. Where there are fewer than 10 data points to calculate a CV, the TSD recommends using 0.6 as a default value.

In this case, during the irrigation season, there were six data points collected in 2006, 2007, and 2008. Since there are fewer than 10 data points, the CV of the data set is 0.6. Using Table 3.1 in section 3.3.2. of the TSD, the "reasonable potential" multiplier (RPM) is 3.8.

Because there are limited data, the permit uses all data from the irrigation and non-irrigation season to determine reasonable potential and to calculate permit limits. During the non-irrigation season (November 1 – March 31), the 7Q10 flow of the upstream receiving water is 0 mgd, and the effluent is 100% of the downstream flow during the non-irrigation season. During the irrigation season (April 1 – October 31), the 7Q10 flow is 11.9 mgd. Yakama Nation Water quality standards does not allow for mixing zones for acute toxicity, but allows a 20% mixing zone for chronic toxicity. Therefore, the only time that mixing zones are allowed for WET are during the irrigation season for chronic toxicity.

2B. Calculate the Maximum Projected Effluent Concentration.

The maximum reported effluent criteria for total zinc was 12.5 TU_c based on 6 samples collected in 2006, 2007, and 2008. There were no data collected upstream, so the upstream concentrations of total copper are 0 µg/L.

C_e = maximum reported effluent criteria * $RPM_{irrigation}$

C_e = 12.5 TUc * 3.8 = 48 TUc

2C. Calculate the concentration of the pollutant at the edge of the mixing zone.

There is reasonable potential to exceed criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the criterion. The maximum projected concentration is calculated from the following equation (See Section IIIB to see how the equation below is derived):

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

$Q_e + (Q_u \text{ X } \%MZ)$

where,

C_d	=	receiving water concentration at the edge of the mixing zone
C_e	=	maximum projected effluent concentration
	=	maximum reported effluent concentration * reasonable potential multiplier
Q_e	=	maximum effluent flow (1.16mgd)
C_u	=	upstream concentration of pollutant (irrigation: 0.84 mg/l, non-irrigation: 0 mg/L)
Q_u	=	upstream flow 11.9 mgd for acute and chronic during Irrigation Season, and 0 mgd for acute and chronic during Non-irrigation Season.
%MZ	=	% of upstream flow allowed for mixing zone (0% for acute and 20% for chronic)

Irrigation Season

The acute criterion is expressed in acute toxicity units, but WET data collected by the facility is expressed as chronic units. To compare whole effluent testing results to the criterion, the maximum observed chronic toxicity of 12.5 TUc must be converted to acute toxicity units. No acute toxicity effluent data were collected to convert acute toxic units to chronic units, therefore, a default acute-to-chronic ratio of 10 is recommended in Section 1.3.4 of the TSD in order to estimate the effluent limits for acute toxicity.

max Ce is 12.5 TUc/10 = 1.3 TUc,a

multiplying by the RPM, **Ce = max Ce * RPM = 1.3 TUc,a * 3.8 = 4.9 TUc,a**

No mixing zone is allowed for acute criterion so $C_d = C_e$ = 4.9 TUc,a

For the chronic criterion, the mixing zone is 20%.

$$C_d = \frac{(48 \text{ TUc X } 1.16 \text{ mgd}) + (0.0 \text{ TUc X } 11.9 \text{ mgd} *20\%)}{1.16 \text{ mgd} + (11.9 \text{ mgd X } 20\%)}$$

$$\mathbf{C_d = 16 \text{ TUc}}$$

Non-irrigation Season

During the non-irrigation season, the 7Q10 flow of Q_u is 0 mgd, so there is no mixing zone. The acute C_e is 4.9 TUc,a. The chronic C_e is = 48 TUc.

The projected concentrations are compared with the criterion to determine if there is reasonable potential for the water quality criteria to be exceeded. The reasonable potential analysis shows that projected maximum concentrations for acute and chronic conditions in both irrigation and non-irrigation seasons are at or greater than the criteria. Therefore, limits must be included in the permit.

Table E-13. Whole Effluent Toxicity Reasonable Potential Analysis

Whole Effluent Toxicity	**Irrigation**		**Reasonable Potential?**	**Non-Irrigation**		**Reasonable Potential?**
	Projected C_d	**Criterion**		**Projected C_d**	**Criterion**	
Acute	4.9 TUc,a	0.3 TUa	YES	4.9 TUc,a	0.3 TUa	YES
Chronic	16 TUc	1 TUc	YES	48 TUc	1 TUc	YES

B. CALCULATE WATER QUALITY-BASED EFFLUENT LIMITS.

Step 1: Calculate the wasteload allocations

Wasteload allocations (WLAs) are calculated using the same mass balance equation used to calculate the concentration of the pollutant at the edge of the mixing zone. However, C_d becomes the acute or chronic criteria and C_e is replaced by the acute or chronic WLA. The equation is rearranged to solve for the WLA, becoming:

$$WLA_a = \frac{(C_d\ Q_u \times \%MZ) + (C_d \times Q_e) - (C_u \times Q_u \times \%MZ)}{Q_e} \quad \text{(Equation 4)}$$

When no mixing zone is allowed, Equation 4 becomes:

WLA = water quality criterion

For whole effluent toxicity only, the acute wasteload allocation is converted into an equivalent chronic WLA (WLAa,c) by multiplying the acute WLA by an acute-to-chronic ratio. Since there are no measured ACR, EPA's Technical Support Document (TSD) Section 1.3.4 recommends an ACR of 10.

Irrigation Season

For the acute criterion, no mixing zone is allowed. The ACR is 10 Therefore,

WLAa = acute water quality criterion * 10 = 3TUa,c

For the chronic criterion,

$$WLA_c = \frac{(1\ TUc * 11.9\ mgd * 20\%) + (1\ TUc * 1.16\ mgd) - (0\ TUc * 11.9\ mgd * 20\%)}{1.16\ mgd}$$

WLA_c = 3 TUc

Non-irrigation Season

For the acute criteria, no mixing zone is allowed. The ACR is 10, therefore

WLA_a = acute water quality criterion * 10 = 3 TUa,c

For the chronic criterion

WLA_c = chronic water quality criterion = 1 TUc

Table E-14. Whole Effluent Toxicity Wasteload Allocations

Whole Effluent Toxicity WLAs	Irrigation Season	Non-Irrigation Season
Acute	3 TUa,c**	3 TUa,c**
Chronic	3 TUc	1 TUc

**TUa,c is when acute toxicity is being expressed in chronic toxic units (TUc). TUa,c should be treated as TUc, which is defined in Section D of the permit.

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

$$LTA_a = WLA_a \text{ X } \exp[0.5\sigma^2 - z\sigma] \text{ (1-day average)}$$

$$LTA_c = WLA_c \text{ X } \exp[0.5\sigma_4^2 - z\sigma_{30}] \text{ (4-day average)}$$

where,

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

$\sigma_4^2 \quad = \quad \ln(CV^2/4 + 1)$

$z \quad = \quad$ 2.326 for 99th percentile probability basis

<u>Irrigation Season</u>

For the irrigation season, the CV is 0.6, $\sigma = 0.55$, $\sigma_4 = 0.29$

$$\sigma = (\ln(0.6^2 + 1))^{1/2} = 0.55$$

$$\sigma_4 = (\ln(0.6^2/4 + 1))^{1/2} = 0.29$$

LTA_a = 3 TUa,c X $\exp[0.5 \text{ X } 0.55^2 - 2.326 \text{ X } 0.55]$

$LTA_{a,c}$ = 0.98 TUa,c

LTA_c = 3 TUc X $\exp[0.5 \text{ X } 0.29^2 - 2.326 \text{ X } 0.29]$

LTA_c = 1.6 TUc

<u>Non-irrigation Season</u>

For the non-irrigation season, the same data set applies where CV is 0.6, $\sigma = 0.55$, $\sigma_4 = 0.29$.

$LTA_{a,c}$ = 3 TUa,c X $\exp[0.5 \text{ X } 0.55^2 - 2.326 \text{ X } 0.55]$

$LTA_{a,c}$ = 0.98 TUa,c

LTA_c = 1 TUc X $\exp[0.5 \text{ X } 0.29^2 - 2.326 \text{ X } 0.29]$

LTA_c = 0.53 TUc

The LTAs are compared and the most stringent is used to develop the daily maximum and monthly average permit limits. In this case, the acute LTA is the most stringent for the Irrigation Season and the chronic LTA is the most stringent for the Non-irrigation Season.

Table E-15. Whole Effluent Toxicity Long-Term Averages

Whole Effluent Toxicity LTAs	Irrigation Season	Non-Irrigation Season
Acute	0.98 TUa,c**	0.98 TUa,c**
Chronic	1.6 TUc	0.53 TUc
Most stringent	0.98 TUa,c**	0.53 TUc

**TUa,c is when acute toxicity is being expressed in chronic toxic units (TUc). TUa,c should be treated as TUc, which is defined in Section D of the permit.

Step 2: Derive the maximum daily (MDL) and average monthly (AML) permit limits

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

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

where:

σ = square root $(\ln(CV^2 + 1))$ = 0.55
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = 0.60
$LTA_{irrigation}$ = 0.98 TUa,c
$LTA_{non\text{-}irrigation}$ = 0.53 TUc

The maximum daily limits are calculated as follows:

$MDL_{irrigation}$ = 0.98 TUa,c x $\exp[2.326 \times 0.55 - 0.5 \times 0.55^2]$

$MDL_{irrigation}$ = 3.0 TUa,c

$MDL_{non\text{-}irrigation}$ = 0.53 TUc X $\exp[2.326 \times 0.55 - 0.5 \times 0.55^2]$

$MDL_{non\text{-}irrigation}$ = 1.6 TUc

The average monthly limit is calculated as follows:

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

where:

σ = square root $[\ln(CV^2/n + 1)]$; 0.29
z = 1.645 for 95th percentile probability basis
CV = coefficient of variation; 0.60
n =4

$AML_{irrigation}$= 0.98 TUa,c X $\exp[1.645 \times 0.29 - 0.5 \times 0.29^2]$

$AML_{irrigation}$= 1.5 TU a,c

$AML_{non\text{-}irrigation}$ = 0.53 TUc X $\exp[1.645 \times 0.29 - 0.5 \times 0.29^2]$

$AML_{non\text{-}irrigation}$ = 0.83 TUc

When an NPDES discharge is to a zero flow stream, as is the case here during the non-irrigation season, the 2010 TTT recommends establishing a monthly median limit of 1 TUc for chronic WET. When a discharge is to a zero flow stream the statistically calculated AML is usually less than 1 TUc, and under these circumstances chronic WET test results showing no toxicity in 100% effluent are reported as censored values at the most hazardous effluent concentration possible to test (i.e., 100%). For statistically-calculated chronic WET limits less than 1 TUc where there is no mixing or zero flow, the RWC necessary to test for compliance with this limit will be greater than 100% effluent, which is not possible (i.e., 0.8 TUc=RWC of 125% effluent). Under these situations, and in conjunction with a statistically-calculated MDL and routine WET monitoring using the most sensitive test species identified, the 2010 TTT recommends establishing a monthly median limit of 1 TUc for chronic WET in lieu of a AML at either 1 TUc or a statistically-calculated value less than 1 TUc.

Table E-16. Whole Effluent Toxicity NPDES Permit Limits

Whole Effluent Toxicity Monthly and Daily Limits	Irrigation Season	Non-Irrigation Season
MDL	3.0 TUa,c	1.6 TUc
AML	1.5 TUa,c	1 TUc

** TUa,c is when acute toxicity is being expressed in chronic toxic units (TUc). TUa,c should be treated as TUc, which is defined in Section D of the permit.

***During the non-irrigation season only, the monthly compliance level for chronic WET is established as a monthly median limit, not an average monthly limit.

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Table E-17 Summary of Permit Limit Derivation for Outfall 001 at Drainage Way No. 2 During the Irrigation Season							
Parameter	Wasteload Allocation (WLA)		Long Term Average (LTA)		Effluent Limits		
	Acute WLA	Chronic WLA	Acute LTA	Chronic LTA	Basis	Maximum daily limit	Average Monthly Limit
Ammonia	5 mg/L	2.5 mg/L	1.9 mg/L	2.0 mg/L	acute	1.2 mg/L	2.5 mg/L
Copper	5.5 µg/L	12 µg/L	2.5 µg/L	10 µg/L	acute	5.5 µg/L	3.4 µg/L
Zinc	52 µg/L	160 µg/L	15 µg/L	120 µg/L	acute	52 µg/L	25 µg/L
Chlorine	19 µg/L	33 µg/L	6.1 µg/L	26 µg/L	acute	19 µg/L	7.5 µg/L
Whole Effluent Toxicity	3 TUa,c**	3 TUc	0.98 TUa,c**	1.6 TUc	acute	3 TUa,c**	1.5 TUa,c**

** TUa,c is when acute toxicity is being expressed in chronic toxic units (TUc). TUa,c should be treated as TUc, which is defined in Part I.D.2.d of the permit.

Table E-18 Summary of Permit Limit Derivation for Outfall 001 at Drainage Way No. 2 During the Non-Irrigation Season							
Parameter	Wasteload Allocation (WLA)		Long Term Average (LTA)		Effluent Limits		
	Acute WLA	Chronic WLA	Acute LTA	Chronic LTA	Basis	Maximum daily limit	Average Monthly Limit
Ammonia	9.5 mg/L	2.8 mg/L	3.5 mg/L	2.3 mg/L	chronic	1.3 mg/L	2.7 mg/L
Copper	5.5 µg/L	4 µg/L	2.5 µg/L	3.4 µg/L	acute	5.5 µg/L	3.4 µg/L
Zinc	52 µg/L	52 µg/L	15 µg/L	39 µg/L	acute	52 µg/L	25 µg/L
Chlorine	19 µg/L	11 µg/L	6.1 µg/L	8.6 µg/L	acute	19 µg/L	7.5 µg/L
Whole Effluent Toxicity	3 TUa,c**	1 TUc	0.98 TUa,c**	0.53 TUc	chronic	1.6 TUc	1.0 TUc

** TUa,c is when acute toxicity is being expressed in chronic toxic units (TUc). TUa,c should be treated as TUc, which is defined in Part I,D.2.d of the permit.

***During the non-irrigation season only, the monthly compliance limit for chronic WET is established as a monthly median limit, not an average monthly limit

Table E-19 Comparison of Technology-based Effluent Limits to Water Quality-based Effluent Limits												
Parameter	**Technology-based Effluent Limits**				**Water quality-based Effluent Limits**				**Proposed Effluent Limits in Draft Permit**			
	AML	AWL	IML	range	AML	AWL	IML	range	AML	AWL	IML	range
BOD_5	30 mg/L	45 mg/L	—	—	—	—	—	—	30 mg/L	45 mg/L	—	—
	290 lbs/day	435 lbs/day			—	—			290 lbs/day	435 lbs/day		
BOD_5, Percent Removal	85	—	—	—	—	—	—	—	85	—	—	—
TSS	30 mg/L	45 mg/L	—	—	—	—	—	—	30 mg/L	45 mg/L	—	—
	290 lbs/day	435 lbs/day			—	—			290 lbs/day	435 lbs/day		
TSS, Percent Removal	85	—	—	—	—	—	—	—	85	—	—	—
Fecal Coliform Bacteria	—	—	—	—	100/100 ml	200/100 ml	—	—	100/100 ml	200/100 ml	—	—
Total Ammonia as N (April 1 to Oct. 31)	—	—	—	—	2.2 mg/l	—	5.0 mg/l	—	2.2 mg/l	—	5.0 mg/l	—
					21 lbs/day	—	48 lbs/day		21 lbs/day	—	48 lbs/day	
Total Ammonia as N (Nov. 1 to March 31)	—	—	—	—	2.7 mg/l		6.2 mg/l	—	2.7 mg/l	—	6.2 mg/l	—
					26 lbs/day	—	60 lbs/day		26 lbs/day	—	60 lbs/day	
Total Residual Chlorine (April 1 to Oct. 31)	0.5 mg/L	0.75 mg/L	—	—	0.013 mg/l	—	0.019 mg/l	—	0.013mg/l	—	0.019 mg/l	—
					0.13 lbs/day		0.18 lbs/day		0.13 lbs/day	—	0.18 lbs/day	
					0.0075 mg/L		0.011		0.0075		0.011 mg/L	

Total Residual Chlorine (Nov. 1 to March 31)	0.5 mg/L	0.75 mg/L	—	—	0.073 lbs/day	—	mg/L 0.11 lbs/day	—	mg/L 0.073 lbs/day	—	0.11 lbs/day	—
Total Zinc (year-round)	—	—	—	—	0.025 mg/L 0.23 lbs/day	—	0.052 mg/L 0.50 lbs/day	—	0.025 mg/L 0.23 lbs/day	—	0.052 mg/L 0.50 lbs/day	—
Total Copper (year-round)	---	---	---	---	0.0034 mg/L	---	0.0055 mg/L	---	0.0034 mg/L	---	0.0055 mg/L	---
Whole Effluent Toxicity (April 1 to October 31)	---	---	---	---	1.5 TUc	---	3.0 TUc	---	1.5 TUc	---	3.0 TUc	---
Whole Effluent Toxicity (November 1 to March 31)	---	---	---	---	1.0 TUc	---	1.6 TUc	---	1.0 TUc	---	1.6 TUc	---

APPENDIX F
ENDANGERED SPECIES ACT

I. Threatened and Endangered Species

Section 7 of the Endangered Species Act (ESA) requires federal agencies to request a consultation with the National Oceanic and Atmospheric Administration-Fisheries (NOAA-Fisheries) and the U.S. Fish and Wildlife Service (USFWS) regarding potential effects an action may have on listed endangered species.

The following federally-listed endangered and threatened species may be located in the vicinity of the discharges. This list was developed from the *Species List* found on the U.S. Fish and Wildlife Services – Species Report at: http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=WA&status=listed. This *Species List* identifies those species under the jurisdiction of USFWS and NOAA-Fisheries.

Endangered Species:	None
Threatened Species:	Middle Columbia River steelhead (*O. mykiss*) Bull Trout (*Salvelinus confluentus*) Ute Ladies'-tresses (*Spiranthes diluvialis*)

II. Potential Effects for Species

EPA has prepared a Biological Assessment for the issuance of the City of Wapato permit and determined that the permitted discharges will have **No Effect** on the Bull trout, and Utes' Ladies Tresses, and the Mid Columbia steelhead. The permit may be modified during its 5-year term if new information on the effects of the discharges on listed species becomes available.

EPA will provide the NOAA-Fisheries with the draft permit and fact sheet and the Biological Evaluation during the public notice period. Any comments received from the agency regarding this determination will be considered prior to issuance of this permit.

APPENDIX G
ESSENTIAL FISH HABITAT ASSESSMENT

An analysis of EFH, in consultation with NOAA Fisheries, is required for any federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities. The objectives of this EFH analysis are to determine whether the EPA action described in sections I and II of the biological assessment would adversely affect designated EFH. For the purpose of this EFH analysis, EPA defines the Action Area as Wanity Slough.

According to the Magnuson-Stevens Fishery Conservation and Management Act (MSA§3), EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth and maturity. For the purpose of interpreting this definition of EFH: "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, and growth to maturity" covers a species' full life cycle (50 CFR 600.01). "Adverse effect" means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g. physical disruption), indirect (e.g. loss of prey), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

This fact sheet and the draft permit will be submitted to NOAA-Fisheries for review during the public notice period. Any recommendations received from NOAA-Fisheries regarding EFH will be considered prior to final reissuance of this permit.

NOAA-Fisheries has requested that EFH assessments contain the following requirements:

1. **Species in the Facility Area.** The October 15, 2008 federal register lists EFH habitat for Chinook and Coho salmon in the Lower Yakima River, and all streams, estuaries, marine waters, and other waterbodies historically accessible to Chinook and Coho in the Lower Yakima (see 73 FR 60991).

2. **Facility Description and Discharge Location**. The facility activities and wastewater sources are described in Part II of this Fact Sheet, and the discharge location is described in Part III.

3. **EFH Evaluation**. The EPA has tentatively determined that the issuance of this permit will not affect any EFH species in the vicinity of the discharge for the following reasons:

   a. The proposed permit has been developed to protect aquatic life species in Wanity Slough. NPDES permits are established to protect water quality in accordance with water quality standards. The standards are developed to protect the designated uses of the waterbody, including growth and propagation of aquatic life and wildlife.

   b. The derivation of permit limits and monitoring requirements for an NPDES discharge include the basic elements of ecological risk analysis as specified in the Technical Support Document (TSD) (EPA, 1991). This analysis includes, but is not limited to, the following: effluent characterization, threshold concentration determination, exposure considerations, dilution modeling and analysis, multiple sources and natural background consideration, fate and transport variability, and monitoring duration and frequency.